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Basic Shell Commands and Text Manipulation Tools



To do - You are currently the root user in your terminal. Before proceeding further, type **exit** and hit the `↵ Enter` key.

Use of Basic Shell Commands

The stty Command

Using this command with the **-a** switch allows you to identify which combination of keys should be used to control a foreground process:

```
trainee@debian8:~$ stty -a
speed 38400 baud; rows 23; columns 80; line = 0;
intr = ^C; quit = ^\; erase = ^?; kill = ^U; eof = ^D; eol = <undef>;
eol2 = <undef>; swch = <undef>; start = ^Q; stop = ^S; susp = ^Z; rprnt = ^R;
werase = ^W; lnext = ^V; flush = ^O; min = 1; time = 0;
-parenb -parodd -cmspar cs8 -hupcl -cstopb cread -clocal -crtscts
-ignbrk -brkint -ignpar -parmrk -inpck -istrip -inlcr -igncr icrnl ixon -ixoff
-iuclc -ixany -imaxbel -iutf8
opost -olcuc -ocrnl onlcr -onocr -onlret -ofill -ofdel nl0 cr0 tab0 bs0 vt0 ff0
isig icanon iexten echo echoe echok -echonl -noflsh -xcase -tostop -echopr
echoctl echoke
```

```
trainee@ubuntu1604:~$ stty -a
speed 38400 baud; rows 26; columns 80; line = 0;
intr = ^C; quit = ^\; erase = ^?; kill = ^U; eof = ^D; eol = <undef>;
```

```
eol2 = <undef>; swtch = <undef>; start = ^Q; stop = ^S; susp = ^Z; rprnt = ^R;
werase = ^W; lnext = ^V; discard = ^O; min = 1; time = 0;
-parenb -parodd -cmspar cs8 -hupcl -cstopb cread -clocal -crtcts
-ignbrk -brkint -ignpar -parmrk -inpck -istrip -inlcr -igncr icrnl ixon -ixoff
-iuclc -ixany -imaxbel -iutf8
opost -olcuc -ocrnl onlcr -onocr -onlret -ofill -ofdel nl0 cr0 tab0 bs0 vt0 ff0
isig icanon iexten echo echoe echok -echonl -noflsh -xcase -tostop -echoprt
echoctl echoke -flusho -extproc
```

```
[trainee@centos7 ~]$ stty -a
speed 38400 baud; rows 26; columns 80; line = 0;
intr = ^C; quit = ^\; erase = ^?; kill = ^U; eof = ^D; eol = <undef>;
eol2 = <undef>; swtch = <undef>; start = ^Q; stop = ^S; susp = ^Z; rprnt = ^R;
werase = ^W; lnext = ^V; flush = ^O; min = 1; time = 0;
-parenb -parodd -cmspar cs8 -hupcl -cstopb cread -clocal -crtcts
-ignbrk -brkint -ignpar -parmrk -inpck -istrip -inlcr -igncr icrnl ixon -ixoff
-iuclc -ixany -imaxbel -iutf8
opost -olcuc -ocrnl onlcr -onocr -onlret -ofill -ofdel nl0 cr0 tab0 bs0 vt0 ff0
isig icanon iexten echo echoe echok -echonl -noflsh -xcase -tostop -echoprt
echoctl echoke
```

```
trainee@SLES12SP1:~> stty -a
speed 38400 baud; rows 24; columns 80; line = 0;
intr = ^C; quit = ^\; erase = ^?; kill = ^U; eof = ^D; eol = <undef>;
eol2 = <undef>; swtch = <undef>; start = ^Q; stop = ^S; susp = ^Z; rprnt = ^R;
werase = ^W; lnext = ^V; flush = ^O; min = 1; time = 0;
-parenb -parodd -cmspar cs8 -hupcl -cstopb cread -clocal -crtcts
-ignbrk -brkint -ignpar -parmrk -inpck -istrip -inlcr -igncr icrnl ixon -ixoff
-iuclc -ixany -imaxbel -iutf8
opost -olcuc -ocrnl onlcr -onocr -onlret -ofill -ofdel nl0 cr0 tab0 bs0 vt0 ff0
isig icanon iexten echo echoe echok -echonl -noflsh -xcase -tostop -echoprt
echoctl echoke
```



The two most important combinations are **intr = ^C** and **susp = ^Z**. The former kills the process whilst the latter suspends its execution.

Command Line Switches



To do : Use the **-help** option of the **stty** command to view the command line switches.

The date command

This command's output gives the current system date and time. The command can also be used to set the system date:

```
trainee@debian8:~$ date
Fri 19 Aug 04:44:26 BST 2016
```

```
trainee@ubuntu1604:~$ date
Fri 30 Sep 15:19:21 CEST 2016
```

```
[trainee@centos7 ~]$ date
Thu 29 Sep 04:53:58 CEST 2016
```

```
trainee@SLES12SP1:~> date
Fri 30 Sep 15:19:54 CEST 2016
```

Command Line Switches



To do : Use the **-help** option of the **date** command to view the command line switches.

The who Command

This command's output shows who is currently connected to the system:

```
trainee@debian8:~$ who
trainee pts/0      2016-08-18 23:33 (10.0.2.2)
```

```
trainee@ubuntu1604:~$ who
trainee pts/0      2016-09-29 20:36 (10.0.2.2)
```

```
[trainee@centos7 ~]$ who
trainee pts/0      2016-09-28 23:29 (gateway)
```

```
trainee@SLES12SP1:~> who
trainee pts/0      2016-09-30 10:24 (10.0.2.2)
```

Command Line Switches



To do : Use the **-help** option of the **who** command to view the command line switches.

The df Command

This command's output shows the free space on each mounted block device:

```
trainee@debian8:~$ df
Filesystem      1K-blocks    Used Available Use% Mounted on
/dev/sda1       9947060 3386724   6031956  36% /
udev            10240      0      10240   0% /dev
tmpfs           101256    4796    96460   5% /run
tmpfs           253132      0    253132   0% /dev/shm
tmpfs           5120       4      5116   1% /run/lock
tmpfs           253132      0    253132   0% /sys/fs/cgroup
tmpfs           50628      0    50628   0% /run/user/1000
```

```
trainee@ubuntu1604:~$ df
Filesystem      1K-blocks    Used Available Use% Mounted on
udev            230832      0    230832   0% /dev
tmpfs           50028    2864    47164   6% /run
/dev/sda1       9480420 4269160  4706636  48% /
tmpfs           250124      0    250124   0% /dev/shm
tmpfs           5120       4      5116   1% /run/lock
tmpfs           250124      0    250124   0% /sys/fs/cgroup
tmpfs           50028      0    50028   0% /run/user/1000
```

```
[trainee@centos7 ~]$ df
Filesystem      1K-blocks    Used Available Use% Mounted on
/dev/sda2       10229760 4274948  5954812  42% /
devtmpfs        236036      0    236036   0% /dev
tmpfs           250388      0    250388   0% /dev/shm
tmpfs           250388    4716    245672   2% /run
tmpfs           250388      0    250388   0% /sys/fs/cgroup
tmpfs           250388      72    250316   1% /tmp
/dev/sda1       201388 201368      20 100% /boot
tmpfs           50080      0    50080   0% /run/user/1000
```

```
trainee@SLES12SP1:~> df
```

```
Filesystem      1K-blocks    Used Available Use% Mounted on
/dev/sda2      18867200 3510848 15185952 19% /
devtmpfs        188376      0      188376  0% /dev
tmpfs          197260      0      197260  0% /dev/shm
tmpfs          197260     5716     191544  3% /run
tmpfs          197260      0      197260  0% /sys/fs/cgroup
/dev/sda2      18867200 3510848 15185952 19% /.snapshots
/dev/sda2      18867200 3510848 15185952 19% /var/lib/mariadb
/dev/sda2      18867200 3510848 15185952 19% /var/lib/libvirt/images
/dev/sda2      18867200 3510848 15185952 19% /var/lib/mailman
/dev/sda2      18867200 3510848 15185952 19% /var/tmp
/dev/sda2      18867200 3510848 15185952 19% /var/lib/pgsql
/dev/sda2      18867200 3510848 15185952 19% /usr/local
/dev/sda2      18867200 3510848 15185952 19% /tmp
/dev/sda2      18867200 3510848 15185952 19% /var/spool
/dev/sda2      18867200 3510848 15185952 19% /srv
/dev/sda2      18867200 3510848 15185952 19% /var/opt
/dev/sda2      18867200 3510848 15185952 19% /opt
/dev/sda2      18867200 3510848 15185952 19% /var/log
/dev/sda2      18867200 3510848 15185952 19% /var/lib/mysql
/dev/sda2      18867200 3510848 15185952 19% /home
/dev/sda2      18867200 3510848 15185952 19% /var/crash
/dev/sda2      18867200 3510848 15185952 19% /var/lib/named
/dev/sda2      18867200 3510848 15185952 19% /boot/grub2/x86_64-efi
/dev/sda2      18867200 3510848 15185952 19% /boot/grub2/i386-pc
```

The units are shown as **blocks**. In order to **humanize** the output, it is possible to use the **-h** switch (also known as a **parameter**, **option** or **flag**):

```
trainee@debian8:~$ df -h
Filesystem      Size  Used Avail Use% Mounted on
/dev/sda1       9.5G  3.3G  5.8G  36% /
udev            10M   0    10M   0% /dev
tmpfs           99M   4.7M  95M   5% /run
tmpfs           248M  0    248M  0% /dev/shm
```

```
tmpfs          5.0M  4.0K  5.0M   1% /run/lock
tmpfs          248M   0  248M   0% /sys/fs/cgroup
tmpfs          50M    0   50M   0% /run/user/1000
```

```
trainee@ubuntu1604:~$ df -h
Filesystem      Size  Used Avail Use% Mounted on
udev            226M   0  226M   0% /dev
tmpfs           49M   2.8M   47M   6% /run
/dev/sda1       9.1G  4.1G  4.5G  48% /
tmpfs           245M   0  245M   0% /dev/shm
tmpfs           5.0M  4.0K  5.0M   1% /run/lock
tmpfs           245M   0  245M   0% /sys/fs/cgroup
tmpfs           49M   0    49M   0% /run/user/1000
```

```
[trainee@centos7 ~]$ df -h
Filesystem      Size  Used Avail Use% Mounted on
/dev/sda2       9.8G  4.1G  5.7G  42% /
devtmpfs        231M   0  231M   0% /dev
tmpfs           245M   0  245M   0% /dev/shm
tmpfs           245M  4.7M  240M   2% /run
tmpfs           245M   0  245M   0% /sys/fs/cgroup
tmpfs           245M   72K  245M   1% /tmp
/dev/sda1       197M  197M   20K 100% /boot
tmpfs           49M   0    49M   0% /run/user/1000
```

```
trainee@SLES12SP1:~> df -h
Filesystem      Size  Used Avail Use% Mounted on
/dev/sda2       18G  3.4G   15G  19% /
devtmpfs        184M   0  184M   0% /dev
tmpfs           193M   0  193M   0% /dev/shm
tmpfs           193M  5.6M  188M   3% /run
tmpfs           193M   0  193M   0% /sys/fs/cgroup
/dev/sda2       18G  3.4G   15G  19% /.snapshots
/dev/sda2       18G  3.4G   15G  19% /var/lib/mariadb
```

```
/dev/sda2      18G  3.4G  15G  19% /var/lib/libvirt/images
/dev/sda2      18G  3.4G  15G  19% /var/lib/mailman
/dev/sda2      18G  3.4G  15G  19% /var/tmp
/dev/sda2      18G  3.4G  15G  19% /var/lib/pgsql
/dev/sda2      18G  3.4G  15G  19% /usr/local
/dev/sda2      18G  3.4G  15G  19% /tmp
/dev/sda2      18G  3.4G  15G  19% /var/spool
/dev/sda2      18G  3.4G  15G  19% /srv
/dev/sda2      18G  3.4G  15G  19% /var/opt
/dev/sda2      18G  3.4G  15G  19% /opt
/dev/sda2      18G  3.4G  15G  19% /var/log
/dev/sda2      18G  3.4G  15G  19% /var/lib/mysql
/dev/sda2      18G  3.4G  15G  19% /home
/dev/sda2      18G  3.4G  15G  19% /var/crash
/dev/sda2      18G  3.4G  15G  19% /var/lib/named
/dev/sda2      18G  3.4G  15G  19% /boot/grub2/x86_64-efi
/dev/sda2      18G  3.4G  15G  19% /boot/grub2/i386-pc
```

Command Line Switches



To do : Use the **-help** option of the **df** command to view the command line switches.

The free Command

This command's output shows the memory usage:

```
trainee@debian8:~$ free
              total        used         free       shared    buffers     cached
Mem:          506268      499724         6544          3048     125976     121412
```

```

-/+ buffers/cache: 252336 253932
Swap: 2046972 1756 2045216

```

```
traine@ubuntu1604:~$ free
```

```

      total        used         free       shared  buff/cache   available
Mem:    500252      88116         8820         1460     403316     387464
Swap:   1997820      10604        1987216

```

```
[traine@centos7 ~]$ free
```

```

      total        used         free       shared  buff/cache   available
Mem:    500780     192460         11580         3356     296740     245128
Swap:   2096124         3852        2092272

```

```
traine@SLES12SP1:~> free
```

```

      total        used         free       shared    buffers     cached
Mem:    394524     385872         8652         5120         452       296176
-/+ buffers/cache: 89244 305280
Swap:   2103292         600       2102692

```

The units are shown as **blocks**. In order to **humanize** the output, it is possible to use the **-h** switch:

```
traine@debian8:~$ free -h
```

```

      total        used         free       shared    buffers     cached
Mem:    494M       488M         6.3M         3.0M       123M       118M
-/+ buffers/cache: 246M 247M
Swap:   2.0G       1.7M         2.0G

```

```
traine@ubuntu1604:~$ free -h
```

```

      total        used         free       shared  buff/cache   available
Mem:    488M       86M         8.5M         1.4M       393M       378M
Swap:   1.9G       10M         1.9G

```

```
[traine@centos7 ~]$ free -h
```

```

      total        used         free       shared  buff/cache   available

```

```
Mem:      489M      188M      11M      3.3M      289M      239M
Swap:     2.0G      3.8M      2.0G
```

```
trainee@SLES12SP1:~> free -h
              total        used         free      shared    buffers     cached
Mem:          385M        376M        8.4M         5.0M         452K         289M
-/+ buffers/cache:      87M        298M
Swap:         2.0G         600K         2.0G
```

Command Line Switches



To do : Use the **-help** option of the **free** command to view the command line switches.

The whoami Command

This command's output indicates the user name associated with the current effective user ID:

```
trainee@debian8:~$ whoami
trainee
```

```
trainee@ubuntu1604:~$ whoami
trainee
```

```
[trainee@centos7 ~]$ whoami
trainee
```

```
trainee@SLES12SP1:~> whoami
trainee
```

Now become the system administrator **root**:

```
trainee@debian8:~$ su -  
Password: fenestros  
root@debian8:~#
```

```
trainee@ubuntu1604:~$ sudo su -  
[sudo] password for trainee: trainee  
root@ubuntu1604:~#
```

```
[trainee@centos7 ~]$ su -  
Password: fenestros  
Last login: Wed Sep 28 12:08:28 CEST 2016 on pts/0
```

```
trainee@SLES12SP1:~> su -  
Password: fenestros  
SLES12SP1:~ #
```



Important : Note that the password will not be visible.

Now use the **whoami** command again:

```
root@debian8:~# whoami  
root  
root@debian8:~#
```

```
root@ubuntu1604:~# whoami  
root  
root@ubuntu1604:~#
```

```
[root@centos7 ~]# whoami
```

```
root
[root@centos7 ~]#
```

```
SLES12SP1:~ # whoami
root
SLES12SP1:~ #
```



Important : Note the current effective user ID is root.

Finally execute the **exit** command to return as **trainee**:

```
root@debian8:~# exit
logout
trainee@debian8:~
```

```
root@ubuntu1604:~# exit
logout
trainee@ubuntu1604:~$
```

```
[root@centos7 ~]# exit
logout
[trainee@centos7 ~]$
```

```
SLES12SP1:~ # exit
logout
trainee@SLES12SP1:~>
```

Command Line Switches





To do : Use the **-help** option of the **whoami** command to view the command line switches.

The pwd Command

This command's output shows the current working directory:

```
trainee@debian8:~$ pwd  
/home/trainee
```

```
trainee@ubuntu1604:~$ pwd  
/home/trainee
```

```
[trainee@centos7 ~]$ pwd  
/home/trainee
```

```
trainee@SLES12SP1:~> pwd  
/home/trainee
```

Command Line Switches



To do : Use the **help** command with **pwd** option to view the command line switches.

The cd Command

This command's output changes the current working directory to that specified by the **argument**:

```
trainee@debian8:~$ cd /tmp
trainee@debian8:/tmp$ pwd
/tmp
trainee@debian8:/tmp$
```

```
trainee@ubuntu1604:~$ cd /tmp
trainee@ubuntu1604:/tmp$ pwd
/tmp
trainee@ubuntu1604:/tmp$
```

```
[trainee@centos7 ~]$ cd /tmp
[trainee@centos7 tmp]$ pwd
/tmp
[trainee@centos7 tmp]$
```

```
trainee@SLES12SP1:~> cd /tmp
trainee@SLES12SP1:/tmp> pwd
/tmp
trainee@SLES12SP1:/tmp>
```

Command Line Switches



To do : Use the **help** command with **cd** option to view the command line switches.

The ls Command

This command's output lists information about the files in the directory specified as an argument. If no argument is specified, the output lists the files in the current working directory:

```
trainee@debian8:/tmp$ ls
hsperfdata_root  inode  pulse-PKdhtXMmr18n
```

```
trainee@ubuntu1604:/tmp$ ls
hsperfdata_root
inode
systemd-private-cd33d40e1d3a4e08a9cde3de3603311e-systemd-timesyncd.service-bxC1MJ
```

```
[trainee@centos7 tmp]$ ls
hsperfdata_root  inode  systemd-private-45071248a58f4fd2a4de940a5734c8ec-cups.service-0Dc5L6
```

```
trainee@SLES12SP1:/tmp> ls
hsperfdata_root
inode
managera1411267841657715235client
managera3336001029897679475server
managera4847938942232964844client
managera5050357016347721452server
systemd-private-04f820fa26c745be8ddba814c6292f21-rtkit-daemon.service-o4lKP5
systemicontmp5578677472245134133dat
systemicontmp7082392205020802884dat
```

Command Line Switches



To do : Use the **-help** option of the **ls** command to view the command line switches.

The lsof Command

This command's output shows information about open files:

```
trainee@debian8:/tmp$ su -
Password: fenestros
root@debian8:~# lsof | more
COMMAND      PID   TID     USER   FD      TYPE          DEVICE  SIZE/OFF      NODE NAME
systemd       1     root   cwd     DIR       8,1        4096          2 /
systemd       1     root   rtd     DIR       8,1        4096          2 /
systemd       1     root   txt     REG       8,1     1309064     26423 /lib/systemd/systemd
systemd       1     root   mem     REG       8,1        18640     26081 /lib/x86_64-linux-
gnu/libattr.so.1.1.0
systemd       1     root   mem     REG       8,1        14664     26064 /lib/x86_64-linux-
gnu/libdl-2.19.so
systemd       1     root   mem     REG       8,1     448440     26091 /lib/x86_64-linux-
gnu/libpcr.so.3.13.1
systemd       1     root   mem     REG       8,1        31784     26076 /lib/x86_64-linux-
gnu/librt-2.19.so
systemd       1     root   mem     REG       8,1        92888     26135 /lib/x86_64-linux-
gnu/libkmod.so.2.2.8
systemd       1     root   mem     REG       8,1        19016     26113 /lib/x86_64-linux-
gnu/libcap.so.2.24
systemd       1     root   mem     REG       8,1     113024     26093 /lib/x86_64-linux-
gnu/libaudit.so.1.0.0
systemd       1     root   mem     REG       8,1        64024     26096 /lib/x86_64-linux-
gnu/libpam.so.0.83.1
systemd       1     root   mem     REG       8,1     142728     26137 /lib/x86_64-linux-
gnu/libselinux.so.1
systemd       1     root   mem     REG       8,1     1738176     26061 /lib/x86_64-linux-
gnu/libc-2.19.so
systemd       1     root   mem     REG       8,1     137440     26041 /lib/x86_64-linux-
gnu/libpthread-2.19.so
systemd       1     root   mem     REG       8,1     140928     26058 /lib/x86_64-linux-
gnu/ld-2.19.so
systemd       1     root   0u     CHR       1,3         0t0         5593 /dev/null
systemd       1     root   1u     CHR       1,3         0t0         5593 /dev/null
systemd       1     root   2u     CHR       1,3         0t0         5593 /dev/null
```

```
systemd      1          root    3w      CHR      1,11     0t0     5599 /dev/kmsg
systemd      1          root    4u      0000     0,9     0       5589 anon_inode
systemd      1          root    5u      0000     0,9     0       5589 anon_inode
systemd      1          root    6r      DIR      0,20    0       1 /sys/fs/cgroup/systemd
--More--
```

```
trainee@ubuntu1604:/tmp$ sudo su -
[sudo] password for trainee: trainee
root@ubuntu1604:~# lsof | more
COMMAND      PID   TID          USER    FD      TYPE          DEVICE  SIZE/OFF      NODE NAME
systemd      1          root    cwd      DIR          8,1      4096           2 /
systemd      1          root    rtd      DIR          8,1      4096           2 /
systemd      1          root    txt      REG          8,1    1577232      325621 /lib/systemd/systemd
systemd      1          root    mem      REG          8,1      18976      266610 /lib/x86_64-linux-
gnu/libuuid.so.1.3.0
systemd      1          root    mem      REG          8,1    262408      266418 /lib/x86_64-linux-
gnu/libblkid.so.1.1.0
systemd      1          root    mem      REG          8,1      14608      266450 /lib/x86_64-linux-
gnu/libdl-2.23.so
systemd      1          root    mem      REG          8,1    456632      266555 /lib/x86_64-linux-
gnu/libpcr.so.3.13.2
systemd      1          root    mem      REG          8,1    1864888      266426 /lib/x86_64-linux-
gnu/libc-2.23.so
systemd      1          root    mem      REG          8,1    138744      266572 /lib/x86_64-linux-
gnu/libpthread-2.23.so
systemd      1          root    mem      REG          8,1    286824      266502 /lib/x86_64-linux-
gnu/libmount.so.1.1.0
systemd      1          root    mem      REG          8,1      64144      266408 /lib/x86_64-linux-
gnu/libapparmor.so.1.4.0
systemd      1          root    mem      REG          8,1      92864      266489 /lib/x86_64-linux-
gnu/libkmod.so.2.3.0
systemd      1          root    mem      REG          8,1    117288      266416 /lib/x86_64-linux-
gnu/libaudit.so.1.0.0
systemd      1          root    mem      REG          8,1      55904      266542 /lib/x86_64-linux-
```

```

gnu/libpam.so.0.83.1
systemd      1          root mem      REG      8,1  252152    266583 /lib/x86_64-linux-
gnu/libseccomp.so.2.2.3
systemd      1          root mem      REG      8,1   31712    266580 /lib/x86_64-linux-
gnu/librt-2.23.so
systemd      1          root mem      REG      8,1   23128    266429 /lib/x86_64-linux-
gnu/libcap.so.2.24
systemd      1          root mem      REG      8,1  130224    266584 /lib/x86_64-linux-
gnu/libselinux.so.1
systemd      1          root mem      REG      8,1  162632    266398 /lib/x86_64-linux-
gnu/ld-2.23.so
systemd      1          root 0u        CHR      1,3     0t0       6 /dev/null
systemd      1          root 1u        CHR      1,3     0t0       6 /dev/null
systemd      1          root 2u        CHR      1,3     0t0       6 /dev/null
--More--

```

```

[trainee@centos7 tmp]$ su -
Password: fenestros
Last login: Thu Sep 29 06:24:28 CEST 2016 on pts/0
[root@centos7 ~]# lsof | more
COMMAND      PID   TID      USER    FD      TYPE          DEVICE  SIZE/OFF      NODE NAME
systemd      1     1       root    cwd      DIR           8,2     4096          128 /
systemd      1     1       root    rtd      DIR           8,2     4096          128 /
systemd      1     1       root    txt      REG           8,2    1494056    33607555
/usr/lib/systemd/systemd
systemd      1     1       root    mem      REG           8,2     20032    17241167
/usr/lib64/libuuid.so.1.3.0
systemd      1     1       root    mem      REG           8,2    252696    20114965
/usr/lib64/libblkid.so.1.1.0
systemd      1     1       root    mem      REG           8,2     90632    18751025
/usr/lib64/libz.so.1.2.7
systemd      1     1       root    mem      REG           8,2     19888    17326380
/usr/lib64/libattr.so.1.1.0
systemd      1     1       root    mem      REG           8,2     19520    17239651

```

```

/usr/lib64/libdl-2.17.so
systemd      1          root mem      REG          8,2    153192    18023397
/usr/lib64/liblzma.so.5.0.99
systemd      1          root mem      REG          8,2    398272    18105157
/usr/lib64/libpcre.so.1.2.0
systemd      1          root mem      REG          8,2    2107816   17239525
/usr/lib64/libc-2.17.so
systemd      1          root mem      REG          8,2    142304    17240882
/usr/lib64/libpthread-2.17.so
systemd      1          root mem      REG          8,2     88720    17511831
/usr/lib64/libgcc_s-4.8.5-20150702.so.1
systemd      1          root mem      REG          8,2     44096    17241011
/usr/lib64/librt-2.17.so
systemd      1          root mem      REG          8,2    260784    20114966
/usr/lib64/libmount.so.1.1.0
systemd      1          root mem      REG          8,2     91768    18023376
/usr/lib64/libkmod.so.2.2.10
systemd      1          root mem      REG          8,2    118792    17326381
/usr/lib64/libaudit.so.1.0.0
systemd      1          root mem      REG          8,2     61648    18105139
/usr/lib64/libpam.so.0.83.1
systemd      1          root mem      REG          8,2     20024    17326423
/usr/lib64/libcap.so.2.22
systemd      1          root mem      REG          8,2    147120    18447456
/usr/lib64/libselinux.so.1
systemd      1          root mem      REG          8,2    164440    21744303 /usr/lib64/ld-2.17.so
systemd      1          root mem      REG          8,2    1333123    50334524
/etc/selinux/targeted/contexts/files/file_contexts.bin
--More--

```

```
trainee@SLES12SP1:/tmp> su -
```

```
Password:
```

```
SLES12SP1:~ # lsof | more
```

COMMAND	PID	TID	USER	FD	TYPE	DEVICE	SIZE/OFF	NODE	NAME
---------	-----	-----	------	----	------	--------	----------	------	------

```

systemd      1          root  cwd      DIR      0,34    156      256 /
systemd      1          root  rtd      DIR      0,34    156      256 /
systemd      1          root  txt      REG      0,34   1218976  74832 /usr/lib/systemd/systemd
systemd      1          root  mem      REG      0,34    18904   23416 /lib64/libdl-2.19.so
systemd      1          root  mem      REG      0,34   416064  24152 /usr/lib64/libpcre.so.1.2.1
systemd      1          root  mem      REG      0,34  1974416  23410 /lib64/libc-2.19.so
systemd      1          root  mem      REG      0,34   137440  23438 /lib64/libpthread-2.19.so
systemd      1          root  mem      REG      0,34    42672  23442 /lib64/librt-2.19.so
systemd      1          root  mem      REG      0,34   150128  24032
/usr/lib64/libseccomp.so.2.1.0
systemd      1          root  mem      REG      0,34    43960   25095 /lib64/libapparmor.so.1.0.4
systemd      1          root  mem      REG      0,34    84864   24581 /usr/lib64/libkmod.so.2.2.7
systemd      1          root  mem      REG      0,34    18976   24919 /lib64/libcap.so.2.22
systemd      1          root  mem      REG      0,34   100312  24963
/usr/lib64/libaudit.so.1.0.0
systemd      1          root  mem      REG      0,34    60096   59333 /lib64/libpam.so.0.83.1
systemd      1          root  mem      REG      0,34    40880   23873 /lib64/libwrap.so.0.7.6
systemd      1          root  mem      REG      0,34   138792  25858 /lib64/libselinux.so.1
systemd      1          root  mem      REG      0,34   158192  23402 /lib64/ld-2.19.so
systemd      1          root  0u       CHR      1,3      0t0     4298 /dev/null
systemd      1          root  1u       CHR      1,3      0t0     4298 /dev/null
systemd      1          root  2u       CHR      1,3      0t0     4298 /dev/null
systemd      1          root  3r      0000     0,10      0     4268 anon_inode
systemd      1          root  4u      0000     0,10      0     4268 anon_inode
--More--

```

Command Line Switches



To do : Use the **-help** option of the **lsuf** command to view the command line switches.

The touch Command

This command updates the access and modification times of one or several file(s) to the current time. If the file does not exist, the system creates an empty file:

```
root@debian8:~# exit
logout
trainee@debian8:/tmp$ touch test
trainee@debian8:/tmp$ ls
hsperfdata_root  inode  pulse-PKdhtXMmr18n  test
```

```
root@ubuntu1604:~# exit
logout
trainee@ubuntu1604:/tmp$ touch test
trainee@ubuntu1604:/tmp$ ls
hsperfdata_root
inode
systemd-private-cd33d40e1d3a4e08a9cde3de3603311e-systemd-timesyncd.service-bxC1MJ
test
```

```
[root@centos7 ~]# exit
logout
[trainee@centos7 tmp]$ touch test
[trainee@centos7 tmp]$ ls
hsperfdata_root  systemd-private-45071248a58f4fd2a4de940a5734c8ec-cups.service-0Dc5L6
inode             test
```

```
SLES12SP1:~ # exit
logout
trainee@SLES12SP1:/tmp> touch test
trainee@SLES12SP1:/tmp> ls
hsperfdata_root
inode
```

```
managera1411267841657715235client
managera3336001029897679475server
managera4847938942232964844client
managera5050357016347721452server
systemd-private-04f820fa26c745be8ddba814c6292f21-rtkit-daemon.service-o4lKP5
systemicontmp5578677472245134133dat
systemicontmp7082392205020802884dat
test
```

Command Line Switches



To do : Use the **-help** option of the **touch** command to view the command line switches.

The echo Command

This command writes the arguments to the standard output (i.e. the screen):

```
trainee@debian8:/tmp$ echo fenestros
fenestros
```

```
trainee@ubuntu1604:/tmp$ echo fenestros
fenestros
```

```
[trainee@centos7 tmp]$ echo fenestros
fenestros
```

```
trainee@SLES12SP1:/tmp> echo fenestros
fenestros
```

Command Line Switches



To do : Use the **help** command with **echo** option to view the command line switches.

The cp Command

This command is used to copy a source to a destination or multiple sources to a directory:

```
trainee@debian8:/tmp$ cp test ~
trainee@debian8:/tmp$ ls -l ~
total 36
drwxr-xr-x 2 trainee trainee 4096 May  1 20:42 Desktop
drwxr-xr-x 2 trainee trainee 4096 May  1 20:42 Documents
drwxr-xr-x 2 trainee trainee 4096 May  1 20:42 Downloads
drwxr-xr-x 2 trainee trainee 4096 May  1 20:42 Music
drwxr-xr-x 2 trainee trainee 4096 May  1 20:42 Pictures
drwxr-xr-x 2 trainee trainee 4096 May  1 20:42 Public
drwxr-xr-x 2 trainee trainee 4096 May  1 20:42 Templates
-rw-r--r-- 1 trainee trainee   0 Aug 19 16:14 test
drwxr-xr-x 2 trainee trainee 4096 May  1 20:42 Videos
-rw-r--r-- 1 trainee trainee  391 Aug 18 23:34 vitext
```

```
trainee@ubuntu1604:/tmp$ cp test ~
trainee@ubuntu1604:/tmp$ ls -l ~
total 48
drwxr-xr-x 2 trainee trainee 4096 mai   3 08:03 Desktop
drwxr-xr-x 2 trainee trainee 4096 mai   3 08:03 Documents
drwxr-xr-x 2 trainee trainee 4096 mai   3 08:03 Downloads
-rw-r--r-- 1 trainee trainee 8980 mai   3 07:27 examples.desktop
drwxr-xr-x 2 trainee trainee 4096 mai   3 08:03 Music
```

```
drwxr-xr-x 2 trainee trainee 4096 mai  3 08:03 Pictures
drwxr-xr-x 2 trainee trainee 4096 mai  3 08:03 Public
drwxr-xr-x 2 trainee trainee 4096 mai  3 08:03 Templates
-rw-rw-r-- 1 trainee trainee  0 oct.  4 13:31 test
drwxr-xr-x 2 trainee trainee 4096 mai  3 08:03 Videos
-rw-rw-r-- 1 trainee trainee  442 sept. 30 11:35 vitext
```

```
[trainee@centos7 tmp]$ cp test ~
[trainee@centos7 tmp]$ ls -l ~
total 4
drwxr-xr-x. 2 trainee trainee  6 Apr 30 11:54 Desktop
drwxr-xr-x. 2 trainee trainee  6 Apr 30 11:54 Documents
drwxr-xr-x. 2 trainee trainee  6 Apr 30 11:54 Downloads
drwxr-xr-x. 2 trainee trainee  6 Apr 30 11:54 Music
drwxr-xr-x. 2 trainee trainee  6 Apr 30 11:54 Pictures
drwxr-xr-x. 2 trainee trainee  6 Apr 30 11:54 Public
drwxr-xr-x. 2 trainee trainee  6 Apr 30 11:54 Templates
-rw-rw-r--. 1 trainee trainee  0 Sep 29 17:23 test
drwxr-xr-x. 2 trainee trainee  6 Apr 30 11:54 Videos
-rw-rw-r--. 1 trainee trainee 442 Sep 29 00:53 vitext
```

```
trainee@SLES12SP1:/tmp> cp test ~
trainee@SLES12SP1:/tmp> ls -l ~
total 4
drwxr-xr-x 1 trainee users  0 May  1 15:58 bin
drwxr-xr-x 1 trainee users  0 May  2 16:11 Desktop
drwxr-xr-x 1 trainee users  0 May  2 16:11 Documents
drwxr-xr-x 1 trainee users  0 May  2 16:11 Downloads
drwxr-xr-x 1 trainee users  0 May  2 16:11 Music
drwxr-xr-x 1 trainee users  0 May  2 16:11 Pictures
drwxr-xr-x 1 trainee users  0 May  2 16:11 Public
drwxr-xr-x 1 trainee users 20 May  1 15:58 public_html
drwxr-xr-x 1 trainee users  0 May  2 16:11 Templates
-rw-r--r-- 1 trainee users  0 Oct  1 06:01 test
```

```
drwxr-xr-x 1 trainee users  0 May  2 16:11 Videos
-rw-r--r-- 1 trainee users 391 Sep 30 10:27 vitext
```



Note the use of the ~ (tilde) character which is a shortcut to the current user's home directory. In the case of this example :
/home/trainee.

Command Line Switches



To do : Use the **-help** option of the **cp** command to view the command line switches.

The file Command

This command determines a file type:

```
trainee@debian8:/tmp$ file ~/test
/home/trainee/test: empty
```

```
trainee@ubuntu1604:/tmp$ file ~/test
/home/trainee/test: empty
```

```
[trainee@centos7 tmp]$ file ~/test
/home/trainee/test: empty
```

```
trainee@SLES12SP1:/tmp> file ~/test
/home/trainee/test: empty
```



Important - Note that in the case of the first line of the above output, the command **file** is incapable of informing you of the type of file since **test** is empty.

Using the `>` key, redirect the output of **echo fenestros** into the **/home/trainee/test** file as follows:

```
trainee@debian8:/tmp$ echo "fenestros" > ~/test
```

```
trainee@ubuntu1604:/tmp$ echo "fenestros" > ~/test
```

```
[trainee@centos7 tmp]$ echo "fenestros" > ~/test
```

```
trainee@SLES12SP1:/tmp> echo "fenestros" > ~/test
```

Now use the **file** command once again to determine the file type:

```
trainee@debian8:/tmp$ file ~/test  
/home/trainee/test: ASCII text
```

```
trainee@ubuntu1604:/tmp$ file ~/test  
/home/trainee/test: ASCII text
```

```
[trainee@centos7 tmp]$ file ~/test  
/home/trainee/test: ASCII text
```

```
trainee@SLES12SP1:/tmp> file ~/test  
/home/trainee/test: ASCII text
```

Command Line Switches



To do : Use the **-help** option of the **file** command to view the command line switches.

The cat Command

This commands concatenate files, or standard input, to standard output. In the case of only one file as an argument, the effective result is to print the file contents to the screen:

```
trainee@debian8:/tmp$ cat ~/test
fenestros
```

```
trainee@ubuntu1604:/tmp$ cat ~/test
fenestros
```

```
[trainee@centos7 tmp]$ cat ~/test
fenestros
```

```
trainee@SLES12SP1:/tmp> cat ~/test
fenestros
```

Command Line Switches



To do : Use the **-help** option of the **cat** command to view the command line switches.

The mv Command

This command renames a source to a destination or moves sources to a directory:

```
trainee@debian8:/tmp$ mv ~/test .
trainee@debian8:/tmp$ ls -l ~
total 36
drwxr-xr-x 2 trainee trainee 4096 May  1 20:42 Desktop
drwxr-xr-x 2 trainee trainee 4096 May  1 20:42 Documents
drwxr-xr-x 2 trainee trainee 4096 May  1 20:42 Downloads
drwxr-xr-x 2 trainee trainee 4096 May  1 20:42 Music
drwxr-xr-x 2 trainee trainee 4096 May  1 20:42 Pictures
drwxr-xr-x 2 trainee trainee 4096 May  1 20:42 Public
drwxr-xr-x 2 trainee trainee 4096 May  1 20:42 Templates
drwxr-xr-x 2 trainee trainee 4096 May  1 20:42 Videos
-rw-r--r-- 1 trainee trainee  391 Aug 18 23:34 vitext
trainee@debian8:/tmp$ mv test TeSt
trainee@debian8:/tmp$ ls -l
total 16
drwxr-xr-x 2 root      root      4096 Aug 18 11:33 hsuperdata_root
drwxr-xr-x 2 root      root      4096 Aug 18 13:36 inode
drwx----- 2 root      root      4096 Aug 18 11:29 pulse-PKdhtXMr18n
-rw-r--r-- 1 trainee trainee   10 Aug 19 16:20 TeSt
```

```
trainee@ubuntu1604:/tmp$ mv ~/test .
trainee@ubuntu1604:/tmp$ ls -l ~
total 48
drwxr-xr-x 2 trainee trainee 4096 mai   3 08:03 Desktop
drwxr-xr-x 2 trainee trainee 4096 mai   3 08:03 Documents
drwxr-xr-x 2 trainee trainee 4096 mai   3 08:03 Downloads
-rw-r--r-- 1 trainee trainee 8980 mai   3 07:27 examples.desktop
drwxr-xr-x 2 trainee trainee 4096 mai   3 08:03 Music
drwxr-xr-x 2 trainee trainee 4096 mai   3 08:03 Pictures
```

```
drwxr-xr-x 2 trainee trainee 4096 mai   3 08:03 Public
drwxr-xr-x 2 trainee trainee 4096 mai   3 08:03 Templates
drwxr-xr-x 2 trainee trainee 4096 mai   3 08:03 Videos
-rw-rw-r-- 1 trainee trainee  442 sept. 30 11:35 vitext
trainee@ubuntu1604:/tmp$ mv test TeSt
trainee@ubuntu1604:/tmp$ ls -l
total 16
drwxr-xr-x 2 root      root      4096 sept. 28 10:34 hsperrdata_root
drwxr-xr-x 2 root      root      4096 sept. 29 10:32 inode
drwx----- 3 root      root      4096 sept. 29 10:19 systemd-private-cd33d40e1d3a4e08a9cde3de3603311e-systemd-
timesyncd.service-bxC1MJ
-rw-rw-r-- 1 trainee trainee   10 oct.   4 13:36 TeSt
```

```
[trainee@centos7 tmp]$ mv ~/test .
[trainee@centos7 tmp]$ ls -l ~
total 4
drwxr-xr-x. 2 trainee trainee   6 Apr 30 11:54 Desktop
drwxr-xr-x. 2 trainee trainee   6 Apr 30 11:54 Documents
drwxr-xr-x. 2 trainee trainee   6 Apr 30 11:54 Downloads
drwxr-xr-x. 2 trainee trainee   6 Apr 30 11:54 Music
drwxr-xr-x. 2 trainee trainee   6 Apr 30 11:54 Pictures
drwxr-xr-x. 2 trainee trainee   6 Apr 30 11:54 Public
drwxr-xr-x. 2 trainee trainee   6 Apr 30 11:54 Templates
drwxr-xr-x. 2 trainee trainee   6 Apr 30 11:54 Videos
-rw-rw-r--. 1 trainee trainee 442 Sep 29 00:53 vitext
[trainee@centos7 tmp]$ mv test TeSt
[trainee@centos7 tmp]$ ls -l
total 4
drwxr-xr-x. 2 root      root      80 Sep 28 10:52 hsperrdata_root
drwxr-xr-x. 2 root      root     100 Sep 28 12:30 inode
drwx-----. 3 root      root      60 Sep 28 10:49 systemd-private-45071248a58f4fd2a4de940a5734c8ec-cups.service-
ODc5L6
-rw-rw-r--. 1 trainee trainee  10 Sep 29 17:28 TeSt
```

```
trainee@SLES12SP1:/tmp> mv test TeSt
trainee@SLES12SP1:/tmp> ls -l
total 12
drwxr-xr-x 1 root    root      8 Sep 30 10:26 hsperfdata_root
drwxr-xr-x 1 trainee users    48 Aug 18 13:14 inode
-rwxrwxrwx 1 root    root   50048 May  3 14:01 managera1411267841657715235client
-rwxrwxrwx 1 root    root   50048 May  3 14:01 managera3336001029897679475server
-rwxrwxrwx 1 root    root   50048 May  3 14:01 managera4847938942232964844client
-rwxrwxrwx 1 root    root   50048 May  3 14:01 managera5050357016347721452server
drwx----- 1 root    root       6 May  3 13:54 systemd-private-04f820fa26c745be8ddba814c6292f21-rtkit-
daemon.service-o4lKP5
-rw-r--r-- 1 root    root       0 May  3 14:01 systemicontmp5578677472245134133dat
drwxr-xr-x 1 root    root       0 May  3 14:01 systemicontmp7082392205020802884dat
-rw-r--r-- 1 trainee users    10 Oct  1 06:06 TeSt
```



Note the use of the shortcut `.` which indicates the current working directory.

Command Line Switches



To do : Use the **-help** option of the **mv** command to view the command line switches.

The mkdir Command

This command creates the directory(ies) if it (they) does (do) not exist:

```
trainee@debian8:/tmp$ cd ~
```

```
trainee@debian8:~$ mkdir testdir
trainee@debian8:~$ ls
Desktop Documents Downloads Music Pictures Public Templates testdir Videos vitext
```

```
trainee@ubuntu1604:/tmp$ cd ~
trainee@ubuntu1604:~$ mkdir testdir
trainee@ubuntu1604:~$ ls
Desktop Downloads Music Public testdir vitext
Documents examples.desktop Pictures Templates Videos
```

```
[trainee@centos7 tmp]$ cd ~
[trainee@centos7 ~]$ mkdir testdir
[trainee@centos7 ~]$ ls
Desktop Documents Downloads Music Pictures Public Templates testdir Videos vitext
```

```
trainee@SLES12SP1:/tmp> cd ~
trainee@SLES12SP1:~> mkdir testdir
trainee@SLES12SP1:~> ls
bin Documents Music Public Templates Videos
Desktop Downloads Pictures public_html testdir vitext
```

Command Line Switches



To do : Use the **-help** option of the **mkdir** command to view the command line switches.

The rmdir Command

This command removes the directory(ies) if it (they) is (are) **empty**:

```
trainee@debian8:~$ rmdir testdir
trainee@debian8:~$ ls
Desktop  Documents  Downloads  Music  Pictures  Public  Templates  Videos  vitext
```

```
trainee@ubuntu1604:~$ rmdir testdir
trainee@ubuntu1604:~$ ls
Desktop    Downloads      Music    Public    Videos
Documents  examples.desktop  Pictures  Templates  vitext
```

```
[trainee@centos7 ~]$ rmdir testdir
[trainee@centos7 ~]$ ls
Desktop  Documents  Downloads  Music  Pictures  Public  Templates  Videos  vitext
```

```
trainee@SLES12SP1:~> rmdir testdir
trainee@SLES12SP1:~> ls
bin      Documents  Music    Public    Templates  vitext
Desktop  Downloads  Pictures  public_html  Videos
```

Command Line Switches



To do : Use the **-help** option of the **rmdir** command to view the command line switches.

The rm Command

This command removes a directory, empty or not, as well as files:

```
trainee@debian8:~$ mkdir testdir1
trainee@debian8:~$ cd /tmp
trainee@debian8:/tmp$ echo "fenestros" > TeSt
```

```
trainee@debian8:/tmp$ cd ~
trainee@debian8:~$ mv /tmp/TeSt ~/testdir1
trainee@debian8:~$ ls -lR testdir1/
testdir1/:
total 4
-rw-r--r-- 1 trainee trainee 10 Aug 19 17:01 TeSt
trainee@debian8:~$ rmdir testdir1/
rmdir: failed to remove 'testdir1/': Directory not empty
trainee@debian8:~$ rm -rf testdir1/
trainee@debian8:~$ ls
Desktop  Documents  Downloads  Music  Pictures  Public  Templates  Videos  vitext
```

```
trainee@ubuntu1604:~$ mkdir testdir1
trainee@ubuntu1604:~$ cd /tmp
trainee@ubuntu1604:/tmp$ echo "fenestros" > TeSt
trainee@ubuntu1604:/tmp$ cd ~
trainee@ubuntu1604:~$ mv /tmp/TeSt ~/testdir1
trainee@ubuntu1604:~$ ls -lR testdir1/
testdir1/:
total 4
-rw-rw-r-- 1 trainee trainee 10 oct.  4 14:17 TeSt
trainee@ubuntu1604:~$ rmdir testdir1/
rmdir: failed to remove 'testdir1/': Directory not empty
trainee@ubuntu1604:~$ rm -rf testdir1/
trainee@ubuntu1604:~$ ls
Desktop    Downloads      Music    Public    Videos
Documents  examples.desktop  Pictures  Templates  vitext
```

```
[trainee@centos7 ~]$ mkdir testdir1
[trainee@centos7 ~]$ cd /tmp
[trainee@centos7 tmp]$ echo "fenestros" > TeSt
[trainee@centos7 tmp]$ cd ~
[trainee@centos7 ~]$ mv /tmp/TeSt ~/testdir1
[trainee@centos7 ~]$ ls -lR testdir1/
```

```
testdir1/:
total 4
-rw-rw-r--. 1 trainee trainee 10 Sep 29 18:13 TeSt
[trainee@centos7 ~]$ rmdir testdir1/
rmdir: failed to remove 'testdir1/': Directory not empty
[trainee@centos7 ~]$ rm -rf testdir1/
[trainee@centos7 ~]$ ls
Desktop  Documents  Downloads  Music  Pictures  Public  Templates  Videos  vitext
```

```
trainee@SLES12SP1:~> mkdir testdir1
trainee@SLES12SP1:~> cd /tmp
trainee@SLES12SP1:/tmp> echo "fenestros" > TeSt
trainee@SLES12SP1:/tmp> cd ~
trainee@SLES12SP1:~> mv /tmp/TeSt ~/testdir1
trainee@SLES12SP1:~> ls -lR testdir1/
testdir1/:
total 4
-rw-r--r-- 1 trainee users 10 Oct  1 06:47 TeSt
trainee@SLES12SP1:~> rmdir testdir1/
rmdir: failed to remove 'testdir1/': Directory not empty
trainee@SLES12SP1:~> rm -rf testdir1/
trainee@SLES12SP1:~> ls
bin      Documents  Music      Public      Templates  vitext
Desktop  Downloads  Pictures    public_html Videos
```

Command Line Switches



To do : Use the **-help** option of the **rm** command to view the command line switches.

The sort Command

This command writes a sorted concatenation of all files to standard output:

```
trainee@debian8:~$ touch aac abc bca xyz
trainee@debian8:~$ ls
aac bca Documents Music Public Videos xyz
abc Desktop Downloads Pictures Templates vitext
trainee@debian8:~$ ls | sort
aac
abc
bca
Desktop
Documents
Downloads
Music
Pictures
Public
Templates
Videos
vitext
xyz
trainee@debian8:~$ ls | sort -r
xyz
vitext
Videos
Templates
Public
Pictures
Music
Downloads
Documents
Desktop
```

```
bca  
abc  
aac
```

```
trainee@ubuntu1604:~$ touch aac abc bca xyz  
trainee@ubuntu1604:~$ ls  
aac bca Documents examples.desktop Pictures Templates vitext  
abc Desktop Downloads Music Public Videos xyz  
trainee@ubuntu1604:~$ ls | sort  
aac  
abc  
bca  
Desktop  
Documents  
Downloads  
examples.desktop  
Music  
Pictures  
Public  
Templates  
Videos  
vitext  
xyz  
trainee@ubuntu1604:~$ ls | sort -r  
xyz  
vitext  
Videos  
Templates  
Public  
Pictures  
Music  
examples.desktop  
Downloads  
Documents
```

```
Desktop  
bca  
abc  
aac
```

```
[trainee@centos7 ~]$ touch aac abc bca xyz  
[trainee@centos7 ~]$ ls  
aac bca Documents Music Public Videos xyz  
abc Desktop Downloads Pictures Templates vitext  
[trainee@centos7 ~]$ ls | sort  
aac  
abc  
bca  
Desktop  
Documents  
Downloads  
Music  
Pictures  
Public  
Templates  
Videos  
vitext  
xyz  
[trainee@centos7 ~]$ ls | sort -r  
xyz  
vitext  
Videos  
Templates  
Public  
Pictures  
Music  
Downloads  
Documents  
Desktop
```

```
bca  
abc  
aac
```

```
trainee@SLES12SP1:~> ls | sort
```

```
aac  
abc  
bca  
bin  
Desktop  
Documents  
Downloads  
Music  
Pictures  
Public  
public_html  
Templates  
Videos  
vitext  
xyz
```

```
trainee@SLES12SP1:~> ls | sort -r
```

```
xyz  
vitext  
Videos  
Templates  
public_html  
Public  
Pictures  
Music  
Downloads  
Documents  
Desktop  
bin  
bca
```

```
abc  
aac
```



Important - Note the use of the `|` character, called a **pipe**. A pipe is used to channel the standard output of the command that precedes it into the standard input of the command that follows it.

Command Line Switches



To do : Use the **-help** option of the **sort** command to view the command line switches.

The more Command

This command is used to display a long file page by page:

```
trainee@debian8:~$ more /etc/services  
# Network services, Internet style  
#  
# Note that it is presently the policy of IANA to assign a single well-known  
# port number for both TCP and UDP; hence, officially ports have two entries  
# even if the protocol doesn't support UDP operations.  
#  
# Updated from http://www.iana.org/assignments/port-numbers and other  
# sources like http://www.freebsd.org/cgi/cvsweb.cgi/src/etc/services .  
# New ports will be added on request if they have been officially assigned  
# by IANA and used in the real-world or are needed by a debian package.  
# If you need a huge list of used numbers please install the nmap package.
```

```
tcpmux      1/tcp          # TCP port service multiplexer
echo        7/tcp
echo        7/udp
discard     9/tcp          sink null
discard     9/udp          sink null
systat      11/tcp         users
daytime     13/tcp
daytime     13/udp
netstat     15/tcp
qotd        17/tcp          quote
msp         18/tcp          # message send protocol
--More--(4%)
```

```
trainee@ubuntu1604:~$ more /etc/services
# Network services, Internet style
#
# Note that it is presently the policy of IANA to assign a single well-known
# port number for both TCP and UDP; hence, officially ports have two entries
# even if the protocol doesn't support UDP operations.
#
# Updated from http://www.iana.org/assignments/port-numbers and other
# sources like http://www.freebsd.org/cgi/cvsweb.cgi/src/etc/services .
# New ports will be added on request if they have been officially assigned
# by IANA and used in the real-world or are needed by a debian package.
# If you need a huge list of used numbers please install the nmap package.
```

```
tcpmux      1/tcp          # TCP port service multiplexer
echo        7/tcp
echo        7/udp
discard     9/tcp          sink null
discard     9/udp          sink null
systat      11/tcp         users
daytime     13/tcp
daytime     13/udp
```

```
netstat      15/tcp
qotd         17/tcp      quote
msp         18/tcp      # message send protocol
--More-- (4%)
```

```
[trainee@centos7 ~]$ more /etc/services
# /etc/services:
# $Id: services,v 1.55 2013/04/14 ovasik Exp $
#
# Network services, Internet style
# IANA services version: last updated 2013-04-10
#
# Note that it is presently the policy of IANA to assign a single well-known
# port number for both TCP and UDP; hence, most entries here have two entries
# even if the protocol doesn't support UDP operations.
# Updated from RFC 1700, ``Assigned Numbers'' (October 1994).  Not all ports
# are included, only the more common ones.
#
# The latest IANA port assignments can be gotten from
#   http://www.iana.org/assignments/port-numbers
# The Well Known Ports are those from 0 through 1023.
# The Registered Ports are those from 1024 through 49151
# The Dynamic and/or Private Ports are those from 49152 through 65535
#
# Each line describes one service, and is of the form:
#
# service-name  port/protocol  [aliases ...]  [# comment]

tcpmux        1/tcp          # TCP port service multiplexer
--More-- (0%)
```

```
trainee@SLES12SP1:~> more /etc/services
#
# Network services, Internet style
```

```
#
# Note that it is presently the policy of IANA to assign a single well-known
# port number for both TCP and UDP; hence, most entries here have two entries
# even if the protocol doesn't support UDP operations.
#
# This list could be found on:
#       http://www.iana.org/assignments/service-names-port-numbers/service-names-port-numbe
rs.xml
#
# See also: services(5)
#
#
# SERVICE NAME AND TRANSPORT PROTOCOL PORT NUMBER REGISTRY
#
# (last updated on 2011-11-23)
#
# *****
# * Since we merged and converted this registry it loads more slowly. We *
# * know it should load faster and are working on ways to achieve that. *
# * Thank you for your patience. *
# *****
#
--More-- (0%)
```



Important - The `Enter` key scrolls down line by line, the `Space Bar` key scrolls down page by page and the `Q` key comes back to the command line prompt.

Command Line Switches





To do : Use the **-help** option of the **more** command to view the command line switches.

The less Command

The **less** command produces a similar result to that of the **more** command. Practice using the less command and refer to the help using **less -help**. Which command seems the most powerful and versatile ?

```
trainee@debian8:~$ less /etc/services
# Network services, Internet style
#
# Note that it is presently the policy of IANA to assign a single well-known
# port number for both TCP and UDP; hence, officially ports have two entries
# even if the protocol doesn't support UDP operations.
#
# Updated from http://www.iana.org/assignments/port-numbers and other
# sources like http://www.freebsd.org/cgi/cvsweb.cgi/src/etc/services .
# New ports will be added on request if they have been officially assigned
# by IANA and used in the real-world or are needed by a debian package.
# If you need a huge list of used numbers please install the nmap package.

tcpmux      1/tcp          # TCP port service multiplexer
echo        7/tcp
echo        7/udp
discard     9/tcp          sink null
discard     9/udp          sink null
systat      11/tcp         users
daytime     13/tcp
daytime     13/udp
netstat     15/tcp
qotd        17/tcp         quote
msp         18/tcp         # message send protocol
```

```
/etc/services
```

```
trainee@ubuntu1604:~$ less /etc/services
# Network services, Internet style
#
# Note that it is presently the policy of IANA to assign a single well-known
# port number for both TCP and UDP; hence, officially ports have two entries
# even if the protocol doesn't support UDP operations.
#
# Updated from http://www.iana.org/assignments/port-numbers and other
# sources like http://www.freebsd.org/cgi/cvsweb.cgi/src/etc/services .
# New ports will be added on request if they have been officially assigned
# by IANA and used in the real-world or are needed by a debian package.
# If you need a huge list of used numbers please install the nmap package.

tcpmux      1/tcp          # TCP port service multiplexer
echo        7/tcp
echo        7/udp
discard     9/tcp          sink null
discard     9/udp          sink null
systat      11/tcp         users
daytime     13/tcp
daytime     13/udp
netstat     15/tcp
qotd        17/tcp         quote
msp         18/tcp         # message send protocol
/etc/services
```

```
[trainee@centos7 ~]$ less /etc/services
# /etc/services:
# $Id: services,v 1.55 2013/04/14 ovasik Exp $
#
# Network services, Internet style
# IANA services version: last updated 2013-04-10
```

```
#
# Note that it is presently the policy of IANA to assign a single well-known
# port number for both TCP and UDP; hence, most entries here have two entries
# even if the protocol doesn't support UDP operations.
# Updated from RFC 1700, ``Assigned Numbers'' (October 1994).  Not all ports
# are included, only the more common ones.
#
# The latest IANA port assignments can be gotten from
#   http://www.iana.org/assignments/port-numbers
# The Well Known Ports are those from 0 through 1023.
# The Registered Ports are those from 1024 through 49151
# The Dynamic and/or Private Ports are those from 49152 through 65535
#
# Each line describes one service, and is of the form:
#
# service-name  port/protocol  [aliases ...]  [# comment]

tcpmux          1/tcp          # TCP port service multiplexer
/etc/services
```

```
trainee@SLES12SP1:~> less /etc/services
#
# Network services, Internet style
#
# Note that it is presently the policy of IANA to assign a single well-known
# port number for both TCP and UDP; hence, most entries here have two entries
# even if the protocol doesn't support UDP operations.
#
# This list could be found on:
#   http://www.iana.org/assignments/service-names-port-numbers/service-names-port-numbers.xml
#
# See also: services(5)
#
#
```

```
# SERVICE NAME AND TRANSPORT PROTOCOL PORT NUMBER REGISTRY
#
# (last updated on 2011-11-23)
#
# *****
# * Since we merged and converted this registry it loads more slowly. We *
# * know it should load faster and are working on ways to achieve that. *
# * Thank you for your patience. *
# *****
/etc/services lines 1-22/16228 0%
```

Command Line Switches



To do : Use the **-help** option of the **less** command to view the command line switches.

The find Command

This command is used to search for a specific file or directory. The default path is the **current directory** and default expression is **-print**:

```
trainee@debian8:~$ find acc
find: `acc': No such file or directory
trainee@debian8:~$ find aac
aac
```

```
trainee@ubuntu1604:~$ find acc
find: `acc': No such file or directory
trainee@ubuntu1604:~$ find aac
aac
```

```
[trainee@centos7 ~]$ find acc
find: 'acc': No such file or directory
[trainee@centos7 ~]$ find aac
aac
```

```
trainee@SLES12SP1:~> find acc
find: 'acc': No such file or directory
trainee@SLES12SP1:~> find aac
aac
```



Important : Note that when the file cannot be found, the find command informs you clearly. However when the file is found, the find command just prints the name of the file to standard output.

Command Line Switches



To do : Use the **-help** option of the **find** command to view the command line switches.

The su Command

This command is used to change the effective user id and group id to that of the user passed as an argument. When executed with no argument, the system assumes the destination user is **root**:

```
trainee@debian8:~$ su -
Password: fenestros
```

```
trainee@ubuntu1604:~$ sudo su -
```

```
[sudo] password for trainee: trainee
```

```
[trainee@centos7 ~]$ su -  
Password: fenestros  
Last login: Thu Sep 29 17:08:56 CEST 2016 on pts/0
```

```
trainee@SLES12SP1:~> su -  
Password: fenestros
```



Important : Note that the password will not be visible.

Command Line Switches



To do : Use the **-help** option of the **su** command to view the command line switches.

The updatedb and locate Commands

The **locate** command is used to list files in databases that match a pattern supplied as an argument to the command. The **locate** command uses a database. This database needs to be created using the **updatedb** command before using the **locate** command.

The default database is **/var/lib/mlocate/mlocate.db**:

```
root@debian8:~# ls -l /var/lib/mlocate/mlocate.db  
-rw-r----- 1 root mlocate 2067895 Aug 19 07:35 /var/lib/mlocate/mlocate.db
```

```
root@ubuntu1604:~# ls -l /var/lib/mlocate/mlocate.db
```

```
-rw-r----- 1 root mlocate 5293946 oct.  2 07:35 /var/lib/mlocate/mlocate.db
```

```
[root@centos7 ~]# ls -l /var/lib/mlocate/mlocate.db
-rw-r-----. 1 root slocate 3887117 Sep 29 03:46 /var/lib/mlocate/mlocate.db
```

```
SLES12SP1:~ # ls -l /var/lib/mlocate/mlocate.db
-rw-r--r-- 1 root root 3804323 Sep 30 10:30 /var/lib/mlocate/mlocate.db
```



Important : For information concerning the database format, please see **man 5 locatedb**.

The **updatedb** command is configured by editing the **/etc/updatedb.conf** file:

```
root@debian8:~# cat /etc/updatedb.conf
PRUNE_BIND_MOUNTS="yes"
# PRUNENAMES=".git .bzip2 .hg .svn"
PRUNEPATHS="/tmp /var/spool /media"
PRUNEFS="NFS nfs nfs4 rpc_pipefs afs binfmt_misc proc smbfs autofs iso9660 ncpfs coda devpts ftpfs devfs mfs shfs
sysfs cifs lustre tmpfs usbfs udf fuse.glusterfs fuse.sshfs curlftpfs"
```

```
root@ubuntu1604:~# cat /etc/updatedb.conf
PRUNE_BIND_MOUNTS="yes"
# PRUNENAMES=".git .bzip2 .hg .svn"
PRUNEPATHS="/tmp /var/spool /media /home/.ecryptfs /var/lib/schroot"
PRUNEFS="NFS nfs nfs4 rpc_pipefs afs binfmt_misc proc smbfs autofs iso9660 ncpfs coda devpts ftpfs devfs mfs shfs
sysfs cifs lustre tmpfs usbfs udf fuse.glusterfs fuse.sshfs curlftpfs ecryptfs fusesmb devtmpfs"
```

```
[root@centos7 ~]# cat /etc/updatedb.conf
PRUNE_BIND_MOUNTS = "yes"
PRUNEFS = "9p afs anon_inodefs auto autofs bdev binfmt_misc cgroup cifs coda configfs cpuset debugfs devpts
ecryptfs exofs fuse fuse.sshfs fusectl gfs gfs2 hugetlbfs inotifyfs iso9660 jffs2 lustre mqueue ncpfs nfs nfs4
nfsd pipefs proc ramfs rootfs rpc_pipefs securityfs selinuxfs sfs sockfs sysfs tmpfs ubifs udf usbfs"
```

```
PRUNENAMES = ".git .hg .svn"  
PRUNEPATHS = "/afs /media /mnt /net /sfs /tmp /udev /var/cache/ccache /var/lib/yum/yumdb /var/spool/cups  
/var/spool/squid /var/tmp"
```

```
SLES12SP1:~ # cat /etc/updatedb.conf  
# /etc/updatedb.conf: config file for mlocate  
  
# This file sets variables that are used by updatedb.  
# For more info, see the updatedb.conf(5) manpage.  
  
# Filesystems that are pruned from updatedb database  
PRUNEFS="afs anon_inodefs auto autofs bdev binfmt binfmt_misc cgroup cifs coda configfs cramfs cpuset debugfs  
devfs devpts devtmps ecryptfs eventpollfs exofs futexfs ftpfs fuse fusectl gfs gfs2 hostfs hugetlbfs inotifyfs  
iso9660 jffs2 lustre misc mqueue ncdfs nfs NFS nfs4 nfsd nnpfs ocfs ocfs2 pipefs proc ramfs rpc_pipefs securityfs  
selinuxfs sfs shfs smbfs sockfs spufs sshfs subfs supermount sysfs tmpfs ubifs udf usbfs vboxsf vperfctrfs"  
  
# Paths which are pruned from updatedb database  
PRUNEPATHS="/tmp /var/tmp /var/cache /var/lock /var/run /var/spool /mnt /cdrom /usr/tmp /proc /media /sys  
/.snapshots /var/run/media"  
  
# Folder names that are pruned from updatedb database  
PRUNENAMES=".git .hg .svn CVS"  
  
# Skip bind mounts.  
PRUNE_BIND_MOUNTS="yes"
```

Use of these two commands is very simple:

```
root@debian8:~# updatedb  
root@debian8:~# locate aac  
/home/trainee/aac  
/lib/modules/3.16.0-4-amd64/kernel/drivers/scsi/aacraid  
/lib/modules/3.16.0-4-amd64/kernel/drivers/scsi/aacraid/aacraid.ko  
/usr/lib/x86_64-linux-gnu/libaacs.so.0
```

```
/usr/lib/x86_64-linux-gnu/libaacs.so.0.4.1
/usr/share/doc/libaacs0
/usr/share/doc/libaacs0/KEYDB.cfg.gz
/usr/share/doc/libaacs0/changelog.Debian.amd64.gz
/usr/share/doc/libaacs0/changelog.Debian.gz
/usr/share/doc/libaacs0/changelog.gz
/usr/share/doc/libaacs0/copyright
/usr/share/mime/audio/aac.xml
/var/cache/apt/archives/libaacs0_0.7.1-1+b1_amd64.deb
/var/lib/dpkg/info/libaacs0:amd64.list
/var/lib/dpkg/info/libaacs0:amd64.md5sums
/var/lib/dpkg/info/libaacs0:amd64.postinst
/var/lib/dpkg/info/libaacs0:amd64.postrm
/var/lib/dpkg/info/libaacs0:amd64.shlibs
```

```
root@ubuntu1604:~# updatedb
root@ubuntu1604:~# locate aac
/home/trainee/aac
/lib/modules/4.4.0-21-generic/kernel/drivers/scsi/aacraid
/lib/modules/4.4.0-21-generic/kernel/drivers/scsi/aacraid/aacraid.ko
/lib/modules/4.4.0-38-generic/kernel/drivers/scsi/aacraid
/lib/modules/4.4.0-38-generic/kernel/drivers/scsi/aacraid/aacraid.ko
/usr/share/app-install/desktop/krita-data:kde4__calligraactive.desktop
/usr/share/mime/audio/aac.xml
/usr/src/linux-headers-4.4.0-21/drivers/scsi/aacraid
/usr/src/linux-headers-4.4.0-21/drivers/scsi/aacraid/Makefile
/usr/src/linux-headers-4.4.0-21-generic/include/config/scsi/aacraid.h
/usr/src/linux-headers-4.4.0-38/drivers/scsi/aacraid
/usr/src/linux-headers-4.4.0-38/drivers/scsi/aacraid/Makefile
/usr/src/linux-headers-4.4.0-38-generic/include/config/scsi/aacraid.h
```

```
[root@centos7 ~]# updatedb
[root@centos7 ~]# locate aac
/home/trainee/aac
```

```
/usr/lib/modules/3.10.0-327.13.1.el7.x86_64/kernel/drivers/scsi/aacraid
/usr/lib/modules/3.10.0-327.13.1.el7.x86_64/kernel/drivers/scsi/aacraid/aacraid.ko
/usr/lib/modules/3.10.0-327.el7.x86_64/kernel/drivers/scsi/aacraid
/usr/lib/modules/3.10.0-327.el7.x86_64/kernel/drivers/scsi/aacraid/aacraid.ko
/usr/lib/python2.7/site-packages/ipalib/plugins/caacl.py
/usr/lib/python2.7/site-packages/ipalib/plugins/caacl.pyc
/usr/lib/python2.7/site-packages/ipalib/plugins/caacl.pyo
/usr/share/gtk-doc/html/gst-plugins-good-plugins-1.0/gst-plugins-good-plugins-aacparse.html
/usr/share/gupnp-dlna-2.0/dlna-profiles/aac.xml
/usr/share/mime/audio/aac.xml
/usr/src/kernels/3.10.0-327.13.1.el7.x86_64/drivers/scsi/aacraid
/usr/src/kernels/3.10.0-327.13.1.el7.x86_64/drivers/scsi/aacraid/Makefile
/usr/src/kernels/3.10.0-327.13.1.el7.x86_64/include/config/scsi/aacraid.h
/usr/src/kernels/3.10.0-327.el7.x86_64/drivers/scsi/aacraid
/usr/src/kernels/3.10.0-327.el7.x86_64/drivers/scsi/aacraid/Makefile
/usr/src/kernels/3.10.0-327.el7.x86_64/include/config/scsi/aacraid.h
```

```
SLES12SP1:~ # locate aac
/lib/modules/3.12.49-11-default/kernel/drivers/scsi/aacraid
/lib/modules/3.12.49-11-default/kernel/drivers/scsi/aacraid/aacraid.ko
/usr/share/YaST2/scrconf/aaconf.scr
/usr/share/mime/audio/aac.xml
```

Command Line Switches



To do : Use the **-help** option of the **updatedb** and **locate** commands to view their command line switches.

The whereis Command

This command is used to show the full paths of the executable, the configuration files and the manuals associated with the argument:

```
root@debian8:~# whereis passwd
passwd: /usr/bin/passwd /etc/passwd /usr/share/man/man1/passwd.1ssl.gz /usr/share/man/man1/passwd.1.gz
/usr/share/man/man5/passwd.5.gz
```

```
root@ubuntu1604:~# whereis passwd
passwd: /usr/bin/passwd /etc/passwd /usr/share/man/man5/passwd.5.gz /usr/share/man/man1/passwd.1.gz
/usr/share/man/man1/passwd.1ssl.gz
```

```
[root@centos7 ~]# whereis passwd
passwd: /usr/bin/passwd /etc/passwd /usr/share/man/man1/passwd.1.gz /usr/share/man/man5/passwd.5.gz
```

```
SLES12SP1:~ # whereis passwd
passwd: /usr/bin/passwd /etc/passwd /etc/passwd.YaST2save /usr/share/man/man1/passwd.1ssl.gz
/usr/share/man/man1/passwd.1.gz /usr/share/man/man5/passwd.5.gz
```

Command Line Switches



To do : Use the **-help** option of the **whereis** command to view the command line switches.

The which Command

This command searches the PATH variable and returns to standard output the first full path associated with the argument:

```
root@debian8:~# which passwd
/usr/bin/passwd
```

```
root@ubuntu1604:~# which passwd
```

```
/usr/bin/passwd
```

```
[root@centos7 ~]# which passwd  
/bin/passwd
```

```
SLES12SP1:~ # which passwd  
/usr/bin/passwd
```

Command Line Switches



To do : Use the **-help** option of the **which** command to view the command line switches.

The uptime Command

This command prints to standard output the current time, the length of time the system has been up, the number of users on the system and the average number of jobs in the run queue over the last 1, 5 and 15 minutes:

```
root@debian8:~# uptime  
18:02:14 up 1 day, 6:33, 1 user, load average: 0.00, 0.01, 0.05
```

```
root@ubuntu1604:~# uptime  
15:18:02 up 1 day, 13:10, 1 user, load average: 0,00, 0,03, 0,0
```

```
[root@centos7 ~]# uptime  
19:18:57 up 1 day, 8:30, 1 user, load average: 0.10, 0.09, 0.07
```

```
SLES12SP1:~ # uptime  
07:48am up 21:25, 1 user, load average: 0.10, 0.05, 0.05
```

Command Line Switches

The switches associated with this command are:



To do : Use the **-help** option of the **uptime** command to view the command line switches.

The w Command

This command outputs the same data as the **uptime** command on the first line and then complements this information with the details of each user connected to the system, including what each user is currently doing. This is the replacement under Linux for the Unix command **whodo**:

```
root@debian8:~# w
 18:11:31 up 1 day, 6:42,  1 user,  load average: 0.00, 0.01, 0.05
USER      TTY      FROM            LOGIN@   IDLE   JCPU   PCPU WHAT
trainee   pts/0    10.0.2.2        14:16   0.00s  0.13s  0.03s sshd: trainee [priv]
```

```
root@ubuntu1604:~# w
 15:27:17 up 1 day, 13:19,  1 user,  load average: 0,10, 0,06, 0,06
USER      TTY      FROM            LOGIN@   IDLE   JCPU   PCPU WHAT
trainee   pts/0    10.0.2.2        lun.17   0.00s  0.11s  0.00s sshd: trainee [priv]
```

```
[root@centos7 ~]# w
 19:28:55 up 1 day, 8:40,  1 user,  load average: 0.00, 0.01, 0.05
USER      TTY      FROM            LOGIN@   IDLE   JCPU   PCPU WHAT
trainee   pts/0    gateway         15:22   7.00s  0.16s  0.12s sshd: trainee [priv]
```

```
SLES12SP1:~ # w
 07:57:55 up 21:34,  1 user,  load average: 0.00, 0.03, 0.05
USER      TTY      FROM            LOGIN@   IDLE   JCPU   PCPU WHAT
```

```
trainee pts/0 10.0.2.2 04:09 0.00s 0.12s 0.00s sshd: trainee [priv]
```

The JCPU time is the time used by all processes attached to the tty. It does not include past background jobs, but does include currently running background jobs.

The PCPU time is the time used by the current process, named in the **what** field.

Command Line Switches



To do : Use the **-help** option of the **w** command to view the command line switches.

The uname Command

This command prints system information to the standard output:

```
root@debian8:~# uname -a
Linux debian8 3.16.0-4-amd64 #1 SMP Debian 3.16.7-ckt25-2 (2016-04-08) x86_64 GNU/Linux
root@debian8:~# uname -s
Linux
root@debian8:~# uname -n
debian8
root@debian8:~# uname -r
3.16.0-4-amd64
root@debian8:~# uname -v
#1 SMP Debian 3.16.7-ckt25-2 (2016-04-08)
root@debian8:~# uname -m
x86_64
root@debian8:~# uname -p
unknown
```

```
root@debian8:~# uname -i
unknown
root@debian8:~# uname -o
GNU/Linux
```

```
root@ubuntu1604:~# uname -a
Linux ubuntu1604 4.4.0-21-generic #37-Ubuntu SMP Mon Apr 18 18:33:37 UTC 2016 x86_64 x86_64 x86_64 GNU/Linux
root@ubuntu1604:~# uname -s
Linux
root@ubuntu1604:~# uname -n
ubuntu1604
root@ubuntu1604:~# uname -r
4.4.0-21-generic
root@ubuntu1604:~# uname -v
#37-Ubuntu SMP Mon Apr 18 18:33:37 UTC 2016
root@ubuntu1604:~# uname -m
x86_64
root@ubuntu1604:~# uname -p
x86_64
root@ubuntu1604:~# uname -i
x86_64
root@ubuntu1604:~# uname -o
GNU/Linux
```

```
[root@centos7 ~]# uname -a
Linux centos7.fenestros.loc 3.10.0-327.13.1.el7.x86_64 #1 SMP Thu Mar 31 16:04:38 UTC 2016 x86_64 x86_64 x86_64
GNU/Linux
[root@centos7 ~]# uname -s
Linux
[root@centos7 ~]# uname -n
centos7.fenestros.loc
[root@centos7 ~]# uname -r
3.10.0-327.13.1.el7.x86_64
[root@centos7 ~]# uname -v
```

```
#1 SMP Thu Mar 31 16:04:38 UTC 2016
[root@centos7 ~]# uname -m
x86_64
[root@centos7 ~]# uname -p
x86_64
[root@centos7 ~]# uname -i
x86_64
[root@centos7 ~]# uname -o
GNU/Linux
```

```
SLES12SP1:~ # uname -a
Linux SLES12SP1 3.12.49-11-default #1 SMP Wed Nov 11 20:52:43 UTC 2015 (8d714a0) x86_64 x86_64 x86_64 GNU/Linux
SLES12SP1:~ # uname -s
Linux
SLES12SP1:~ # uname -n
SLES12SP1
SLES12SP1:~ # uname -r
3.12.49-11-default
SLES12SP1:~ # uname -v
#1 SMP Wed Nov 11 20:52:43 UTC 2015 (8d714a0)
SLES12SP1:~ # uname -m
x86_64
SLES12SP1:~ # uname -p
x86_64
SLES12SP1:~ # uname -i
x86_64
SLES12SP1:~ # uname -o
GNU/Linux
```

Command Line Switches



To do : Use the **-help** option of the **uname** command to view the command line switches.

The du Command

This command summarizes disk usage of each file, recursively for directories:

```
root@debian8:~# du -sh /* 2>/dev/null
12M /bin
31M /boot
0 /dev
6.9M /etc
1.9M /home
0 /initrd.img
207M /lib
4.0K /lib64
16K /lost+found
8.0K /media
4.0K /mnt
152M /opt
0 /proc
59M /root
4.7M /run
8.5M /sbin
4.0K /srv
0 /sys
100K /tmp
2.0G /usr
767M /var
0 /vmlinuz
```

```
root@ubuntu1604:~# du -sh /* 2>/dev/null
13M /bin
100M /boot
4,0K /cdrom
0 /dev
```

```
13M /etc
1,7M  /home
0    /initrd.img
0    /initrd.img.old
584M  /lib
4,0K  /lib64
16K  /lost+found
4,0K  /media
4,0K  /mnt
155M  /opt
0    /proc
6,1M  /root
4,1M  /run
13M  /sbin
4,0K  /snap
4,0K  /srv
0    /sys
72K  /tmp
2,9G  /usr
341M  /var
0    /vmlinuz
0    /vmlinuz.old
```

```
[root@centos7 ~]# du -sh /* 2>/dev/null
0    /bin
187M  /boot
0    /dev
33M  /etc
20M  /home
0    /lib
0    /lib64
0    /lost+found
0    /media
0    /mnt
```

```
173M  /opt
0    /proc
43M  /root
8.7M  /run
0    /sbin
0    /srv
0    /sys
64K  /tmp
3.6G  /usr
228M  /var
```

```
SLES12SP1:~ # du -sh /* 2>/dev/null
```

```
5.1M  /bin
44M  /boot
0    /dev
19M  /etc
216K  /home
190M  /lib
16M  /lib64
0    /mnt
151M  /opt
0    /proc
6.1M  /root
5.4M  /run
11M  /sbin
0    /selinux
64K  /srv
0    /sys
60K  /tmp
2.6G  /usr
133M  /var
```



Important : Note the use of the **2>/dev/null** redirection. This sends all eventual errors in the **file descriptor 2** directly to **/dev/null** so



that they do not appear in the output. File descriptors are covered in the **The Command Line Interface** unit.

Command Line Switches



To do : Use the **-help** option of the **du** command to view the command line switches.

The clear Command

This command is used to clear the current screen of the terminal:

```
root@debian8:~# clear
```

```
root@debian8:~#
```

```
root@ubuntu1604:~# clear
```

```
root@ubuntu1604:~#
```

```
[root@centos7 ~]# clear
```

```
[root@centos7 ~]#
```

```
SLES12SP1:~ # clear
```

```
SLES12SP1:~ #
```

The exit Command

This command exits the current shell:

```
root@debian8:~# exit
logout
trainee@debian8:~$
```

```
root@ubuntu1604:~# exit
logout
trainee@ubuntu1604:~$
```

```
[root@centos7 ~]# exit
logout
[trainee@centos7 ~]$
```

```
SLES12SP1:~ # exit
logout
trainee@SLES12SP1:~>
```

Command Line Switches



To do : Use the **help** command with **exit** option to view the command line switches.

The logout Command

This command logs out a user from a login shell writing the utmp and wtmp entries in the log files.

Command Line Switches



To do : Use the **help** command with **logout** option to view the command line switches.

The sleep Command

This command pauses for a number seconds. The number is specified as the first argument.

Command Line Switches



To do : Use the **-help** option of the **sleep** command to view the command line switches.

The wall Command

When using RHEL/CentOS 7:

Wall sends a message to everybody logged in with their mesg(1) permission set to yes. The message can be given as an argument to wall, or it can be sent to wall's standard input. When using the standard input from a terminal, the message should be terminated with the EOF key (usually Control-D). The length of the message is limited to 20 lines. For every invocation of wall a notification will be written to syslog, with facility LOG_USER and level LOG_INFO.

Start a second session as trainee via ssh on your VM. Return to your first session as root and type :

```
[trainee@centos7 ~]$ su -  
Password: fenestros
```

```
Last login: Thu Sep 29 17:08:56 CEST 2016 on pts/0
[root@centos7 ~]# wall this is a message from root
[root@centos7 ~]#
Broadcast message from root@centos7.fenestros.loc (pts/0) (Fri Sep 30 05:35:26 2016):

this is a message from root
[Enter]
[root@centos7 ~]#
```

In the second session you should see the following message :

```
[trainee@centos7 ~]$
Broadcast message from root@centos7.fenestros.loc (pts/0) (Fri Sep 30 05:35:26 2016):

this is a message from root
```

Now look at the end of the **/var/log/messages** file :

```
[root@centos7 ~]# tail /var/log/messages
Sep 30 05:31:08 centos7 sh: Sleeping ' ' ' '
Sep 30 05:34:16 centos7 sh: Sleeping ' ' ' '
Sep 30 05:35:13 centos7 systemd: Started Session 311 of user trainee.
Sep 30 05:35:13 centos7 systemd-logind: New session 311 of user trainee.
Sep 30 05:35:13 centos7 systemd: Starting Session 311 of user trainee.
Sep 30 05:35:13 centos7 dbus[515]: [system] Activating service name='org.freedesktop.problems' (using
servicehelper)
Sep 30 05:35:13 centos7 dbus-daemon: dbus[515]: [system] Activating service name='org.freedesktop.problems'
(using servicehelper)
Sep 30 05:35:13 centos7 dbus[515]: [system] Successfully activated service 'org.freedesktop.problems'
Sep 30 05:35:13 centos7 dbus-daemon: dbus[515]: [system] Successfully activated service
'org.freedesktop.problems'
Sep 30 05:35:26 centos7 wall[27550]: wall: user root broadcasted 1 lines (29 chars)
```



Important : La commande wall ignore la variable d'environnement TZ. L'heure affichée dans la première page est basée sur les paramètres de régionalisation du système.

When using Debian 8, Ubuntu 16.04 LTS and SLES 12:

wall displays a message, or the contents of a file, or otherwise its standard input, on the terminals of all currently logged in users. The command will wrap lines that are longer than 79 characters. Short lines are whitespace padded to have 79 characters. The command will always put a carriage return and new line at the end of each line. Only the superuser can write on the terminals of users who have chosen to deny messages or are using a program which automatically denies messages. Reading from a file is refused when the invoker is not superuser and the program is suid or sgid.

Start a second session as trainee via ssh on your VM. Return to your first session as root and type :

```
trainee@debian8:~$ su -  
Password: fenestros  
root@debian8:~# wall this is a message from root  
Broadcast message from trainee@debian8 (pts/0) (Sat Aug 20 03:23:20 2016):  
this is a message from root  
root@debian8:~#
```

```
trainee@ubuntu1604:~$ sudo su -  
[sudo] password for trainee: trainee  
root@ubuntu1604:~# wall this is a message from root  
Broadcast message from trainee@ubuntu1604 (pts/0) (Fri Oct 7 10:18:21 2016):  
this is a message from root  
root@ubuntu1604:~#
```

```
trainee@SLES12SP1:~> su -  
Password: fenestros  
SLES12SP1:~ # wall this is a message from root  
Broadcast message from trainee@SLES12SP1 (pts/1) (Sat Oct 1 18:39:50 2016):  
this is a message from root
```

```
SLES12SP1:~ #
```

In the second session you should see the following message :

```
Broadcast message from trainee@debian8 (pts/0) (Sat Aug 20 03:23:20 2016):  
this is a message from root
```

```
Broadcast message from trainee@ubuntu1604 (pts/0) (Fri Oct 7 10:18:21 2016):  
this is a message from root
```

```
Broadcast message from trainee@SLES12SP1 (pts/1) (Sat Oct 1 18:39:50 2016):  
this is a message from root
```

The seq Command

The **seq** command prints numbers from FIRST to LAST, in steps of INCREMENT:

- seq [OPTION]... LAST
- seq [OPTION]... FIRST LAST
- seq [OPTION]... FIRST INCREMENT LAST

For example :

```
root@debian8:~# seq 10  
1  
2  
3  
4  
5  
6  
7  
8  
9
```

```
10
root@debian8:~# seq 20 30
20
21
22
23
24
25
26
27
28
29
30
root@debian8:~# seq 20 10 90
20
30
40
50
60
70
80
90
root@debian8:~#
```

```
root@ubuntu1604:~# seq 10
1
2
3
4
5
6
7
8
9
```

```
10
root@ubuntu1604:~# seq 20 30
20
21
22
23
24
25
26
27
28
29
30
root@ubuntu1604:~# seq 20 10 90
20
30
40
50
60
70
80
90
root@ubuntu1604:~#
```

```
[root@centos7 ~]# seq 10
1
2
3
4
5
6
7
8
9
```

```
10  
[root@centos7 ~]# seq 20 30  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
[root@centos7 ~]# seq 20 10 90  
20  
30  
40  
50  
60  
70  
80  
90  
[root@centos7 ~]#
```

```
SLES12SP1:~ # seq 10  
1  
2  
3  
4  
5  
6  
7  
8  
9
```

```
10
SLES12SP1:~ # seq 20 30
20
21
22
23
24
25
26
27
28
29
30
SLES12SP1:~ # seq 20 10 90
20
30
40
50
60
70
80
90
SLES12SP1:~ #
```

Command Line Switches



To do : Use the **-help** option of the **seq** command to view the command line switches.

The screen Command

Screen is a full-screen window manager that multiplexes a physical terminal between several processes (typically interactive shells). Each virtual terminal provides the functions of a DEC VT100 terminal and, in addition, several control functions from the ISO 6429 (ECMA 48, ANSI X3.64) and ISO 2022 standards (e.g. insert/delete line and support for multiple character sets). There is a scrollback history buffer for each virtual terminal and a copy-and-paste mechanism that allows moving text regions between windows.

The screen command is not installed by default under Debian 8, Ubuntu 16.04 LTS and RHEL/CentOS 7. Use the appropriate package manager to install it:

```
root@debian8:~# which screen
root@debian8:~# apt-get install screen
Reading package lists... Done
Building dependency tree
Reading state information... Done
Suggested packages:
  iselect screenie byobu
The following NEW packages will be installed:
  screen
0 upgraded, 1 newly installed, 0 to remove and 0 not upgraded.
Need to get 569 kB of archives.
After this operation, 930 kB of additional disk space will be used.
Get:1 http://ftp.fr.debian.org/debian/ jessie/main screen amd64 4.2.1-3+deb8u1 [569 kB]
Fetched 569 kB in 0s (3,163 kB/s)
Selecting previously unselected package screen.
(Reading database ... 82450 files and directories currently installed.)
Preparing to unpack .../screen_4.2.1-3+deb8u1_amd64.deb ...
Unpacking screen (4.2.1-3+deb8u1) ...
Processing triggers for systemd (215-17+deb8u4) ...
Processing triggers for install-info (5.2.0.dfsg.1-6) ...
Processing triggers for man-db (2.7.0.2-5) ...
Setting up screen (4.2.1-3+deb8u1) ...
Processing triggers for systemd (215-17+deb8u4) ...
```

```
root@debian8:~# which screen
/usr/bin/screen
```

```
root@ubuntu1604:~# which screen
root@ubuntu1604:~# apt-get install screen
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following packages were automatically installed and are no longer required:
  libpangol1.0-0 libpangox-1.0-0
Use 'apt autoremove' to remove them.
Suggested packages:
  iselect | screenie | byobu
The following NEW packages will be installed:
  screen
0 upgraded, 1 newly installed, 0 to remove and 1 not upgraded.
Need to get 560 kB of archives.
After this operation, 972 kB of additional disk space will be used.
Get:1 http://fr.archive.ubuntu.com/ubuntu xenial/main amd64 screen amd64 4.3.1-2build1 [560 kB]
Fetched 560 kB in 0s (2 306 kB/s)
Selecting previously unselected package screen.
(Reading database ... 207619 files and directories currently installed.)
Preparing to unpack .../screen_4.3.1-2build1_amd64.deb ...
Unpacking screen (4.3.1-2build1) ...
Processing triggers for systemd (229-4ubuntu10) ...
Processing triggers for ureadahead (0.100.0-19) ...
Processing triggers for install-info (6.1.0.dfsg.1-5) ...
Processing triggers for man-db (2.7.5-1) ...
Setting up screen (4.3.1-2build1) ...
Processing triggers for systemd (229-4ubuntu10) ...
Processing triggers for ureadahead (0.100.0-19) ...
root@ubuntu1604:~# which screen
/usr/bin/screen
```

```
[root@centos7 ~]# which screen
/usr/bin/which: no screen in (/usr/local/sbin:/usr/local/bin:/sbin:/bin:/usr/sbin:/usr/bin:/root/bin)
[root@centos7 ~]# yum install screen
Loaded plugins: fastestmirror, langpacks
Loading mirror speeds from cached hostfile
 * base: ftp.rezopole.net
 * extras: centos.mirror.ate.info
 * updates: centos.mirror.fr.planethoster.net
Resolving Dependencies
--> Running transaction check
---> Package screen.x86_64 0:4.1.0-0.23.20120314git3c2946.el7_2 will be installed
--> Finished Dependency Resolution
```

Dependencies Resolved

```
=====
Package      Arch          Version                               Repository  Size
=====
Installing:
screen       x86_64        4.1.0-0.23.20120314git3c2946.el7_2    updates     552 k
=====
```

Transaction Summary

```
=====
Install 1 Package
```

Total download size: 552 k

Installed size: 914 k

Is this ok [y/d/N]: y

Downloading packages:

```
screen-4.1.0-0.23.20120314git3c2946.el7_2.x86_64.rpm      | 552 kB  00:00:01
```

Running transaction check

Running transaction test

Transaction test succeeded

Running transaction

```
Installing : screen-4.1.0-0.23.20120314git3c2946.el7_2.x86_64      1/1
Verifying  : screen-4.1.0-0.23.20120314git3c2946.el7_2.x86_64      1/1
```

Installed:

```
screen.x86_64 0:4.1.0-0.23.20120314git3c2946.el7_2
```

Complete!

```
[root@centos7 ~]# which screen
/bin/screen
```

However, the screen command **is** installed by default under SLES 12 :

```
SLES12SP1:~ # which screen
/usr/bin/screen
```

Create a session with screen:

```
root@debian8:~# screen -S mysession
```

```
root@ubuntu1604:~# screen -S mysession
```

```
[root@centos7 ~]# screen -S mysession
```

```
SLES12SP1:~ # screen -S mysession
```



Important - When using RHEL/CentOS 7, you will notice that the title of the window holding the ssh session changes to **[screen 0: root@centos7:~]**. However when using Debian 8, Ubuntu 16.04 LTS or SLES 12 you will not see this.

Now press the **CTRL** and **A** keys, release the **A** key and press the **C** key in order to create a second **nested** screen.



Important - When using RHEL/CentOS 7, you will notice that the title of the window holding the ssh session changes to **[screen 1: root@centos7:~]**. However when using Debian 8, Ubuntu 16.04 LTS or SLES 12 you will not see this.

To return to the first screen, use the `CTRL A A` keys. This allows you to toggle between the last two screens used.

To see the status of all active screens, use the **screen -ls** command:

```
root@debian8:~# screen -ls
There is a screen on:
    27309.mysession (20/08/16 04:20:08)    (Attached)
1 Socket in /var/run/screen/S-root.
```

```
root@ubuntu1604:~# screen -ls
There is a screen on:
    1745.mysession (07/10/2016 11:00:55)  (Attached)
1 Socket in /var/run/screen/S-root
```

```
[root@centos7 ~]# screen -ls
There is a screen on:
    25812.mysession (Attached)
1 Socket in /var/run/screen/S-root.
```

```
SLES12SP1:~ # screen -ls
There is a screen on:
    11827.mysession (Attached)
1 Socket in /var/run/screens/S-root.
```

Now enter the following commands:

```
root@debian8:~# sleep 9999 &
[1] 2941
```

```
root@debian8:~# jobs
[1]+  Running                  sleep 9999 &
root@debian8:~#
```

```
root@ubuntu1604:~# sleep 9999 &
[1] 9699
root@ubuntu1604:~# jobs
[1]+  Running                  sleep 9999 &
root@ubuntu1604:~#
```

```
[root@centos7 ~]# sleep 9999 &
[1] 2272
[root@centos7 ~]# jobs
[1]+  Running                  sleep 9999 &
[root@centos7 ~]#
```

```
SLES12SP1:~ # sleep 9999 &
[1] 19879
SLES12SP1:~ # jobs
[1]+  Running                  sleep 9999 &
SLES12SP1:~ #
```

In order to detach the current screen press the **CTRL** and **A** keys, release the **A** key and press the **D** key:

```
root@debian8:~# screen -S mysession
[detached from 27309.mysession]
root@debian8:~#
```

```
root@ubuntu1604:~# screen -S mysession
[detached from 1745.mysession]
root@ubuntu1604:~#
```

```
[root@centos7 ~]# screen -S mysession
[detached from 25812.mysession]
```

```
[root@centos7 ~]#
```

```
[detached from 11827.mysession]  
SLES12SP1:~ #
```

To re-attach the screen, execute the following command:

```
root@debian8:~# screen -r
```

```
root@ubuntu1604:~# screen -r
```

```
[root@centos7 ~]# screen -r
```

```
SLES12SP1:~ # screen -r
```

Using the jobs command, check if the process created by the sleep command is still running:unit

```
root@debian8:~# jobs  
[1]+  Running                  sleep 9999 &
```

```
root@ubuntu1604:~# jobs  
[1]+  Running                  sleep 9999 &
```

```
[root@centos7 ~]# jobs  
[1]+  Running                  sleep 9999 &
```

```
SLES12SP1:~ # jobs  
[1]+  Running                  sleep 9999 &
```

To move forward or backwards between screens press the `CTRL` and `A` keys, release the `A` key and press the `N` key or press the `CTRL` and `A` keys, release the `A` key and press the `P` key.

Once again detach the current screen by pressing the `CTRL` `A` keys, releasing the `A` key and then pressing `D`:

```
root@debian8:~# screen -S mysession
[detached from 27309.mysession] key
root@debian8:~#
```

```
root@ubuntu1604:~# screen -S mysession
[detached from 1745.mysession]
root@ubuntu1604:~#
```

```
[root@centos7 ~]# screen -S mysession
[detached from 25812.mysession]
[root@centos7 ~]#
```

```
[detached from 11827.mysession]
SLES12SP1:~ #
```

Now create a new, non-nested screen:

```
root@debian8:~# screen -S mysession1
```

```
root@ubuntu1604:~# screen -S mysession1
```

```
[root@centos7 ~]# screen -S mysession1
```

```
SLES12SP1:~ # screen -S mysession1
```

Use the **screen -ls** command to see what has happened:

```
root@debian8:~# screen -ls
There are screens on:
  10234.mysession1      (20/08/16 07:17:19)    (Attached)
  27309.mysession      (20/08/16 04:20:08)    (Detached)
2 Sockets in /var/run/screen/S-root.
```

```
root@ubuntu1604:~# screen -ls
There are screens on:
  15800.mysession1      (07/10/2016 13:58:29)  (Attached)
  1745.mysession      (07/10/2016 11:00:55)  (Detached)
2 Sockets in /var/run/screen/S-root.
```

```
[root@centos7 ~]# screen -ls
There are screens on:
  14942.mysession1      (Attached)
  25812.mysession      (Detached)
2 Sockets in /var/run/screen/S-root.
```

```
SLES12SP1:~ # screen -ls
There are screens on:
  26655.mysession1      (Attached)
  11827.mysession      (Detached)
2 Sockets in /var/run/screens/S-root.
```

To re-attach a specific screen, reference it by it's number:

```
root@debian8:~# screen -r 27309
```

```
root@ubuntu1604:~# screen -r 1745
```

```
[root@centos7 ~]# screen -r 25812
```

```
SLES12SP1:~ # screen -r 11827
```

Finally, check out what has happened:

```
root@debian8:~# sleep 9999 &
[1] 2941
root@debian8:~# jobs
```

```
[1]+  Running                  sleep 9999 &unit
root@debian8:~# jobs
[1]+  Running                  sleep 9999 &
root@debian8:~# screen -ls
There are screens on:
  10234.mysession1            (20/08/16 07:17:20)    (Attached)
  27309.mysession (20/08/16 04:20:09)    (Attached)
2 Sockets in /var/run/screen/S-root.
```

```
root@ubuntu1604:~# sleep 9999 &
[1] 9699
root@ubuntu1604:~# jobs
[1]+  Running                  sleep 9999 &
root@ubuntu1604:~# jobs
[1]+  Running                  sleep 9999 &
root@ubuntu1604:~# screen -ls
There are screens on:
  15800.mysession1           (07/10/2016 13:58:29) (Attached)
  1745.mysession (07/10/2016 11:00:55) (Attached)
2 Sockets in /var/run/screen/S-root.
```

```
[root@centos7 ~]# sleep 9999 &
[1] 2272
[root@centos7 ~]# jobs
[1]+  Running                  sleep 9999 &
[root@centos7 ~]# jobs
[1]+  Running                  sleep 9999 &
[root@centos7 ~]# screen -ls
There is a screen on:
  25812.mysession (Attached)
1 Socket in /var/run/screen/S-root.
```

```
[root@centos7 ~]# screen -ls
There are screens on:
```

```
14942.myssession1      (Attached)
25812.myssession (Attached)
2 Sockets in /var/run/screen/S-root.
```

```
SLES12SP1:~ # sleep 9999 &
[1] 19879
SLES12SP1:~ # jobs
[1]+  Running                  sleep 9999 &
SLES12SP1:~ # jobs
[1]+  Running                  sleep 9999 &
SLES12SP1:~ # screen -ls
There are screens on:
26655.myssession1      (Attached)
11827.myssession (Attached)
2 Sockets in /var/run/screens/S-root.
```

Command Line Switches



To do : Use the **-help** option of the **screen** command to view the command line switches.

Switches and Arguments

Switches under Linux can either be short or long. Several differences are important to note.

Firstly short options are generally preceded by a single dash -, whilst long options are preceded by a double dash - -.

An example is the help option used with most commands:

- -h

- -help

Secondly, Linux short switches can be combined whereas long switches cannot be combined. For example **ls -l -a -i** can also be written as **ls -lai**, **ls -lia** or **ls -ali**:

```
root@debian8:~# ls -lai /tmp
total 40
130564 drwxrwxrwt 10 root root 4096 Aug 20 09:17 .
      2 drwxr-xr-x 22 root root 4096 Aug  1 12:38 ..
130572 drwxrwxrwt  2 root root 4096 Aug 18 11:28 .font-unix
134332 drwxr-xr-x  2 root root 4096 Aug 18 11:33 hspcrfdata_root
130570 drwxrwxrwt  2 root root 4096 Aug 18 11:28 .ICE-unix
140612 drwxr-xr-x  2 root root 4096 Aug 18 13:36 inode
140574 srw-----  1 root root    0 Aug 18 11:32 .java_pid1704
140611 srw-----  1 root root    0 Aug 18 11:33 .java_pid2098
134331 drwx-----  2 root root 4096 Aug 18 11:29 pulse-PKdhtXMmr18n
130573 drwxrwxrwt  2 root root 4096 Aug 18 11:28 .Test-unix
130569 drwxrwxrwt  2 root root 4096 Aug 18 11:28 .X11-unix
130571 drwxrwxrwt  2 root root 4096 Aug 18 11:28 .XIM-unix
root@debian8:~# ls -ali /tmp
total 40
130564 drwxrwxrwt 10 root root 4096 Aug 20 09:17 .
      2 drwxr-xr-x 22 root root 4096 Aug  1 12:38 ..
130572 drwxrwxrwt  2 root root 4096 Aug 18 11:28 .font-unix
134332 drwxr-xr-x  2 root root 4096 Aug 18 11:33 hspcrfdata_root
130570 drwxrwxrwt  2 root root 4096 Aug 18 11:28 .ICE-unix
140612 drwxr-xr-x  2 root root 4096 Aug 18 13:36 inode
140574 srw-----  1 root root    0 Aug 18 11:32 .java_pid1704
140611 srw-----  1 root root    0 Aug 18 11:33 .java_pid2098
134331 drwx-----  2 root root 4096 Aug 18 11:29 pulse-PKdhtXMmr18n
130573 drwxrwxrwt  2 root root 4096 Aug 18 11:28 .Test-unix
130569 drwxrwxrwt  2 root root 4096 Aug 18 11:28 .X11-unix
130571 drwxrwxrwt  2 root root 4096 Aug 18 11:28 .XIM-unix
```

```
root@ubuntu1604:~# ls -lai /tmp
total 40
390918 drwxrwxrwt 10 root root 4096 oct.  7 16:31 .
      2 drwxr-xr-x 24 root root 4096 sept. 28 10:40 ..
521792 drwxrwxrwt  2 root root 4096 sept. 28 10:31 .font-unix
522570 drwxr-xr-x  2 root root 4096 sept. 28 10:34 hsperfdata_root
521777 drwxrwxrwt  2 root root 4096 sept. 28 10:31 .ICE-unix
521308 drwxr-xr-x  2 root root 4096 sept. 29 10:32 inode
395765 srw-----  1 root root    0 sept. 28 10:34 .java_pid2124
521306 drwx-----  3 root root 4096 sept. 29 10:19 systemd-private-cd33d40e1d3a4e08a9cde3de3603311e-systemd-
timesyncd.service-bxC1MJ
521801 drwxrwxrwt  2 root root 4096 sept. 28 10:31 .Test-unix
521757 drwxrwxrwt  2 root root 4096 sept. 28 10:31 .X11-unix
521785 drwxrwxrwt  2 root root 4096 sept. 28 10:31 .XIM-unix
root@ubuntu1604:~# ls -ali /tmp
total 40
390918 drwxrwxrwt 10 root root 4096 oct.  7 16:31 .
      2 drwxr-xr-x 24 root root 4096 sept. 28 10:40 ..
521792 drwxrwxrwt  2 root root 4096 sept. 28 10:31 .font-unix
522570 drwxr-xr-x  2 root root 4096 sept. 28 10:34 hsperfdata_root
521777 drwxrwxrwt  2 root root 4096 sept. 28 10:31 .ICE-unix
521308 drwxr-xr-x  2 root root 4096 sept. 29 10:32 inode
395765 srw-----  1 root root    0 sept. 28 10:34 .java_pid2124
521306 drwx-----  3 root root 4096 sept. 29 10:19 systemd-private-cd33d40e1d3a4e08a9cde3de3603311e-systemd-
timesyncd.service-bxC1MJ
521801 drwxrwxrwt  2 root root 4096 sept. 28 10:31 .Test-unix
521757 drwxrwxrwt  2 root root 4096 sept. 28 10:31 .X11-unix
521785 drwxrwxrwt  2 root root 4096 sept. 28 10:31 .XIM-unix
```

```
[root@centos7 ~]# ls -lai /tmp
total 244
 11071 drwxrwxrwt. 10 root root    260 Sep 30 06:24 .
   128 dr-xr-xr-x. 18 root root  4096 Dec 10 2015 ..
 13635 drwxrwxrwt.  2 root root    40 Sep 28 10:48 .font-unix
```

```

 24858 drwxr-xr-x.  2 root root    100 Sep 30 06:05 hsperfdata_root
 13597 drwxrwxrwt.  2 root root     40 Sep 28 10:48 .ICE-unix
287056 drwxr-xr-x.  2 root root    100 Sep 28 12:30 inode
 24861 srw-----  1 root root     0 Sep 28 10:52 .java_pid3213
 25344 srw-----  1 root root     0 Sep 28 10:52 .java_pid3302
 16615 drwx-----  3 root root     60 Sep 28 10:49 systemd-private-45071248a58f4fd2a4de940a5734c8ec-
cups.service-0Dc5L6
 13595 drwxrwxrwt.  2 root root     40 Sep 28 10:48 .Test-unix
 13590 drwxrwxrwt.  2 root root     40 Sep 28 10:48 .X11-unix
 13629 drwxrwxrwt.  2 root root     40 Sep 28 10:48 .XIM-unix
8098838 -rw-----  1 root root 242724 Sep 30 05:45 yum_save_tx.2016-09-30.05-45.FF7K04.yumtx
[root@centos7 ~]# ls -ali /tmp
total 244
 11071 drwxrwxrwt. 10 root root    260 Sep 30 06:24 .
   128 dr-xr-xr-x. 18 root root   4096 Dec 10 2015 ..
 13635 drwxrwxrwt.  2 root root     40 Sep 28 10:48 .font-unix
 24858 drwxr-xr-x.  2 root root    100 Sep 30 06:05 hsperfdata_root
 13597 drwxrwxrwt.  2 root root     40 Sep 28 10:48 .ICE-unix
287056 drwxr-xr-x.  2 root root    100 Sep 28 12:30 inode
 24861 srw-----  1 root root     0 Sep 28 10:52 .java_pid3213
 25344 srw-----  1 root root     0 Sep 28 10:52 .java_pid3302
 16615 drwx-----  3 root root     60 Sep 28 10:49 systemd-private-45071248a58f4fd2a4de940a5734c8ec-
cups.service-0Dc5L6
 13595 drwxrwxrwt.  2 root root     40 Sep 28 10:48 .Test-unix
 13590 drwxrwxrwt.  2 root root     40 Sep 28 10:48 .X11-unix
 13629 drwxrwxrwt.  2 root root     40 Sep 28 10:48 .XIM-unix
8098838 -rw-----  1 root root 242724 Sep 30 05:45 yum_save_tx.2016-09-30.05-45.FF7K04.yumtx

```

```

SLES12SP1:~ # ls -lai /tmp
total 8
256 drwxrwxrwt 1 root    root    802 Oct  2 01:00 .
256 drwxr-xr-x 1 root    root    156 May  1 14:55 ..
258 drwxrwxrwt 1 root    root     0 May  3 13:54 .ICE-unix
261 drwxrwxrwt 1 root    root     0 May  2 15:56 .Test-unix

```

```

257 drwxrwxrwt 1 root    root    0 May  3 13:53 .X11-unix
259 drwxrwxrwt 1 root    root    0 May  2 15:56 .XIM-unix
373 drwx----- 1 trainee users   12 May  3 13:54 .esd-1000
279 drwx----- 1 gdm     gdm     0 May  3 13:54 .esd-486
260 drwxrwxrwt 1 root    root    0 May  2 15:56 .font-unix
502 srw----- 1 root    root    0 Sep 30 10:26 .java_pid2399
462 srw----- 1 root    root    0 Aug 18 12:48 .java_pid2546
448 srw----- 1 root    root    0 May  3 14:01 .java_pid3281
403 drwxr-xr-x 1 root    root    8 Sep 30 10:26 hsperfdata_root
488 drwxr-xr-x 1 trainee users   48 Aug 18 13:14 inode
444 -rwxrwxrwx 1 root    root   50048 May  3 14:01 managera1411267841657715235client
439 -rwxrwxrwx 1 root    root   50048 May  3 14:01 managera3336001029897679475server
440 -rwxrwxrwx 1 root    root   50048 May  3 14:01 managera4847938942232964844client
443 -rwxrwxrwx 1 root    root   50048 May  3 14:01 managera5050357016347721452server
388 drwx----- 1 root    root    6 May  3 13:54 systemd-private-04f820fa26c745be8ddba814c6292f21-rtkit-
daemon.service-04lKP5
427 -rw-r--r-- 1 root    root    0 May  3 14:01 systemictmp5578677472245134133dat
426 drwxr-xr-x 1 root    root    0 May  3 14:01 systemictmp7082392205020802884dat
SLES12SP1:~ # ls -ali /tmp
total 8
256 drwxrwxrwt 1 root    root   802 Oct  2 01:00 .
256 drwxr-xr-x 1 root    root   156 May  1 14:55 ..
258 drwxrwxrwt 1 root    root    0 May  3 13:54 .ICE-unix
261 drwxrwxrwt 1 root    root    0 May  2 15:56 .Test-unix
257 drwxrwxrwt 1 root    root    0 May  3 13:53 .X11-unix
259 drwxrwxrwt 1 root    root    0 May  2 15:56 .XIM-unix
373 drwx----- 1 trainee users   12 May  3 13:54 .esd-1000
279 drwx----- 1 gdm     gdm     0 May  3 13:54 .esd-486
260 drwxrwxrwt 1 root    root    0 May  2 15:56 .font-unix
502 srw----- 1 root    root    0 Sep 30 10:26 .java_pid2399
462 srw----- 1 root    root    0 Aug 18 12:48 .java_pid2546
448 srw----- 1 root    root    0 May  3 14:01 .java_pid3281
403 drwxr-xr-x 1 root    root    8 Sep 30 10:26 hsperfdata_root
488 drwxr-xr-x 1 trainee users   48 Aug 18 13:14 inode

```

```
444 -rwxrwxrwx 1 root root 50048 May 3 14:01 managera1411267841657715235client
439 -rwxrwxrwx 1 root root 50048 May 3 14:01 managera3336001029897679475server
440 -rwxrwxrwx 1 root root 50048 May 3 14:01 managera4847938942232964844client
443 -rwxrwxrwx 1 root root 50048 May 3 14:01 managera5050357016347721452server
388 drwx----- 1 root root 6 May 3 13:54 systemd-private-04f820fa26c745be8ddba814c6292f21-rtkit-
daemon.service-o4lKP5
427 -rw-r--r-- 1 root root 0 May 3 14:01 systemicontmp5578677472245134133dat
426 drwxr-xr-x 1 root root 0 May 3 14:01 systemicontmp7082392205020802884dat
```

However **ls -l -all -inode** cannot be written **ls -l -allinode**:

```
root@debian8:~# ls -l --all --inode /tmp
total 40
130564 drwxrwxrwt 10 root root 4096 Aug 20 09:17 .
    2 drwxr-xr-x 22 root root 4096 Aug 1 12:38 ..
130572 drwxrwxrwt 2 root root 4096 Aug 18 11:28 .font-unix
134332 drwxr-xr-x 2 root root 4096 Aug 18 11:33 hsperrdata_root
130570 drwxrwxrwt 2 root root 4096 Aug 18 11:28 .ICE-unix
140612 drwxr-xr-x 2 root root 4096 Aug 18 13:36 inode
140574 srw----- 1 root root 0 Aug 18 11:32 .java_pid1704
140611 srw----- 1 root root 0 Aug 18 11:33 .java_pid2098
134331 drwx----- 2 root root 4096 Aug 18 11:29 pulse-PKdhtXMmr18n
130573 drwxrwxrwt 2 root root 4096 Aug 18 11:28 .Test-unix
130569 drwxrwxrwt 2 root root 4096 Aug 18 11:28 .X11-unix
130571 drwxrwxrwt 2 root root 4096 Aug 18 11:28 .XIM-unix

root@debian8:~# ls -l --allinode /tmp
ls: unrecognized option '--allinode'
Try 'ls --help' for more information.
```

```
root@ubuntu1604:~# ls -l --all --inode /tmp
total 40
390918 drwxrwxrwt 10 root root 4096 oct. 7 16:31 .
    2 drwxr-xr-x 24 root root 4096 sept. 28 10:40 ..
```

```
521792 drwxrwxrwt  2 root root 4096 sept. 28 10:31 .font-unix
522570 drwxr-xr-x  2 root root 4096 sept. 28 10:34 hsperfdata_root
521777 drwxrwxrwt  2 root root 4096 sept. 28 10:31 .ICE-unix
521308 drwxr-xr-x  2 root root 4096 sept. 29 10:32 inode
395765 srw-----  1 root root    0 sept. 28 10:34 .java_pid2124
521306 drwx-----  3 root root 4096 sept. 29 10:19 systemd-private-cd33d40e1d3a4e08a9cde3de3603311e-systemd-
timesyncd.service-bxC1MJ
521801 drwxrwxrwt  2 root root 4096 sept. 28 10:31 .Test-unix
521757 drwxrwxrwt  2 root root 4096 sept. 28 10:31 .X11-unix
521785 drwxrwxrwt  2 root root 4096 sept. 28 10:31 .XIM-unix
```

```
root@ubuntu1604:~# ls -l --allinode /tmp
ls: unrecognized option '--allinode'
Try 'ls --help' for more information.
```

```
[root@centos7 ~]# ls -l --all --inode /tmp
total 244
 11071 drwxrwxrwt. 10 root root    260 Sep 30 06:24 .
   128 dr-xr-xr-x. 18 root root   4096 Dec 10 2015 ..
 13635 drwxrwxrwt.  2 root root    40  Sep 28 10:48 .font-unix
 24858 drwxr-xr-x.  2 root root   100  Sep 30 06:05 hsperfdata_root
 13597 drwxrwxrwt.  2 root root    40  Sep 28 10:48 .ICE-unix
287056 drwxr-xr-x.  2 root root   100  Sep 28 12:30 inode
 24861 srw-----.  1 root root    0  Sep 28 10:52 .java_pid3213
 25344 srw-----.  1 root root    0  Sep 28 10:52 .java_pid3302
 16615 drwx-----.  3 root root    60  Sep 28 10:49 systemd-private-45071248a58f4fd2a4de940a5734c8ec-
cups.service-0Dc5L6
 13595 drwxrwxrwt.  2 root root    40  Sep 28 10:48 .Test-unix
 13590 drwxrwxrwt.  2 root root    40  Sep 28 10:48 .X11-unix
 13629 drwxrwxrwt.  2 root root    40  Sep 28 10:48 .XIM-unix
8098838 -rw-----.  1 root root 242724 Sep 30 05:45 yum_save_tx.2016-09-30.05-45.FF7K04.yumtx
```

```
[root@centos7 ~]# ls -l --allinode /tmp
ls: unrecognized option '--allinode'
```

Try 'ls --help' for more information

```
SLES12SP1:~ # ls -l --all --inode /tmp
total 8
256 drwxrwxrwt 1 root    root    802 Oct  2 01:00 .
256 drwxr-xr-x 1 root    root    156 May  1 14:55 ..
258 drwxrwxrwt 1 root    root     0 May  3 13:54 .ICE-unix
261 drwxrwxrwt 1 root    root     0 May  2 15:56 .Test-unix
257 drwxrwxrwt 1 root    root     0 May  3 13:53 .X11-unix
259 drwxrwxrwt 1 root    root     0 May  2 15:56 .XIM-unix
373 drwx----- 1 trainee users   12 May  3 13:54 .esd-1000
279 drwx----- 1 gdm     gdm     0 May  3 13:54 .esd-486
260 drwxrwxrwt 1 root    root     0 May  2 15:56 .font-unix
502 srw----- 1 root    root     0 Sep 30 10:26 .java_pid2399
462 srw----- 1 root    root     0 Aug 18 12:48 .java_pid2546
448 srw----- 1 root    root     0 May  3 14:01 .java_pid3281
403 drwxr-xr-x 1 root    root     8 Sep 30 10:26 hsperfdata_root
488 drwxr-xr-x 1 trainee users    48 Aug 18 13:14 inode
444 -rwxrwxrwx 1 root    root  50048 May  3 14:01 managera1411267841657715235client
439 -rwxrwxrwx 1 root    root  50048 May  3 14:01 managera3336001029897679475server
440 -rwxrwxrwx 1 root    root  50048 May  3 14:01 managera4847938942232964844client
443 -rwxrwxrwx 1 root    root  50048 May  3 14:01 managera5050357016347721452server
388 drwx----- 1 root    root     6 May  3 13:54 systemd-private-04f820fa26c745be8ddba814c6292f21-rtkit-
daemon.service-o4lKP5
427 -rw-r--r-- 1 root    root     0 May  3 14:01 systemcontmp5578677472245134133dat
426 drwxr-xr-x 1 root    root     0 May  3 14:01 systemcontmp7082392205020802884dat
```

```
SLES12SP1:~ # ls -l --allinode /tmp
ls: unrecognized option '--allinode'
Try 'ls --help' for more information.
```



Important - You should **not** combine any short options that take an argument.

Manipulating Text Files

Text files play a very important role under Linux. For example, almost all configuration files are simple text files and being able to manipulate them is of great importance. Manipulating text files is essentially achieved by using **Regular Expressions**. There are two types of Regular Expressions:

- The IEEE POSIX Basic Regular Expressions (**BRE**) understood by the commands **vi**, **grep**, **expr** and **sed**,
- The IEEE POSIX Extended Regular Expressions (**ERE**) understood by the commands **egrep** (`grep -E`) and **awk**.

Regular Expressions

Regular Expressions use **Metacharacters**. Certain are common to both BREs and EREs:

Metacharacter	Description
<code>^string</code>	Match lines beginning with <i>string</i>
<code>string\$</code>	Match lines ending with <i>string</i>
<code>\Metacharacter</code>	Cancel any special effect associated with <i>Metacharacter</i>
<code>[string]</code>	Match any of the characters within <i>string</i>
<code>[^string]</code>	Exclude any of the characters in <i>string</i>
<code>.</code>	Match any character except when at the end of a line
<code>character*</code>	Match 0 or more occurrences of <i>character</i>
<code>\<</code>	Match <i>string</i> at the beginning of a word
<code>\></code>	Match <i>string</i> at the end of a word

BREs

Certain Metacharacters are specific to BREs:

Metacharacter	Description
<code>\{x,y\}</code>	Match from x to y occurrences of the preceding element
<code>\{x\}</code>	Match exactly x occurrences of the preceding element

Metacharacter	Description
\{x,\}	Match x or more occurrences of the preceding element
\(BRE)	Commit to memory the BRE
\1	Recall the first BRE committed to memory
\2, \3 ...	Recall the second BRE committed to memory, recall the third BRE committed to memory ...

EREs

Certain Metacharacters are specific to EREs:

Metacharacter	Description
{x,y}	Match from x to y occurrences of the preceding element
{x}	Match exactly x occurrences of the preceding element
{x,}	
?	Matches 0 or 1 occurrence of the preceding element
+	Matches 1 or more occurrence(s) of the preceding element
	Matches either the expression before or the expression after the operator
()	Combines the Regular Expressions between the parentheses

Text-search Utilities

The grep Command

The **grep** command can be used to find lines containing a string of characters in a group of files. The **-v** or **-invert-case** option can be stipulated to find lines that do **not** contain the specified string.

The grep command is case sensitive. The **-i** or **-ignore-case** option can be specified in order to use grep in a non case sensitive search.

The grep command can also use **BREs**.

Command Line Switches



To do : Use the **-help** option of the **grep** command to view the command line switches.

The egrep Command

The **egrep** command is identical to the **grep** command when used with the **-E** switch. Both can use EREs.

Command Line Switches



To do : Use the **-help** option of the **egrep** command to view the command line switches.

The fgrep Command

The **fgrep** command is identical to the **grep** command when used with the **-F** switch. Both have no knowledge of Regular Expressions.



To do : Use the **-help** option of the **fgrep** command to view the command line switches.

LAB #1 - Using grep, egrep and fgrep

Download the following file by clicking on it's title:

[greptest](#)

```
fenestr0S
fenestros
555-5555
f
.fenestros
.fe
£
```

Move the file to the **/tmp** directory:

```
root@debian8:~# mv /home/trainee/Downloads/greptest /tmp/greptest
```

```
root@ubuntu1604:~# mv /home/trainee/Downloads/greptest /tmp/greptest
```

```
[root@centos7 ~]# mv /home/trainee/Downloads/greptest /tmp/greptest
```

```
SLES12SP1:~ # mv /home/trainee/Downloads/greptest /tmp/greptest
```

Now use `grep` to search for lines containing at least one uppercase or lowercase letter:

```
root@debian8:~# grep '[a-zA-Z]' /tmp/greptest
fenestr0S
fenestros
f
.fenestros
.fe
```

```
root@ubuntu1604:~# grep '[a-zA-Z]' /tmp/greptest
```

```
fenestr0S
fenestros
f
.fenestros
.fe
```

```
[root@centos7 ~]# grep '[a-zA-Z]' /tmp/greptest
fenestr0S
fenestros
f
.fenestros
.fe
```

```
SLES12SP1:~ # grep '[a-zA-Z]' /tmp/greptest
fenestr0S
fenestros
f
.fenestros
.fe
```

Next use grep to search for lines containing at least one uppercase or lowercase letter or a number:

```
root@debian8:~# grep '[a-zA-Z0-9]' /tmp/greptest
fenestr0S
fenestros
555-5555
f
.fenestros
.fe
```

```
root@ubuntu1604:~# grep '[a-zA-Z0-9]' /tmp/greptest
fenestr0S
fenestros
555-5555
```

```
f
.fenestros
.fe
```

```
[root@centos7 ~]# grep '[a-zA-Z0-9]' /tmp/greptest
fenestr0S
fenestros
555-5555
f
.fenestros
.fe
```

```
SLES12SP1:~ # grep '[a-zA-Z0-9]' /tmp/greptest
fenestr0S
fenestros
555-5555
f
.fenestros
.fe
```

To search for the NNN-NNNN pattern where N is a number, use the following command:

```
root@debian8:~# grep '[0-9]\{3\}-[0-9]\{4\}' /tmp/greptest
555-5555
```

```
root@ubuntu1604:~# grep '[0-9]\{3\}-[0-9]\{4\}' /tmp/greptest
555-5555
```

```
[root@centos7 ~]# grep '[0-9]\{3\}-[0-9]\{4\}' /tmp/greptest
555-5555
```

```
SLES12SP1:~ # grep '[0-9]\{3\}-[0-9]\{4\}' /tmp/greptest
555-5555
```

Lines containing just one character have that character both at the beginning (^) and at the end (\$) of the line:

```
root@debian8:~# grep '^.$' /tmp/greptest
f
£
```

```
root@ubuntu1604:~# grep '^.$' /tmp/greptest
f
£
```

```
[root@centos7 ~]# grep '^.$' /tmp/greptest
f
£
```

```
SLES12SP1:~ # grep '^.$' /tmp/greptest
f
£
```

To search for a line containing a special character such as ., that character needs to be preceded by \:

```
root@debian8:~# grep '^\. ' /tmp/greptest
.fenestros
.fe
```

```
root@ubuntu1604:~# grep '^\. ' /tmp/greptest
.fenestros
.fe
```

```
[root@centos7 ~]# grep '^\. ' /tmp/greptest
.fenestros
.fe
```

```
SLES12SP1:~ # grep '^\. ' /tmp/greptest
```

```
.fenestros  
.fe
```



The grep command can also be used to search for a string in all the files within a specific directory as follows **grep -rnw 'directory' -e "pattern"**. You can also search only within certain files by specifying the files extensions: **grep -include={*.doc,*.xls} -rnw 'directory' -e "pattern"**. Finally you can exclude certain file extensions as follows: **grep -exclude=*.doc -rnw 'directory' -e "pattern"**.

Download the following file by clicking on it's title:

[greptest](#)

```
# Starting comment  
fenestr0S  
fenestros  
# Another comment  
555-5555  
f  
  
.fenestros  
  
.fe  
  
£  
# End comment
```

Move the file to the **/tmp** directory:

```
root@debian8:~# mv /home/trainee/Downloads/greptest /tmp/greptest
```

```
root@ubuntu1604:~# mv /home/trainee/Downloads/greptest /tmp/greptest
```

```
[root@centos7 ~]# mv /home/trainee/Downloads/greptest /tmp/greptest
```

```
SLES12SP1:~ # mv /home/trainee/Downloads/greptest /tmp/greptest
```

Now use the **grep** command with the **-E** switch to remove all the comments and empty lines:

```
root@debian8:~# grep -E -v '^(#|$)' /tmp/greptest
fenestr0S
fenestros
555-5555
f
.fenestros
.fe
£
```

```
root@ubuntu1604:~# grep -E -v '^(#|$)' /tmp/greptest
fenestr0S
fenestros
555-5555
f
.fenestros
.fe
£
```

```
[root@centos7 ~]# grep -E -v '^(#|$)' /tmp/greptest
fenestr0S
fenestros
555-5555
f
.fenestros
.fe
```

```
£
```

```
SLES12SP1:~ # grep -E -v '^(#|$)' /tmp/greptest
fenestr0S
fenestros
555-5555
f
.fenestros
.fe
£
```



The expression `^(#|$)` matches all lines beginning with the `#` character OR all lines with zero characters between the start and the end of the line.

Now use the **egrep** command to do the same thing, this time redirecting the output to the file **/tmp/greptest1**:

```
root@debian8:~# egrep -v '^(#|$)' /tmp/greptest > /tmp/greptest1
root@debian8:~# cat /tmp/greptest1
fenestr0S
fenestros
555-5555
f
.fenestros
.fe
£
```

```
root@ubuntu1604:~# egrep -v '^(#|$)' /tmp/greptest > /tmp/greptest1
root@ubuntu1604:~# cat /tmp/greptest1
fenestr0S
fenestros
555-5555
```

```
f
.fenestros
.fe
£
```

```
[root@centos7 ~]# egrep -v '^(#|$)' /tmp/greptest > /tmp/greptest1
[root@centos7 ~]# cat /tmp/greptest1
fenestr0S
fenestros
555-5555
f
.fenestros
.fe
£
```

```
SLES12SP1:~ # egrep -v '^(#|$)' /tmp/greptest > /tmp/greptest1
SLES12SP1:~ # cat /tmp/greptest1
fenestr0S
fenestros
555-5555
f
.fenestros
.fe
£
```



Important: The above command is very useful when you want to quickly ascertain which directives are active in a very long configuration file.

Download the following file by clicking on it's title:

[greptest](#)

```
# Starting comment
^ This line will be used to demonstrate the use of fgrep
fenestr0S
fenestros
# Another comment
555-5555
f

.fenestros

.fe

f
# End comment
```

Move the file to the **/tmp** directory:

```
root@debian8:~# mv /home/trainee/Downloads/greptest /tmp/greptest
```

```
root@ubuntu1604:~# mv /home/trainee/Downloads/greptest /tmp/greptest
```

```
[root@centos7 ~]# mv /home/trainee/Downloads/greptest /tmp/greptest
```

```
SLES12SP1:~ # mv /home/trainee/Downloads/greptest /tmp/greptest
```

Now use `fgrep` to match the line starting with the `^` character:

```
root@debian8:~# fgrep '^' /tmp/greptest
^ This line will be used to demonstrate the use of fgrep
```

```
root@ubuntu1604:~# fgrep '^' /tmp/greptest
^ This line will be used to demonstrate the use of fgrep
```

```
[root@centos7 ~]# fgrep '^' /tmp/greptest  
^ This line will be used to demonstrate the use of fgrep
```

```
SLES12SP1:~ # fgrep '^' /tmp/greptest  
^ This line will be used to demonstrate the use of fgrep
```

Compare the above output to that when using the grep command:

```
root@debian8:~# grep '^' /tmp/greptest  
# Starting comment  
^ This line will be used to demonstrate the use of fgrep  
fenestr0S  
fenestros  
# Another comment  
555-5555  
f  
  
.fenestros  
  
.fe  
  
£  
# End comment
```

```
root@ubuntu1604:~# grep '^' /tmp/greptest  
# Starting comment  
^ This line will be used to demonstrate the use of fgrep  
fenestr0S  
fenestros  
# Another comment  
555-5555  
f  
  
.fenestros
```

```
.fe  
  
£  
# End comment
```

```
[root@centos7 ~]# grep '^' /tmp/greptest  
# Starting comment  
^ This line will be used to demonstrate the use of fgrep  
fenestr0S  
fenestros  
# Another comment  
555-5555  
f  
  
.fenestros  
  
.fe  
  
£  
# End comment
```

```
SLES12SP1:~ # grep '^' /tmp/greptest  
# Starting comment  
^ This line will be used to demonstrate the use of fgrep  
fenestr0S  
fenestros  
# Another comment  
555-5555  
f  
  
.fenestros  
  
.fe
```

```
£  
# End comment
```

As you can see, `grep` matched **every** line that had a *beginning*. In order to get the same result as the `grep` command, you need to use the following command:

```
root@debian8:~# grep '^\\^' /tmp/greptest  
^ This line will be used to demonstrate the use of fgrep
```

```
root@ubuntu1604:~# grep '^\\^' /tmp/greptest  
^ This line will be used to demonstrate the use of fgrep
```

```
[root@centos7 ~]# grep '^\\^' /tmp/greptest  
^ This line will be used to demonstrate the use of fgrep
```

```
SLES12SP1:~ # grep '^\\^' /tmp/greptest  
^ This line will be used to demonstrate the use of fgrep
```

The Stream Editor SED

sed is an abbreviation of *Stream Editor* and is a non-interactive text editor. `sed`'s basic syntax is as follows:

```
sed [address] command [arguments] file
```

The specified commands are applied to each line in the file unless an *address* is specified. `Sed` prints all results to standard output and does not modify the source file. The address therefore specifies which lines are concerned by the command.

`sed`'s addresses are as follows:

address	Matching lines
x	Line number x
\$	The last line of the file

address	Matching lines
/BRE/	Lines matching the specified BRE
x,y	From line x to line y
/ERb1/, /ERb2/	All lines from the first line that matches the first BRE to the first line that matches the second BRE

sed's commands are as follows:

command	Description
d	Do not show the matching line(s) on standard output
p	Show the matching line(s) on standard output
s	Do a substitution upon match
w	Write the matching line(s) to a file
=	Print the matching line's number
!	Exclude the line(s) matching the address

Command Line Switches



To do : Use the **-help** option of the **fgrep** command to view the command line switches.

LAB #2 - Using sed

Start by displaying the contents of the file **/etc/services** whilst inhibiting the display of the first 10 lines:

```
root@debian8:~# sed '1,10d' /etc/services | more
# If you need a huge list of used numbers please install the nmap package.

tcpmux      1/tcp          # TCP port service multiplexer
echo        7/tcp
echo        7/udp
```

```
discard    9/tcp      sink null
discard    9/udp      sink null
systat     11/tcp     users
daytime    13/tcp
daytime    13/udp
netstat    15/tcp
qotd       17/tcp     quote
msp        18/tcp     # message send protocol
msp        18/udp
chargen    19/tcp     ttytst source
chargen    19/udp     ttytst source
ftp-data   20/tcp
ftp        21/tcp
fsp        21/udp     fspd
ssh        22/tcp     # SSH Remote Login Protocol
ssh        22/udp
telnet     23/tcp
smtp       25/tcp     mail
--More--
```

```
root@ubuntu1604:~# sed '1,10d' /etc/services | more
# If you need a huge list of used numbers please install the nmap package.
```

```
tcpmux     1/tcp      # TCP port service multiplexer
echo       7/tcp
echo       7/udp
discard    9/tcp      sink null
discard    9/udp      sink null
systat     11/tcp     users
daytime    13/tcp
daytime    13/udp
netstat    15/tcp
qotd       17/tcp     quote
msp        18/tcp     # message send protocol
```

```
msp      18/udp
chargen  19/tcp      ttytst source
chargen  19/udp      ttytst source
ftp-data 20/tcp
ftp      21/tcp
fsp      21/udp      fspd
ssh      22/tcp      # SSH Remote Login Protocol
ssh      22/udp
telnet   23/tcp
smtp     25/tcp      mail
--More--
```

```
[root@centos7 ~]# sed '1,10d' /etc/services | more
# are included, only the more common ones.
#
# The latest IANA port assignments can be gotten from
#   http://www.iana.org/assignments/port-numbers
# The Well Known Ports are those from 0 through 1023.
# The Registered Ports are those from 1024 through 49151
# The Dynamic and/or Private Ports are those from 49152 through 65535
#
# Each line describes one service, and is of the form:
#
# service-name port/protocol [aliases ...] [# comment]

tcpmux    1/tcp      # TCP port service multiplexer
tcpmux    1/udp      # TCP port service multiplexer
rje       5/tcp      # Remote Job Entry
rje       5/udp      # Remote Job Entry
echo      7/tcp
echo      7/udp
discard   9/tcp      sink null
discard   9/udp      sink null
sysstat   11/tcp     users
```

```
systat      11/udp      users
daytime     13/tcp
--More--
```

```
SLES12SP1:~ # sed '1,10d' /etc/services | more
# See also: services(5)
#
#
# SERVICE NAME AND TRANSPORT PROTOCOL PORT NUMBER REGISTRY
#
# (last updated on 2011-11-23)
#
# *****
# * Since we merged and converted this registry it loads more slowly. We *
# * know it should load faster and are working on ways to achieve that. *
# * Thank you for your patience. *
# *****
#
# Service names and port numbers are used to distinguish between different
# services that run over transport protocols such as TCP, UDP, DCCP, and
# SCTP.
#
# Service names are assigned on a first-come, first-served process, as
# documented in [RFC6335].
#
# Port numbers are assigned in various ways, based on three ranges: System
# Ports (0-1023), User Ports (1024-49151), and the Dynamic and/or Private
# Ports (49152-65535); the difference uses of these ranges is described in
--More--
```

Now display the same file without any commented lines:

```
root@debian8:~# sed '/^#/d' /etc/services | more
```

```
tcpmux      1/tcp          # TCP port service multiplexer
echo        7/tcp
echo        7/udp
discard     9/tcp      sink null
discard     9/udp      sink null
systat      11/tcp      users
daytime     13/tcp
daytime     13/udp
netstat     15/tcp
qotd        17/tcp      quote
msp         18/tcp      # message send protocol
msp         18/udp
chargen     19/tcp      ttytst source
chargen     19/udp      ttytst source
ftp-data    20/tcp
ftp         21/tcp
fsp         21/udp      fspd
ssh         22/tcp      # SSH Remote Login Protocol
ssh         22/udp
telnet      23/tcp
smtp        25/tcp      mail
time        37/tcp      timserver
--More--
```

```
root@ubuntu1604:~# sed '/^#/d' /etc/services | more
```

```
tcpmux      1/tcp          # TCP port service multiplexer
echo        7/tcp
echo        7/udp
discard     9/tcp      sink null
discard     9/udp      sink null
systat      11/tcp      users
daytime     13/tcp
daytime     13/udp
```

```
netstat    15/tcp
qotd      17/tcp      quote
msp       18/tcp      # message send protocol
msp       18/udp
chargen   19/tcp      ttytst source
chargen   19/udp      ttytst source
ftp-data  20/tcp
ftp       21/tcp
fsp       21/udp      fspd
ssh       22/tcp      # SSH Remote Login Protocol
ssh       22/udp
telnet    23/tcp
smtp      25/tcp      mail
time      37/tcp      timserver
--More--
```

```
[root@centos7 ~]# sed '/^#/d' /etc/services | more
```

```
tcpmux    1/tcp      # TCP port service multiplexer
tcpmux    1/udp      # TCP port service multiplexer
rje       5/tcp      # Remote Job Entry
rje       5/udp      # Remote Job Entry
echo      7/tcp
echo      7/udp
discard   9/tcp      sink null
discard   9/udp      sink null
systat    11/tcp     users
systat    11/udp     users
daytime   13/tcp
daytime   13/udp
qotd      17/tcp     quote
qotd      17/udp     quote
msp       18/tcp     # message send protocol
msp       18/udp     # message send protocol
```

```
chargen      19/tcp      ttytst source
chargen      19/udp      ttytst source
ftp-data     20/tcp
ftp-data     20/udp
ftp          21/tcp
ftp          21/udp      fsp fspd
--More--
```

```
SLES12SP1:~ # sed '/^#/d' /etc/services | more
tcpmux       1/tcp      # TCP Port Service Multiplexer [Mark_Lottor]
tcpmux       1/udp      # TCP Port Service Multiplexer [Mark_Lottor]
compressnet  2/tcp      # Management Utility
compressnet  2/udp      # Management Utility
compressnet  3/tcp      # Compression Process [Bernie_Volz]
compressnet  3/udp      # Compression Process [Bernie_Volz]
rje          5/tcp      # Remote Job Entry [Jon_Postel]
rje          5/udp      # Remote Job Entry [Jon_Postel]
echo         7/tcp      # Echo [Jon_Postel]
echo         7/udp      # Echo [Jon_Postel]
discard      9/tcp      # Discard [Jon_Postel]
discard      9/udp      # Discard [Jon_Postel]
discard      9/sctp     # Discard [Randall_Stewart] [RFC4960]
discard      9/dccp     # Discard [Eddie_Kohler] [RFC4340]
systat       11/tcp     # Active Users [Jon_Postel]
systat       11/udp     # Active Users [Jon_Postel]
daytime      13/tcp     # Daytime [RFC867] [Jon_Postel]
daytime      13/udp     # Daytime [RFC867] [Jon_Postel]
qotd         17/tcp     # Quote of the Day [Jon_Postel]
qotd         17/udp     # Quote of the Day [Jon_Postel]
msp          18/tcp     # Message Send Protocol (historic) [Rina_Nethan
iel]
msp          18/udp     # Message Send Protocol (historic) [Rina_Nethan
--More--
```



Important: Note that the BRE is preceded and followed by the / character.

Continue by trying to just display the first two lines of **/etc/passwd**:

```
root@debian8:~# sed '1,2p' /etc/passwd
root:x:0:0:root:/root:/bin/bash
root:x:0:0:root:/root:/bin/bash
daemon:x:1:1:daemon:/usr/sbin:/usr/sbin/nologin
daemon:x:1:1:daemon:/usr/sbin:/usr/sbin/nologin
bin:x:2:2:bin:/bin:/usr/sbin/nologin
sys:x:3:3:sys:/dev:/usr/sbin/nologin
sync:x:4:65534:sync:/bin:/bin/sync
games:x:5:60:games:/usr/games:/usr/sbin/nologin
man:x:6:12:man:/var/cache/man:/usr/sbin/nologin
lp:x:7:7:lp:/var/spool/lpd:/usr/sbin/nologin
...
```

```
root@ubuntu1604:~# sed '1,2p' /etc/passwd
root:x:0:0:root:/root:/bin/bash
root:x:0:0:root:/root:/bin/bash
daemon:x:1:1:daemon:/usr/sbin:/usr/sbin/nologin
daemon:x:1:1:daemon:/usr/sbin:/usr/sbin/nologin
bin:x:2:2:bin:/bin:/usr/sbin/nologin
sys:x:3:3:sys:/dev:/usr/sbin/nologin
sync:x:4:65534:sync:/bin:/bin/sync
...
```

```
[root@centos7 ~]# sed '1,2p' /etc/passwd
root:x:0:0:root:/root:/bin/bash
root:x:0:0:root:/root:/bin/bash
bin:x:1:1:bin:/bin:/sbin/nologin
```

```
bin:x:1:1:bin:/bin:/sbin/nologin
daemon:x:2:2:daemon:/sbin:/sbin/nologin
adm:x:3:4:adm:/var/adm:/sbin/nologin
lp:x:4:7:lp:/var/spool/lpd:/sbin/nologin
...
```

```
SLES12SP1:~ # sed '1,2p' /etc/passwd
at:x:25:25:Batch jobs daemon:/var/spool/atjobs:/bin/bash
at:x:25:25:Batch jobs daemon:/var/spool/atjobs:/bin/bash
bin:x:1:1:bin:/bin:/bin/bash
bin:x:1:1:bin:/bin:/bin/bash
daemon:x:2:2:Daemon:/sbin:/bin/bash
ftp:x:40:49:FTP account:/srv/ftp:/bin/bash
ftppsecure:x:488:65534:Secure FTP User:/var/lib/empty:/bin/false
...
```



Important: As you can see in the above output, the command used displays not only the first two lines but **also** the entire file. As a result the first two lines are displayed twice.

To force sed to **only** display the lines you specify, use the **-n** switch:

```
root@debian8:~# sed -n '1,2p' /etc/passwd
root:x:0:0:root:/root:/bin/bash
daemon:x:1:1:daemon:/usr/sbin:/usr/sbin/nologin
```

```
root@ubuntu1604:~# sed -n '1,2p' /etc/passwd
root:x:0:0:root:/root:/bin/bash
daemon:x:1:1:daemon:/usr/sbin:/usr/sbin/nologin
```

```
[root@centos7 ~]# sed -n '1,2p' /etc/passwd
root:x:0:0:root:/root:/bin/bash
```

```
bin:x:1:1:bin:/bin:/sbin/nologin
```

```
SLES12SP1:~ # sed -n '1,2p' /etc/passwd
at:x:25:25:Batch jobs daemon:/var/spool/atjobs:/bin/bash
bin:x:1:1:bin:/bin:/bin/bash
```

Now you want to use sed to strip out the comments from **/etc/services** and save the result to **/tmp/sedtest** without displaying anything on standard output:

```
root@debian8:~# sed -n '/^#!/w /tmp/sedtest' /etc/services
root@debian8:~# more /tmp/sedtest

tcpmux      1/tcp          # TCP port service multiplexer
echo        7/tcp
echo        7/udp
discard     9/tcp          sink null
discard     9/udp          sink null
systat      11/tcp         users
daytime     13/tcp
daytime     13/udp
netstat     15/tcp
qotd        17/tcp         quote
msp         18/tcp         # message send protocol
msp         18/udp
chargen     19/tcp         ttytst source
chargen     19/udp         ttytst source
ftp-data    20/tcp
ftp         21/tcp
fsp         21/udp         fspd
ssh         22/tcp         # SSH Remote Login Protocol
ssh         22/udp
telnet      23/tcp
smtp        25/tcp         mail
time        37/tcp         timserver
```

```
--More-- (2%)
```

```
root@ubuntu1604:~# sed -n '/^#!/w /tmp/sedtest' /etc/services
root@ubuntu1604:~# more /tmp/sedtest
```

```
tcpmux      1/tcp          # TCP port service multiplexer
echo        7/tcp
echo        7/udp
discard     9/tcp          sink null
discard     9/udp          sink null
sysstat     11/tcp         users
daytime     13/tcp
daytime     13/udp
netstat     15/tcp
qotd        17/tcp         quote
msp         18/tcp         # message send protocol
msp         18/udp
chargen     19/tcp         ttytst source
chargen     19/udp         ttytst source
ftp-data    20/tcp
ftp         21/tcp
fsp         21/udp         fspd
ssh         22/tcp         # SSH Remote Login Protocol
ssh         22/udp
telnet      23/tcp
smtp        25/tcp         mail
time        37/tcp         timserver
--More-- (2%)
```

```
[root@centos7 ~]# sed -n '/^#!/w /tmp/sedtest' /etc/services
[root@centos7 ~]# more /tmp/sedtest
```

```
tcpmux      1/tcp          # TCP port service multiplexer
tcpmux      1/udp          # TCP port service multiplexer
```

```
rje          5/tcp          # Remote Job Entry
rje          5/udp          # Remote Job Entry
echo        7/tcp
echo        7/udp
discard     9/tcp          sink null
discard     9/udp          sink null
systat      11/tcp         users
systat      11/udp         users
daytime     13/tcp
daytime     13/udp
qotd        17/tcp          quote
qotd        17/udp          quote
msp         18/tcp          # message send protocol
msp         18/udp          # message send protocol
chargen     19/tcp         ttytst source
chargen     19/udp         ttytst source
ftp-data    20/tcp
ftp-data    20/udp
ftp         21/tcp
ftp         21/udp         fsp fspd
--More-- (0%)
```

```
SLES12SP1:~ # sed -n '/^#!/w /tmp/sedtest' /etc/services
SLES12SP1:~ # more /tmp/sedtest
tcpmux      1/tcp          # TCP Port Service Multiplexer [Mark_Lottor]
tcpmux      1/udp          # TCP Port Service Multiplexer [Mark_Lottor]
compressnet 2/tcp          # Management Utility
compressnet 2/udp          # Management Utility
compressnet 3/tcp          # Compression Process [Bernie_Volz]
compressnet 3/udp          # Compression Process [Bernie_Volz]
rje         5/tcp          # Remote Job Entry [Jon_Postel]
rje         5/udp          # Remote Job Entry [Jon_Postel]
echo        7/tcp          # Echo [Jon_Postel]
echo        7/udp          # Echo [Jon_Postel]
```

```
discard      9/tcp      # Discard [Jon_Postel]
discard      9/udp      # Discard [Jon_Postel]
discard      9/sctp     # Discard [Randall_Stewart] [RFC4960]
discard      9/dccp     # Discard [Eddie_Kohler] [RFC4340]
systat       11/tcp     # Active Users [Jon_Postel]
systat       11/udp     # Active Users [Jon_Postel]
daytime      13/tcp     # Daytime [RFC867] [Jon_Postel]
daytime      13/udp     # Daytime [RFC867] [Jon_Postel]
qotd         17/tcp     # Quote of the Day [Jon_Postel]
qotd         17/udp     # Quote of the Day [Jon_Postel]
msp          18/tcp     # Message Send Protocol (historic) [Rina_Nethan
iel]
msp          18/udp     # Message Send Protocol (historic) [Rina_Nethan
--More-- (0%)
```



Important: In the above command, we start by matching all lines in the `/etc/services` file that start with a `#`. We then tell `sed` to write all non-matching lines to the file `/tmp/sedtest`.

Finally, create a file containing **user1,user2,user3**. Replace the commas by spaces:

```
root@debian8:~# echo "user1,user2,user3" > /tmp/sedtest1
root@debian8:~# cat /tmp/sedtest1 | sed 's/,/ /g'
user1 user2 user3
```

```
root@ubuntu1604:~# echo "user1,user2,user3" > /tmp/sedtest1
root@ubuntu1604:~# cat /tmp/sedtest1 | sed 's/,/ /g'
user1 user2 user3
```

```
[root@centos7 ~]# echo "user1,user2,user3" > /tmp/sedtest1
[root@centos7 ~]# cat /tmp/sedtest1 | sed 's/,/ /g'
user1 user2 user3
```

```
SLES12SP1:~ # echo "user1,user2,user3" > /tmp/sedtest1
SLES12SP1:~ # cat /tmp/sedtest1 | sed 's/,/ /g'
user1 user2 user3
```



Important: The above sed command has the following format **s/what is to be replaced (character, string or BRE)/replacement/g**. The use of the **g** character forces sed to replace all occurrences that match. If **g** is not stipulated, only the first matching occurrence is replaced.

The Text Processor AWK

Presentation

The **awk** command acts as a **filter** and uses the following syntax:

```
awk [-F separator] '[condition] {action}' [file]
```

Field Separation

A file or a text stream is treated by awk as a sequence of records. By default each line is a record. Awk analyzes each record, separating that record into fields and then storing the record and fields in variables:

- \$0 contains the record,
- \$1 contains the first field,
- \$2 contains the second field,
- e.t.c.

Awk interprets a space as a separator between fields unless a different separator is specified with the **-F** option.

Awk then checks if the condition is met for each record and if so, executes the action.

For example, the following command takes the standard output of **ls -l** and prints fields 8, 3 and 4 to standard output:

```
root@debian8:~# ls -l | awk '{print $8 $3 $4}'
```

```
2016rootroot  
2016rootroot  
2016rootroot  
2016rootroot  
2016rootroot
```

```
root@ubuntu1604:~# ls -l | awk '{print $8 $3 $4}'
```

```
10:40rootroot  
2016rootroot  
2016rootroot
```

```
[root@centos7 ~]# ls -l | awk '{print $8 $3 $4}'
```

```
2015rootroot  
19:09270users  
2015rootroot  
2015rootroot
```

```
SLES12SP1:~ # ls -l | awk '{print $8 $3 $4}'
```

```
06:55traineeusers  
06:55traineeusers  
06:55traineeusers  
09:04traineeusers  
15:41traineeusers  
2016traineeusers  
2016traineeusers
```

```
14:00traineeusers
15:59traineeusers
16:16traineeusers
16:16traineeusers
17:00traineeusers
16:14traineeusers
2016traineeusers
2016traineeusers
2016traineeusers
2016traineeusers
2016traineeusers
15:46traineeusers
03:59traineeusers
2016traineeusers
10:27traineeusers
06:55traineeusers
```

Since there is no condition, the action is applied to every record.

To make the output easier to read, you can include spaces between each field:

```
root@debian8:~# ls -l | awk '{print $8 " " $3 " " $4}'
2016 root root
```

```
root@ubuntu1604:~# ls -l | awk '{print $8 " " $3 " " $4}'
10:40 root root
2016 root root
2016 root root
```

```
[root@centos7 ~]# ls -l | awk '{print $8 " " $3 " " $4}'
```

```
2015 root root
19:09 270 users
2015 root root
2015 root root
```

```
SLES12SP1:~ # ls -l | awk '{print $8 " " $3 " " $4}'
06:55 trainee users
06:55 trainee users
06:55 trainee users
09:04 trainee users
15:41 trainee users
2016 trainee users
2016 trainee users
14:00 trainee users
15:59 trainee users
16:16 trainee users
16:16 trainee users
17:00 trainee users
16:14 trainee users
2016 trainee users
15:46 trainee users
03:59 trainee users
2016 trainee users
10:27 trainee users
06:55 trainee users
```

Conditions

A regular expression applied to a record

- Format:
 - `/regular expression/ {action}`
- Example:
 - `/hello/ {print $0}`

A regular expression applied to a field

- Format:
 - `$n ~/regular expression/ {action}`
 - `$n!~/regular expression/ {action}`
- Examples:
 - `$1 ~/hello/ {print $0}`
 - `$1!~/hello/ {print $0}`

Comparisons

- Format:
 - `$n operator criteria {action}`
- Example:
 - `$1 > 20 {print $0}`

Operators

Operator	Condition
<	Less than
≤	Less than or equal to
==	Equal to
!=	Different
>	Greater than

Operator	Condition
>=	Greater than or equal to

Logical Operators

- Format:
 - test1 logical operator test2 {action}
- Example:
 - \$1 ~/hello/ && \$2 > 20 {print \$0}

Operators

Operator	Condition
	OR
&&	AND
!	NO

Built-in Variables

- Format:
 - expression1, expression2 {instruction}
- Example:
 - NR==7, NR==10 {print \$0}

Variables

Variable	Description
NR	Total number of records
NF	Total number of fields
FILENAME	Name of current input file
FS	The field separator, by default a space or tab
RS	The record separator, by default newline

Variable	Description
OFS	Output field separator, by default a space
ORS	Output record separator, by default newline
OFMT	Numeric output format, by default "%. 6g "

Awk Scripts

To combine several *clauses* composed of *conditions* and *actions* in the same statement, it is advisable to create an *awk script*. Awk scripts are comprised of three sections:

- **BEGIN**
 - This section is executed once, prior to executing the body of the script
- **BODY**
 - This sections contains the clauses to be applied to each line
- **END**
 - This section is executed once, after executing the body of the script

For example:

```
root@debian8:~# cat > awkscript
BEGIN {
    print "List of the currently mounted file systems"}
{print $0}
END {
    print "====="}
[^\D]
```

```
root@ubuntu1604:~# cat > awkscript
BEGIN {
    print "List of the currently mounted file systems"}
{print $0}
END {
    print "====="}
```

```
[^D]
```

```
[root@centos7 ~]# cat > awkscript
BEGIN {
    print "List of the currently mounted file systems"}
{print $0}
END {
    print "====="}
[^D]
```

```
SLES12SP1:~ # cat > awkscript
BEGIN {
    print "List of the currently mounted file systems"}
{print $0}
END {
    print "====="}
[^D]
```

Now apply the awk script to **/etc/fstab** :

```
root@debian8:~# awk -f awkscript /etc/fstab
List of the currently mounted file systems
# /etc/fstab: static file system information.
#
# Use 'blkid' to print the universally unique identifier for a
# device; this may be used with UUID= as a more robust way to name devices
# that works even if disks are added and removed. See fstab(5).
#
# <file system> <mount point> <type> <options> <dump> <pass>
# / was on /dev/sda1 during installation
UUID=4a230056-285f-42f4-bfe0-5a73dbc5b745 / ext4 errors=remount-ro 0 1
# swap was on /dev/sda5 during installation
UUID=da5a77e9-344d-42aa-aed6-a38d381ba436 none swap sw 0 0
/dev/sr0 /media/cdrom0 udf,iso9660 user,noauto 0 0
```

```

=====
root@ubuntu1604:~# awk -f awkscript /etc/fstab
List of the currently mounted file systems
# /etc/fstab: static file system information.
#
# Use 'blkid' to print the universally unique identifier for a
# device; this may be used with UUID= as a more robust way to name devices
# that works even if disks are added and removed. See fstab(5).
#
# <file system> <mount point> <type> <options> <dump> <pass>
# / was on /dev/sda1 during installation
UUID=c27fce7f-cc8a-4c6f-b19b-d929a4d570f2 / ext4 errors=remount-ro 0 1
# swap was on /dev/sda5 during installation
UUID=68f67549-63f1-4833-b792-3566455bbe95 none swap sw 0 0
=====

```

```

[root@centos7 tmp]# awk -f awkscript /etc/fstab
Liste des systèmes de fichiers montés

#
# /etc/fstab
# Created by anaconda on Sun Mar 8 12:38:10 2015
#
# Accessible filesystems, by reference, are maintained under '/dev/disk'
# See man pages fstab(5), findfs(8), mount(8) and/or blkid(8) for more info
#
UUID=b35de665-5ec8-4226-a533-58a1b567ac91 / xfs defaults 1 1
UUID=e8d3bd48-1386-411c-9675-41c3f8f1a309 /boot xfs defaults 1 2
UUID=11a4d11d-81e4-46a7-82e0-7796cd597dc9 swap swap defaults 0 0
=====

```

```

SLES12SP1:~ # awk -f awkscript /etc/fstab
List of the currently mounted file systems

```

```
UUID=9e0e4497-5e47-419a-8ff4-9e2dd7d6a11b swap swap defaults 0 0
UUID=65337196-2d6b-4c8b-b917-30c3867bf265 / btrfs defaults 0 0
UUID=65337196-2d6b-4c8b-b917-30c3867bf265 /boot/grub2/i386-pc btrfs subvol=@/boot/grub2/i386-pc 0 0
UUID=65337196-2d6b-4c8b-b917-30c3867bf265 /boot/grub2/x86_64-efi btrfs subvol=@/boot/grub2/x86_64-efi 0 0
UUID=65337196-2d6b-4c8b-b917-30c3867bf265 /home btrfs subvol=@/home 0 0
UUID=65337196-2d6b-4c8b-b917-30c3867bf265 /opt btrfs subvol=@/opt 0 0
UUID=65337196-2d6b-4c8b-b917-30c3867bf265 /srv btrfs subvol=@/srv 0 0
UUID=65337196-2d6b-4c8b-b917-30c3867bf265 /tmp btrfs subvol=@/tmp 0 0
UUID=65337196-2d6b-4c8b-b917-30c3867bf265 /usr/local btrfs subvol=@/usr/local 0 0
UUID=65337196-2d6b-4c8b-b917-30c3867bf265 /var/crash btrfs subvol=@/var/crash 0 0
UUID=65337196-2d6b-4c8b-b917-30c3867bf265 /var/lib/libvirt/images btrfs subvol=@/var/lib/libvirt/images 0 0
UUID=65337196-2d6b-4c8b-b917-30c3867bf265 /var/lib/mailman btrfs subvol=@/var/lib/mailman 0 0
UUID=65337196-2d6b-4c8b-b917-30c3867bf265 /var/lib/mariadb btrfs subvol=@/var/lib/mariadb 0 0
UUID=65337196-2d6b-4c8b-b917-30c3867bf265 /var/lib/mysql btrfs subvol=@/var/lib/mysql 0 0
UUID=65337196-2d6b-4c8b-b917-30c3867bf265 /var/lib/named btrfs subvol=@/var/lib/named 0 0
UUID=65337196-2d6b-4c8b-b917-30c3867bf265 /var/lib/pgsql btrfs subvol=@/var/lib/pgsql 0 0
UUID=65337196-2d6b-4c8b-b917-30c3867bf265 /var/log btrfs subvol=@/var/log 0 0
UUID=65337196-2d6b-4c8b-b917-30c3867bf265 /var/opt btrfs subvol=@/var/opt 0 0
UUID=65337196-2d6b-4c8b-b917-30c3867bf265 /var/spool btrfs subvol=@/var/spool 0 0
UUID=65337196-2d6b-4c8b-b917-30c3867bf265 /var/tmp btrfs subvol=@/var/tmp 0 0
UUID=65337196-2d6b-4c8b-b917-30c3867bf265 /.snapshots btrfs subvol=@/.snapshots 0 0
=====
```



Important: Note the use of the **-f** switch which instructs awk to use the script.

The printf function

The integrated function **printf** is used to format output and has the following syntax:

```
printf ("string",expression1,expression2,...,expressionn)
```

string contains as many formats as there are expressions.

Examples of formats commonly used are:

Format	Description
%30s	Displays a right-justified string of 30 characters
%-30s	Displays a left-justified string of 30 characters
%4d	Displays a right-justified decimal number of 4 digits
%-4d	Displays a left-justified decimal number of 4 digits

Control Statements

awk can use the following control statements:

if

```
if condition {  
    command  
    command  
    ...  
}  
  
else {  
    command  
    command  
    ...  
}
```

or:

```
if condition
    command
else
    command
```

for

```
for variable in list {
    command
    command
    ...
}
```

or:

```
for variable in list
    command
```

or in the case of a table:

```
for key in table {
    print key , table[key]
```

```
}
```

while

```
while condition {  
    command  
    command  
    ...  
}
```

do-while

```
do {  
    command  
    command  
    ...  
} while condition
```

Command Line Switches



To do : Use the **-help** option of the **awk** command to view the command line switches.

LAB #3 - Using awk

Download the file **sales.txt** by clicking on the title below:

[sales](#)

```
# Fenestr0s.com
# Annual sales by French department
# 83
Desktops$100
Portables$50
Servers$21
Ipads$4

# 06
Desktops$99
Portables$60
Servers$8
Ipads$16

# 13
Desktops$130
Portables$65
Servers$12
Ipads$56
```

Now download the awk script **sales.awk** by clicking on the title below:

[sales.awk](#)

```
# BEGIN
BEGIN {
```

```
    FS="$@"
}
# TABLE
$1 !~ /^#/ && $1 !~ /^$/ {
    sales[$1]+=$2
}
# END
END {
    for (pc in sales)
        printf("PC Type :  %s \t Sales (06+13+83) : %10d\n",pc,sales[pc]);
}
```

This script contains 13 lines. The purpose of this script is to calculate the total number of computers sold in the three French departments from the data present in the **sales** file:

```
1 # BEGIN
2 BEGIN {
3     FS="$@"
4 }
5 # TABLE
6 $1 !~ /^#/ && $1 !~ /^$/ {
7     sales[$1]+=$2
8 }
9 # END
10 END {
11     for (pc in sales)
12         printf("PC Type :  %s \t Sales (06+13+83) : %10d\n",pc,sales[pc]);
13 }
```

It is important that you understand the key lines in the above script:

- Line **3**,
 - Defines a new field separator in a BEGIN section.

- Line **6**,
 - Discards all commented and empty lines.
- Line **7**,
 - The table's key is **\$1**, in other words the different types of computers. Against each key, the number of each type of computer sold is stored in **\$2**. The **+=** characters indicate that the value stored in \$2 is incremental.
- Line **12**,
 - Uses `printf` to format the output of each line in the table.

Now execute the script and check the output is correct:

```
root@debian8:~# awk -f /home/trainee/Downloads/sales.awk /home/trainee/Downloads/sales.txt
PC Type : Portables      Sales (06+13+83) :      175
PC Type : Ipads          Sales (06+13+83) :       76
PC Type : Desktops      Sales (06+13+83) :     329
PC Type : Servers        Sales (06+13+83) :       41
```

```
root@ubuntu1604:~# awk -f /home/trainee/Downloads/sales.awk /home/trainee/Downloads/sales.txt
PC Type : Servers        Sales (06+13+83) :       41
PC Type : Portables      Sales (06+13+83) :     175
PC Type : Ipads          Sales (06+13+83) :       76
PC Type : Desktops      Sales (06+13+83) :     329
```

```
[root@centos7 ~]# awk -f /home/trainee/Downloads/sales.awk /home/trainee/Downloads/sales.txt
PC Type : Portables      Sales (06+13+83) :     175
PC Type : Ipads          Sales (06+13+83) :       76
PC Type : Desktops      Sales (06+13+83) :     329
PC Type : Servers        Sales (06+13+83) :       41
```

```
SLES12SP1:~ # awk -f /home/trainee/Downloads/sales.awk /home/trainee/Downloads/sales.txt
PC Type : Portables      Sales (06+13+83) :     175
PC Type : Ipads          Sales (06+13+83) :       76
PC Type : Desktops      Sales (06+13+83) :     329
PC Type : Servers        Sales (06+13+83) :       41
```

Other Useful Commands

The expand Command

The **expand** command converts tabulations in a file to spaces and prints the results to STDOUT. With no file as an argument or with the - character as an argument, the command takes it's input from STDIN.

Download the following file:

[expand](#)

```
un  deux    trois    quatre   cinq
```

Move the file to the /root folder:

```
root@debian8:~# mv /home/trainee/Downloads/expand.txt /root/expand
```

```
root@ubuntu1604:~# mv /home/trainee/Downloads/expand.txt /root/expand
```

```
[root@centos7 ~]# mv /home/trainee/Downloads/expand.txt /root/expand
```

```
SLES12SP1:~ # mv /home/trainee/Downloads/expand.txt /root/expand
```



```
un deux trois quatre cinq
un deux trois quatre cinq
un deux trois quatre cinq
```

```
SLES12SP1:~ # cat expand
un deux trois quatre cinq
```

Now use the **-vet** switches of the **cat** command to view the non-printable characters:

```
root@debian8:~# cat -vet expand
un^Ideux^Itrois^Iquatre^Icinq$
```

```
root@ubuntu1604:~# cat -vet expand
un^Ideux^Itrois^Iquatre^Icinq$
un^Ideux^Itrois^Iquatre^Icinq$
un^Ideux^Itrois^Iquatre^Icinq$
```

```
un^Ideux^Itrois^Iquatre^Icinq$  
un^Ideux^Itrois^Iquatre^Icinq$  
un^Ideux^Itrois^Iquatre^Icinq$  
un^Ideux^Itrois^Iquatre^Icinq$  
un^Ideux^Itrois^Iquatre^Icinq$  
un^Ideux^Itrois^Iquatre^Icinq$  
un^Ideux^Itrois^Iquatre^Icinq$
```

```
[root@centos7 ~]# cat -vet expand  
un^Ideux^Itrois^Iquatre^Icinq$  
un^Ideux^Itrois^Iquatre^Icinq$  
un^Ideux^Itrois^Iquatre^Icinq$  
un^Ideux^Itrois^Iquatre^Icinq$  
un^Ideux^Itrois^Iquatre^Icinq$  
un^Ideux^Itrois^Iquatre^Icinq$  
un^Ideux^Itrois^Iquatre^Icinq$  
un^Ideux^Itrois^Iquatre^Icinq$  
un^Ideux^Itrois^Iquatre^Icinq$  
un^Ideux^Itrois^Iquatre^Icinq$
```

```
SLES12SP1:~ # cat -vet expand  
un^Ideux^Itrois^Iquatre^Icinq$  
un^Ideux^Itrois^Iquatre^Icinq$  
un^Ideux^Itrois^Iquatre^Icinq$  
un^Ideux^Itrois^Iquatre^Icinq$  
un^Ideux^Itrois^Iquatre^Icinq$  
un^Ideux^Itrois^Iquatre^Icinq$  
un^Ideux^Itrois^Iquatre^Icinq$  
un^Ideux^Itrois^Iquatre^Icinq$  
un^Ideux^Itrois^Iquatre^Icinq$  
un^Ideux^Itrois^Iquatre^Icinq$
```





Important : As you can see the tabulations are shown as `^I` and the end of each line as a `$`.

Now use the **expand** command to convert the tabulations into spaces and send the result to the **expand1** file:

```
root@debian8:~# expand expand > expand1
```

```
root@ubuntu1604:~# expand expand > expand1
```

```
[root@centos7 ~]# expand expand > expand1
```

```
SLES12SP1:~ # expand expand > expand1
```

View the resulting **expand1** file with the **cat** command and the **-vet** switches:

```
root@debian8:~# cat -vet expand1
un      deux      trois     quatre   cinq$
```

```
root@ubuntu1604:~# cat -vet expand1
un      deux      trois     quatre   cinq$
```

```
un      deux      trois      quatre     cinq$  
un      deux      trois      quatre     cinq$
```

```
[root@centos7 ~]# cat -vet expand1  
un      deux      trois      quatre     cinq$  
un      deux      trois      quatre     cinq$
```

```
SLES12SP1:~ # cat -vet expand1  
un      deux      trois      quatre     cinq$  
un      deux      trois      quatre     cinq$
```



Important : As you can see, the tabulations have been changed into spaces.

Command Line Switches



To do : Use the **-help** option of the **expand** command to view the command line switches.

La Commande unexpand

The **expand** command converts spaces in a file to tabulations and prints the results to STDOUT. With no file as an argument or with the **-** character as an argument, the command takes it's input from STDIN.

Now use the **expand** command to convert the spaces in the **expand1** file into tabulations and send the result to the **expand2** file:

```
root@debian8:~# cat -vet expand1
un      deux      trois      quatre     cinq$
root@debian8:~# unexpand -a expand1 > expand2
root@debian8:~# cat -vet expand2
un^Ideux^Itrois^Iquatre^Icinq$
un^Ideux^Itrois^Iquatre^Icinq$
un^Ideux^Itrois^Iquatre^Icinq$
un^Ideux^Itrois^Iquatre^Icinq$
un^Ideux^Itrois^Iquatre^Icinq$
un^Ideux^Itrois^Iquatre^Icinq$
```

```
un^Ideux^Itrois^Iquatre^Icinq$
un^Ideux^Itrois^Iquatre^Icinq$
un^Ideux^Itrois^Iquatre^Icinq$
un^Ideux^Itrois^Iquatre^Icinq$
```

```
root@ubuntu1604:~# cat -vet expand1
un      deux      trois      quatre     cinq$
root@ubuntu1604:~# unexpand -a expand1 > expand2
root@ubuntu1604:~# cat -vet expand2
un^Ideux^Itrois^Iquatre^Icinq$
```

```
[root@centos7 ~]# cat -vet expand1
un      deux      trois      quatre     cinq$
```

```
un      deux      trois      quatre     cinq$
[root@centos7 ~]# unexpand -a expand1 > expand2
[root@centos7 ~]# cat -vet expand2
un^Ideux^Itrois^Iquatre^Icinq$
```

```
SLES12SP1:~ # cat -vet expand1
un      deux      trois      quatre     cinq$
SLES12SP1:~ # unexpand -a expand1 > expand2
SLES12SP1:~ # cat -vet expand2
un^Ideux^Itrois^Iquatre^Icinq$
un^Ideux^Itrois^Iquatre^Icinq$
```

```
un^Ideux^Itrois^Iquatre^Icinq$  
un^Ideux^Itrois^Iquatre^Icinq$  
un^Ideux^Itrois^Iquatre^Icinq$  
un^Ideux^Itrois^Iquatre^Icinq$  
un^Ideux^Itrois^Iquatre^Icinq$  
un^Ideux^Itrois^Iquatre^Icinq$  
un^Ideux^Itrois^Iquatre^Icinq$  
un^Ideux^Itrois^Iquatre^Icinq$
```



Important : Note that the spaces have been replaced by tabulations.

Command Line Switches



To do : Use the **-help** option of the **unexpand** command to view the command line switches.

The cut command

The cut command splits each line of a file into columns starting with column 1. Each column contains one character. The command can also be used to split lines into fields where the default separator is a tabulation. The default separator can be changed by using the **-d** switch.

Select the first 7 columns of the **/etc/passwd** file:

```
root@debian8:~# cut -c1-7 /etc/passwd  
root:x:  
daemon:  
bin:x:2
```

```
sys:x:3
sync:x:
games:x
man:x:6
lp:x:7:
mail:x:
news:x:
uucp:x:
proxy:x
www-dat
backup:
list:x:
irc:x:3
gnats:x
nobody:
systemd
systemd
systemd
systemd
trainee
sshd:x:
Debian-
message
statd:x
avahi-a
avahi:x
colord:
dnsmasq
speech-
pulse:x
rtkit:x
saned:x
usbmux:
lightdm
```

```
root@ubuntu1604:~# cut -c1-7 /etc/passwd
root:x:
daemon:
bin:x:2
sys:x:3
sync:x:
games:x
man:x:6
lp:x:7:
mail:x:
news:x:
uucp:x:
proxy:x
www-dat
backup:
list:x:
irc:x:3
gnats:x
nobody:
systemd
systemd
systemd
systemd
syslog:
_apt:x:
message
uidd:x
lightdm
whoopsi
avahi-a
avahi:x
dnsmasq
colord:
speech-
```

```
hplip:x
kernoop
pulse:x
rtkit:x
saned:x
usbmux:
trainee
sshd:x:
```

```
[root@centos7 ~]# cut -c1-7 /etc/passwd
```

```
root:x:
bin:x:1
daemon:
adm:x:3
lp:x:4:
sync:x:
shutdow
halt:x:
mail:x:
operato
games:x
ftp:x:1
nobody:
dbus:x:
polkitd
unbound
colord:
usbmuxd
avahi:x
avahi-a
saslaut
qemu:x:
libstor
rpc:x:3
```

```
rpcuser  
nfsnobo  
rtkit:x  
radvd:x  
ntp:x:3  
chrony:  
abrt:x:  
pulse:x  
gdm:x:4  
gnome-i  
postfix  
sshd:x:  
tcpdump  
trainee  
vboxadd  
tss:x:5
```

```
SLES12SP1:~ # cut -c1-7 /etc/passwd
```

```
at:x:25  
bin:x:1  
daemon:  
ftp:x:4  
ftpsecu  
games:x  
gdm:x:4  
lp:x:4:  
mail:x:  
man:x:1  
message  
news:x:  
nobody:  
nscd:x:  
ntp:x:7  
openslp
```

```
polkitd
postfix
pulse:x
root:x:
rpc:x:4
rtkit:x
scard:x
sshd:x
statd:x
usbmux:
uucp:x:
vnc:x:4
wwwrun:
trainee
```

In order to select columns 1 to 5, columns 10 to 15 and columns 30 and higher, us the following command:

```
root@debian8:~# cut -c1-5,10-15,30- /etc/passwd
root:0:rootsh
daemon:1:da:/usr/sbin/nologin
bin:x:bin:/nologin
sys:x:sys:/nologin
sync:65534:/sync
games:60:ga:/usr/sbin/nologin
man:x2:man:./usr/sbin/nologin
lp:x:lp:/var/sbin/nologin
mail:8:mailr/sbin/nologin
news:9:news:/usr/sbin/nologin
uucp::10:uuuucp:/usr/sbin/nologin
proxy3:13:p/sbin/nologin
www-dx:33:3r/www:/usr/sbin/nologin
backu34:34:ckups:/usr/sbin/nologin
list::38:Maager:/var/list:/usr/sbin/nologin
irc:x39:ircd:/usr/sbin/nologin
```

```
gnats1:41:Gting System (admin):/var/lib/gnats:/usr/sbin/nologin
nobod65534:nonexistent:/usr/sbin/nologin
systemd Time Synchronization,,,:/run/systemd:/bin/false
systemd Network Management,,,:/run/systemd/netif:/bin/false
systemd Resolver,,,:/run/systemd/resolve:/bin/false
systemd Bus Proxy,,,:/run/systemd:/bin/false
train:1000:,:/home/trainee:/bin/bash
sshd:4:6553hd:/usr/sbin/nologin
Debian:x:1pool/exim4:/bin/false
messaging:10n/dbus:/bin/false
statd07:655fs:/bin/false
avahi-daemon:x autoip daemon,,,:/var/lib/avahi-autoipd:/bin/false
avahi09:115emon,,,:/var/run/avahi-daemon:/bin/false
colord110:11r management daemon,,,:/var/lib/colord:/bin/false
dnsmasq:111:6,,:/var/lib/misc:/bin/false
speech-dispatcher:13:119emon,,,:/var/run/speech-dispatcher:/bin/sh
pulse:13:119emon,,,:/var/run/pulse:/bin/false
rtkit14:121,:/proc:/bin/false
saned15:122ed:/bin/false
usbmuxd:116:46,,,:/var/lib/usbmux:/bin/false
lightdm:117:1ay Manager:/var/lib/lightdm:/bin/false
```

```
root@ubuntu1604:~# cut -c1-5,10-15,30- /etc/passwd
root:0:rootsh
daemon:1:da:/usr/sbin/nologin
bin:x:bin:/nologin
sys:x:sys:/nologin
sync:65534:/sync
games:60:ga:/usr/sbin/nologin
man:x2:man:./usr/sbin/nologin
lp:x:lp:/usr/sbin/nologin
mail:8:mailr/sbin/nologin
news:9:news:/usr/sbin/nologin
uucp:10:uuuucp:/usr/sbin/nologin
```

```
proxy3:13:p/sbin/nologin
www-dx:33:3r/www:/usr/sbin/nologin
backu34:34:ckups:/usr/sbin/nologin
list::38:Maager:/var/list:/usr/sbin/nologin
irc:x39:ircd:/usr/sbin/nologin
gnats1:41:Gting System (admin):/var/lib/gnats:/usr/sbin/nologin
nobod65534:nonexistent:/usr/sbin/nologin
systemd Time Synchronization,,,:/run/systemd:/bin/false
systemd Network Management,,,:/run/systemd/netif:/bin/false
systemd Resolver,,,:/run/systemd/resolve:/bin/false
systemd Bus Proxy,,,:/run/systemd:/bin/false
syslog:104:10g:/bin/false
_apt:5:6553t:/bin/false
messas:x:10n/dbus:/bin/false
uidd07:111bin/false
light:108:lay Manager:/var/lib/lightdm:/bin/false
whoopx:109:ent:/bin/false
avahi-daemon:11:120emon,,,:/var/lib/avahi-daemon:/bin/false
avahi-daemon:112:6,,:/var/lib/misc:/bin/false
color113:12r management daemon,,,:/var/lib/colord:/bin/false
speech-dispatcher:15:7:Her,,,:/var/run/speech-dispatcher:/bin/false
hplip:116:ops Tracking Daemon,,,:/bin/false
pulse:17:124emon,,,:/var/run/pulse:/bin/false
rtkit:18:126,:/proc:/bin/false
saned:19:127ed:/bin/false
usbmux:120:46,,,:/var/lib/usbmux:/bin/false
train:1000:,:/home/trainee:/bin/bash
sshd:1:6553hd:/usr/sbin/nologin
```

```
[root@centos7 ~]# cut -c1-5,10-15,30- /etc/passwd
root:0:rootsh
bin:x:bin:/gin
```

```
daemon2:2:dain/nologin
adm:x:adm:/nologin
lp:x:lp:/vabin/nologin
sync:0:syncnc
shutdx:6:0:./sbin/shutdown
halt:0:haltalt
mail:12:maiaail:/sbin/nologin
operax:11:0t:/sbin/nologin
games2:100:es:/sbin/nologin
ftp:x50:FTP:/sbin/nologin
nobod99:99:/nologin
dbus::81:Syus:./sbin/nologin
polki:999:9lkitd:./sbin/nologin
unbou:998:9 resolver:/etc/unbound:/sbin/nologin
color997:99ord:/var/lib/colord:/sbin/nologin
usbmu:113:1r:./sbin/nologin
avahi0:70:ASD Stack:/var/run/avahi-daemon:/sbin/nologin
avahioipd:x IPv4LL Stack:/var/lib/avahi-autoipd:/sbin/nologin
sas lax:996:user"/run/saslauthd:/sbin/nologin
qemu:7:107:bin/nologin
libstemgmt:on account for libstoragemgmt:/var/run/lsm:/sbin/nologin
rpc:x32:Rpcar/lib/rpcbind:/sbin/nologin
rpcus:29:29ser:/var/lib/nfs:/sbin/nologin
nfsno:x:655mous NFS User:/var/lib/nfs:/sbin/nologin
rtkit72:172proc:/sbin/nologin
radvd5:75:rbin/nologin
ntp:x38:./eologin
chron994:99rony:/sbin/nologin
abrt:3:173:in/nologin
pulse71:171stem Daemon:/var/run/pulse:/sbin/nologin
gdm:x42:./vin/nologin
gnometial-s:./run/gnome-initial-setup:./sbin/nologin
postf:89:89ostfix:/sbin/nologin
sshd:74:Prted SSH:/var/empty/sshd:/sbin/nologin
```

```
tcpdu:72:72gin
train:1000:home/trainee:/bin/bash
vboxa:992:1xadd:/bin/false
tss:x59:Acche trousers package to sandbox the tcspd daemon:/dev/null:/sbin/nologin
```

```
SLES12SP1:~ # cut -c1-5,10-15,30- /etc/passwd
at:x:5:Batc/var/spool/atjobs:/bin/bash
bin:x:bin:/
daemon:2:Dan/bash
ftp:x49:FTPftp:/bin/bash
ftpse:x:488FTP User:/var/lib/empty:/bin/false
games2:100:/var/games:/bin/bash
gdm:x:485:Ganager daemon:/var/lib/gdm:/bin/false
lp:x:Printi/spool/lpd:/bin/bash
mail:12:Mair/spool/clientmqueue:/bin/false
man:x62:Maner:/var/cache/man:/bin/bash
messas:x:49 D-Bus:/var/run/dbus:/bin/false
news:13:Newnews:/bin/bash
nobod65534:/var/lib/nobody:/bin/bash
nscd:6:495:/run/nscd:/sbin/nologin
ntp:x492:NTlib/ntp:/bin/false
opens:494:2n:/var/lib/empty:/sbin/nologin
polki:497:4lkitd:/var/lib/polkit:/sbin/nologin
postf:51:51n:/var/spool/postfix:/bin/false
pulse90:489emon:/var/lib/pulseaudio:/sbin/nologin
root:0:rootsh
rpc:x:65534ind:/var/lib/empty:/sbin/nologin
rtkit91:490proc:/bin/false
scard87:487ader:/var/run/pcscd:/usr/sbin/nologin
sshd:8:498:r/lib/sshd:/bin/false
statd89:655aemon:/var/lib/nfs:/sbin/nologin
usbmu493:65emon:/var/lib/usbmuxd:/sbin/nologin
uucp::14:Uny system:/etc/uucp:/bin/bash
vnc:x:491:uar/lib/empty:/sbin/nologin
```

```
wwwru30:8:Whe:/var/lib/wwrun:/bin/false
train:1000:ome/trainee:/bin/bash
```

In order to select the 2nd, 4th and 6th column, use the following command:

```
root@debian8:~# cut -d: -f2,4,6 /etc/passwd
x:0:/root
x:1:/usr/sbin
x:2:/bin
x:3:/dev
x:65534:/bin
x:60:/usr/games
x:12:/var/cache/man
x:7:/var/spool/lpd
x:8:/var/mail
x:9:/var/spool/news
x:10:/var/spool/uucp
x:13:/bin
x:33:/var/www
x:34:/var/backups
x:38:/var/list
x:39:/var/run/ircd
x:41:/var/lib/gnats
x:65534:/nonexistent
x:103:/run/systemd
x:104:/run/systemd/netif
x:105:/run/systemd/resolve
x:106:/run/systemd
x:1000:/home/trainee
x:65534:/var/run/sshd
x:110:/var/spool/exim4
x:111:/var/run/dbus
x:65534:/var/lib/nfs
x:113:/var/lib/avahi-autoipd
```

```
x:115:/var/run/avahi-daemon
x:117:/var/lib/colord
x:65534:/var/lib/misc
x:29:/var/run/speech-dispatcher
x:119:/var/run/pulse
x:121:/proc
x:122:/var/lib/saned
x:46:/var/lib/usbmux
x:124:/var/lib/lightdm
```

```
root@ubuntu1604:~# cut -d: -f2,4,6 /etc/passwd
x:0:/root
x:1:/usr/sbin
x:2:/bin
x:3:/dev
x:65534:/bin
x:60:/usr/games
x:12:/var/cache/man
x:7:/var/spool/lpd
x:8:/var/mail
x:9:/var/spool/news
x:10:/var/spool/uucp
x:13:/bin
x:33:/var/www
x:34:/var/backups
x:38:/var/list
x:39:/var/run/ircd
x:41:/var/lib/gnats
x:65534:/nonexistent
x:102:/run/systemd
x:103:/run/systemd/netif
x:104:/run/systemd/resolve
x:105:/run/systemd
x:108:/home/syslog
```

```
x:65534:/nonexistent
x:110:/var/run/dbus
x:111:/run/uuidd
x:114:/var/lib/lightdm
x:116:/nonexistent
x:119:/var/lib/avahi-autoipd
x:120:/var/run/avahi-daemon
x:65534:/var/lib/misc
x:123:/var/lib/colord
x:29:/var/run/speech-dispatcher
x:7:/var/run/hplip
x:65534:/
x:124:/var/run/pulse
x:126:/proc
x:127:/var/lib/saned
x:46:/var/lib/usbmux
x:1000:/home/trainee
x:65534:/var/run/sshd
```

```
[root@centos7 ~]# cut -d: -f2,4,6 /etc/passwd
x:0:/root
x:1:/bin
x:2:/sbin
x:4:/var/adm
x:7:/var/spool/lpd
x:0:/sbin
x:0:/sbin
x:0:/sbin
x:12:/var/spool/mail
x:0:/root
x:100:/usr/games
x:50:/var/ftp
x:99:/
x:81:/
```

```
x:998:/
x:997:/etc/unbound
x:996:/var/lib/colord
x:113:/
x:70:/var/run/avahi-daemon
x:170:/var/lib/avahi-autoipd
x:76:/run/saslauthd
x:107:/
x:994:/var/run/lsm
x:32:/var/lib/rpcbind
x:29:/var/lib/nfs
x:65534:/var/lib/nfs
x:172:/proc
x:75:/
x:38:/etc/ntp
x:993:/var/lib/chrony
x:173:/etc/abrt
x:171:/var/run/pulse
x:42:/var/lib/gdm
x:991:/run/gnome-initial-setup/
x:89:/var/spool/postfix
x:74:/var/empty/sshd
x:72:/
x:1000:/home/trainee
x:1:/var/run/vboxadd
x:59:/dev/null
```

```
SLES12SP1:~ # cut -d: -f2,4,6 /etc/passwd
x:25:/var/spool/atjobs
x:1:/bin
x:2:/sbin
x:49:/srv/ftp
x:65534:/var/lib/empty
x:100:/var/games
```

```
x:485:/var/lib/gdm
x:7:/var/spool/lpd
x:12:/var/spool/clientmqueue
x:62:/var/cache/man
x:499:/var/run/dbus
x:13:/etc/news
x:65533:/var/lib/nobody
x:495:/run/nscd
x:492:/var/lib/ntp
x:2:/var/lib/empty
x:496:/var/lib/polkit
x:51:/var/spool/postfix
x:489:/var/lib/pulseaudio
x:0:/root
x:65534:/var/lib/empty
x:490:/proc
x:487:/var/run/pcscd
x:498:/var/lib/sshhd
x:65534:/var/lib/nfs
x:65534:/var/lib/usbmuxd
x:14:/etc/uucp
x:491:/var/lib/empty
x:8:/var/lib/wwrun
x:100:/home/trainee
```



Important: Note the use of the **-d** switch to change the default separator.

Command Line Switches





To do : Use the **-help** option of the **cut** command to view the command line switches.

The uniq Command

The following command is used to extract the Primary Group GIDs from the **/etc/passwd** file:

```
root@debian8:~# cut -d: -f4 /etc/passwd | sort -n | uniq
0
1
2
3
7
8
9
10
12
13
29
33
34
38
39
41
46
60
103
104
105
106
110
111
```

```
113
115
117
119
121
122
124
1000
65534
```

```
root@ubuntu1604:~# cut -d: -f4 /etc/passwd | sort -n | uniq
```

```
0
1
2
3
7
8
9
10
12
13
29
33
34
38
39
41
46
60
102
103
104
105
108
```

```
110  
111  
114  
116  
119  
120  
123  
124  
126  
127  
1000  
65534
```

```
[root@centos7 ~]# cut -d: -f4 /etc/passwd | sort -n | uniq  
0  
1  
2  
4  
7  
12  
29  
32  
38  
42  
50  
59  
70  
72  
74  
75  
76  
81  
89  
99
```

```
100
107
113
170
171
172
173
991
993
994
996
997
998
1000
65534
```

```
SLES12SP1:~ # cut -d: -f4 /etc/passwd | sort -n | uniq
```

```
0
1
2
7
8
12
13
14
25
49
51
62
100
485
487
489
490
```

```
491
492
495
496
498
499
65533
65534
```



Important: Note the use of the **uniq** command to remove duplicates from the list.

Command Line Switches



To do : Use the **-help** option of the **uniq** command to view the command line switches.

The tr Command

The **tr** command is used to substitute certain characters by other characters. This command **only** accepts data from standard input (hence the pipe):

```
root@debian8:~# cat /etc/passwd | tr "[a-z]" "[A-Z]"
ROOT:X:0:0:ROOT:/ROOT:/BIN/BASH
DAEMON:X:1:1:DAEMON:/USR/SBIN:/USR/SBIN/NOLOGIN
BIN:X:2:2:BIN:/BIN:/USR/SBIN/NOLOGIN
SYS:X:3:3:SYS:/DEV:/USR/SBIN/NOLOGIN
SYNC:X:4:65534:SYNC:/BIN:/BIN/SYNC
GAMES:X:5:60:GAMES:/USR/GAMES:/USR/SBIN/NOLOGIN
```

```
MAN:X:6:12:MAN:/VAR/CACHE/MAN:/USR/SBIN/NOLOGIN
LP:X:7:7:LP:/VAR/SPOOL/LPD:/USR/SBIN/NOLOGIN
MAIL:X:8:8:MAIL:/VAR/MAIL:/USR/SBIN/NOLOGIN
NEWS:X:9:9:NEWS:/VAR/SPOOL/NEWS:/USR/SBIN/NOLOGIN
UUCP:X:10:10:UUCP:/VAR/SPOOL/UUCP:/USR/SBIN/NOLOGIN
PROXY:X:13:13:PROXY:/BIN:/USR/SBIN/NOLOGIN
WWW-DATA:X:33:33:WWW-DATA:/VAR/WWW:/USR/SBIN/NOLOGIN
BACKUP:X:34:34:BACKUP:/VAR/BACKUPS:/USR/SBIN/NOLOGIN
LIST:X:38:38:MAILING LIST MANAGER:/VAR/LIST:/USR/SBIN/NOLOGIN
IRC:X:39:39:IRCD:/VAR/RUN/IRCD:/USR/SBIN/NOLOGIN
GNATS:X:41:41:GNATS BUG-REPORTING SYSTEM (ADMIN):/VAR/LIB/GNATS:/USR/SBIN/NOLOGIN
NOBODY:X:65534:65534:NOBODY:/NONEXISTENT:/USR/SBIN/NOLOGIN
SYSTEMD-TIMESYNC:X:100:103:SYSTEMD TIME SYNCHRONIZATION,,,:/RUN/SYSTEMD:/BIN/FALSE
SYSTEMD-NETWORK:X:101:104:SYSTEMD NETWORK MANAGEMENT,,,:/RUN/SYSTEMD/NETIF:/BIN/FALSE
SYSTEMD-RESOLVE:X:102:105:SYSTEMD RESOLVER,,,:/RUN/SYSTEMD/RESOLVE:/BIN/FALSE
SYSTEMD-BUS-PROXY:X:103:106:SYSTEMD BUS PROXY,,,:/RUN/SYSTEMD:/BIN/FALSE
TRAINEE:X:1000:1000:TRAINEE,,,:/HOME/TRAINEE:/BIN/BASH
SSHD:X:104:65534::/VAR/RUN/SSHD:/USR/SBIN/NOLOGIN
DEBIAN-EXIM:X:105:110::/VAR/SPOOL/EXIM4:/BIN/FALSE
MESSAGEBUS:X:106:111::/VAR/RUN/DBUS:/BIN/FALSE
STATD:X:107:65534::/VAR/LIB/NFS:/BIN/FALSE
AVAHI-AUTOIPD:X:108:113:AVAHI AUTOIP DAEMON,,,:/VAR/LIB/AVAHI-AUTOIPD:/BIN/FALSE
AVAHI:X:109:115:AVAHI MDNS DAEMON,,,:/VAR/RUN/AVAHI-DAEMON:/BIN/FALSE
COLORD:X:110:117:COLORD COLOUR MANAGEMENT DAEMON,,,:/VAR/LIB/COLORD:/BIN/FALSE
DNSSMASQ:X:111:65534:DNSSMASQ,,,:/VAR/LIB/MISC:/BIN/FALSE
SPEECH-DISPATCHER:X:112:29:SPEECH DISPATCHER,,,:/VAR/RUN/SPEECH-DISPATCHER:/BIN/SH
PULSE:X:113:119:PULSEAUDIO DAEMON,,,:/VAR/RUN/PULSE:/BIN/FALSE
RTKIT:X:114:121:REALTIMEKIT,,,:/PROC:/BIN/FALSE
SANED:X:115:122::/VAR/LIB/SANED:/BIN/FALSE
USBMUX:X:116:46:USBMUX DAEMON,,,:/VAR/LIB/USBMUX:/BIN/FALSE
LIGHTDM:X:117:124:LIGHT DISPLAY MANAGER:/VAR/LIB/LIGHTDM:/BIN/FALSE
```

```
root@ubuntu1604:~# cat /etc/passwd | tr "[a-z]" "[A-Z]"
ROOT:X:0:0:ROOT:/ROOT:/BIN/BASH
```

```
DAEMON:X:1:1:DAEMON:/USR/SBIN:/USR/SBIN/NOLOGIN
BIN:X:2:2:BIN:/BIN:/USR/SBIN/NOLOGIN
SYS:X:3:3:SYS:/DEV:/USR/SBIN/NOLOGIN
SYNC:X:4:65534:SYNC:/BIN:/BIN/SYNC
GAMES:X:5:60:GAMES:/USR/GAMES:/USR/SBIN/NOLOGIN
MAN:X:6:12:MAN:/VAR/CACHE/MAN:/USR/SBIN/NOLOGIN
LP:X:7:7:LP:/VAR/SPOOL/LPD:/USR/SBIN/NOLOGIN
MAIL:X:8:8:MAIL:/VAR/MAIL:/USR/SBIN/NOLOGIN
NEWS:X:9:9:NEWS:/VAR/SPOOL/NEWS:/USR/SBIN/NOLOGIN
UUCP:X:10:10:UUCP:/VAR/SPOOL/UUCP:/USR/SBIN/NOLOGIN
PROXY:X:13:13:PROXY:/BIN:/USR/SBIN/NOLOGIN
WWW-DATA:X:33:33:WWW-DATA:/VAR/WWW:/USR/SBIN/NOLOGIN
BACKUP:X:34:34:BACKUP:/VAR/BACKUPS:/USR/SBIN/NOLOGIN
LIST:X:38:38:MAILING LIST MANAGER:/VAR/LIST:/USR/SBIN/NOLOGIN
IRC:X:39:39:IRCD:/VAR/RUN/IRCD:/USR/SBIN/NOLOGIN
GNATS:X:41:41:GNATS BUG-REPORTING SYSTEM (ADMIN):/VAR/LIB/GNATS:/USR/SBIN/NOLOGIN
NOBODY:X:65534:65534:NOBODY:/NONEXISTENT:/USR/SBIN/NOLOGIN
SYSTEMD-TIMESYNC:X:100:102:SYSTEMD TIME SYNCHRONIZATION,,,:/RUN/SYSTEMD:/BIN/FALSE
SYSTEMD-NETWORK:X:101:103:SYSTEMD NETWORK MANAGEMENT,,,:/RUN/SYSTEMD/NETIF:/BIN/FALSE
SYSTEMD-RESOLVE:X:102:104:SYSTEMD RESOLVER,,,:/RUN/SYSTEMD/RESOLVE:/BIN/FALSE
SYSTEMD-BUS-PROXY:X:103:105:SYSTEMD BUS PROXY,,,:/RUN/SYSTEMD:/BIN/FALSE
SYSLOG:X:104:108::/HOME/SYSLOG:/BIN/FALSE
_APT:X:105:65534::/NONEXISTENT:/BIN/FALSE
MESSAGEBUS:X:106:110::/VAR/RUN/DBUS:/BIN/FALSE
UUIDD:X:107:111::/RUN/UUIDD:/BIN/FALSE
LIGHTDM:X:108:114:LIGHT DISPLAY MANAGER:/VAR/LIB/LIGHTDM:/BIN/FALSE
WHOOPSIE:X:109:116::/NONEXISTENT:/BIN/FALSE
AVAHI-AUTOIPD:X:110:119:AVAHI AUTOIP DAEMON,,,:/VAR/LIB/AVAHI-AUTOIPD:/BIN/FALSE
AVAHI:X:111:120:AVAHI MDNS DAEMON,,,:/VAR/RUN/AVAHI-DAEMON:/BIN/FALSE
DNSMASQ:X:112:65534:DNSMASQ,,,:/VAR/LIB/MISC:/BIN/FALSE
COLORD:X:113:123:COLORD COLOUR MANAGEMENT DAEMON,,,:/VAR/LIB/COLORD:/BIN/FALSE
SPEECH-DISPATCHER:X:114:29:SPEECH DISPATCHER,,,:/VAR/RUN/SPEECH-DISPATCHER:/BIN/FALSE
HPLIP:X:115:7:HPLIP SYSTEM USER,,,:/VAR/RUN/HPLIP:/BIN/FALSE
KERN00PS:X:116:65534:KERNEL OOPS TRACKING DAEMON,,,:/:/BIN/FALSE
```

```
PULSE:X:117:124:PULSEAUDIO DAEMON,,,:/VAR/RUN/PULSE:/BIN/FALSE
RTKIT:X:118:126:REALTIMEKIT,,,:/PROC:/BIN/FALSE
SANED:X:119:127::/VAR/LIB/SANED:/BIN/FALSE
USBMUX:X:120:46:USBMUX DAEMON,,,:/VAR/LIB/USBMUX:/BIN/FALSE
TRAINEE:X:1000:1000:TRAINEE,,,:/HOME/TRAINEE:/BIN/BASH
SSHD:X:121:65534::/VAR/RUN/SSHD:/USR/SBIN/NOLOGIN
```

```
[root@centos7 ~]# cat /etc/passwd | tr "[a-z]" "[A-Z]"
ROOT:X:0:0:ROOT:/ROOT:/BIN/BASH
BIN:X:1:1:BIN:/BIN:/SBIN/NOLOGIN
DAEMON:X:2:2:DAEMON:/SBIN:/SBIN/NOLOGIN
ADM:X:3:4:ADM:/VAR/ADM:/SBIN/NOLOGIN
LP:X:4:7:LP:/VAR/SPOOL/LPD:/SBIN/NOLOGIN
SYNC:X:5:0:SYNC:/SBIN:/BIN/SYNC
SHUTDOWN:X:6:0:SHUTDOWN:/SBIN:/SBIN/SHUTDOWN
HALT:X:7:0:HALT:/SBIN:/SBIN/HALT
MAIL:X:8:12:MAIL:/VAR/SPOOL/MAIL:/SBIN/NOLOGIN
OPERATOR:X:11:0:OPERATOR:/ROOT:/SBIN/NOLOGIN
GAMES:X:12:100:GAMES:/USR/GAMES:/SBIN/NOLOGIN
FTP:X:14:50:FTP USER:/VAR/FTP:/SBIN/NOLOGIN
NOBODY:X:99:99:NOBODY:/:/SBIN/NOLOGIN
DBUS:X:81:81:SYSTEM MESSAGE BUS:/:/SBIN/NOLOGIN
POLKITD:X:999:998:USER FOR POLKITD:/:/SBIN/NOLOGIN
UNBOUND:X:998:997:UNBOUND DNS RESOLVER:/ETC/UNBOUND:/SBIN/NOLOGIN
COLORD:X:997:996:USER FOR COLORD:/VAR/LIB/COLORD:/SBIN/NOLOGIN
USBMUXD:X:113:113:USBMUXD USER:/:/SBIN/NOLOGIN
AVAHI:X:70:70:AVAHI MDNS/DNS-SD STACK:/VAR/RUN/AVAHI-DAEMON:/SBIN/NOLOGIN
AVAHI-AUTOIPD:X:170:170:AVAHI IPV4LL STACK:/VAR/LIB/AVAHI-AUTOIPD:/SBIN/NOLOGIN
SASLAUTH:X:996:76:"SASLAUTHD USER":/RUN/SASLAUTHD:/SBIN/NOLOGIN
QEMU:X:107:107:QEMU USER:/:/SBIN/NOLOGIN
LIBSTORAGEMGMT:X:995:994:DAEMON ACCOUNT FOR LIBSTORAGEMGMT:/VAR/RUN/LSM:/SBIN/NOLOGIN
RPC:X:32:32:RPCBIND DAEMON:/VAR/LIB/RPCBIND:/SBIN/NOLOGIN
RPCUSER:X:29:29:RPC SERVICE USER:/VAR/LIB/NFS:/SBIN/NOLOGIN
NFSNOBODY:X:65534:65534:ANONYMOUS NFS USER:/VAR/LIB/NFS:/SBIN/NOLOGIN
```

```
RTKIT:X:172:172:REALTIMEKIT:/PROC:/SBIN/NOLOGIN
RADVD:X:75:75:RADVD USER:/:/SBIN/NOLOGIN
NTP:X:38:38::/ETC/NTP:/SBIN/NOLOGIN
CHRONY:X:994:993::/VAR/LIB/CHRONY:/SBIN/NOLOGIN
ABRT:X:173:173::/ETC/ABRT:/SBIN/NOLOGIN
PULSE:X:171:171:PULSEAUDIO SYSTEM DAEMON:/VAR/RUN/PULSE:/SBIN/NOLOGIN
GDM:X:42:42::/VAR/LIB/GDM:/SBIN/NOLOGIN
GNOME-INITIAL-SETUP:X:993:991::/RUN/GNOME-INITIAL-SETUP:/:/SBIN/NOLOGIN
POSTFIX:X:89:89::/VAR/SPool/POSTFIX:/SBIN/NOLOGIN
SSHD:X:74:74:PRIVILEGE-SEPARATED SSH:/VAR/EMPTY/SSHD:/SBIN/NOLOGIN
TCPDUMP:X:72:72::/:/SBIN/NOLOGIN
TRAINEE:X:1000:1000:TRAINEE:/HOME/TRAINEE:/BIN/BASH
VBOXADD:X:992:1::/VAR/RUN/VBOXADD:/BIN/FALSE
TSS:X:59:59:ACCOUNT USED BY THE TROUSERS PACKAGE TO SANDBOX THE TCSD DAEMON:/DEV/NULL:/SBIN/NOLOGIN
```

```
SLES12SP1:~ # cat /etc/passwd | tr "[a-z]" "[A-Z]"
AT:X:25:25:BATCH JOBS DAEMON:/VAR/SPool/ATJOBS:/BIN/BASH
BIN:X:1:1:BIN:/BIN:/BIN/BASH
DAEMON:X:2:2:DAEMON:/SBIN:/BIN/BASH
FTP:X:40:49:FTP ACCOUNT:/SRV/FTP:/BIN/BASH
FTPSECURE:X:488:65534:SECURE FTP USER:/VAR/LIB/EMPTY:/BIN/FALSE
GAMES:X:12:100:GAMES ACCOUNT:/VAR/GAMES:/BIN/BASH
GDM:X:486:485:GNOME DISPLAY MANAGER DAEMON:/VAR/LIB/GDM:/BIN/FALSE
LP:X:4:7:PRINTING DAEMON:/VAR/SPool/LPD:/BIN/BASH
MAIL:X:8:12:MAILER DAEMON:/VAR/SPool/CLIENTMQUEUE:/BIN/FALSE
MAN:X:13:62:MANUAL PAGES VIEWER:/VAR/CACHE/MAN:/BIN/BASH
MESSAGEBUS:X:499:499:USER FOR D-BUS:/VAR/RUN/DBUS:/BIN/FALSE
NEWS:X:9:13:NEWS SYSTEM:/ETC/NEWS:/BIN/BASH
NOBODY:X:65534:65533:NOBODY:/VAR/LIB/NOBODY:/BIN/BASH
NSCD:X:496:495:USER FOR NSCD:/RUN/NSCD:/SBIN/NOLOGIN
NTP:X:74:492:NTP DAEMON:/VAR/LIB/NTP:/BIN/FALSE
OPENS LP:X:494:2:OPENS LP DAEMON:/VAR/LIB/EMPTY:/SBIN/NOLOGIN
POLKITD:X:497:496:USER FOR POLKITD:/VAR/LIB/POLKIT:/SBIN/NOLOGIN
POSTFIX:X:51:51:POSTFIX DAEMON:/VAR/SPool/POSTFIX:/BIN/FALSE
```

```
PULSE:X:490:489:PULSEAUDIO DAEMON:/VAR/LIB/PULSEAUDIO:/SBIN/NOLOGIN
ROOT:X:0:0:ROOT:/ROOT:/BIN/BASH
RPC:X:495:65534:USER FOR RPCBIND:/VAR/LIB/EMPTY:/SBIN/NOLOGIN
RTKIT:X:491:490:REALTIMEKIT:/PROC:/BIN/FALSE
SCARD:X:487:487:SMART CARD READER:/VAR/RUN/PCSCD:/USR/SBIN/NOLOGIN
SSHD:X:498:498:SSH DAEMON:/VAR/LIB/SSHD:/BIN/FALSE
STATD:X:489:65534:NFS STATD DAEMON:/VAR/LIB/NFS:/SBIN/NOLOGIN
USBMUX:X:493:65534:USBMUXD DAEMON:/VAR/LIB/USBMUXD:/SBIN/NOLOGIN
UUCP:X:10:14:UNIX-T0-UNIX COPY SYSTEM:/ETC/UUCP:/BIN/BASH
VNC:X:492:491:USER FOR VNC:/VAR/LIB/EMPTY:/SBIN/NOLOGIN
WWWRUN:X:30:8:WWW DAEMON APACHE:/VAR/LIB/WWWRUN:/BIN/FALSE
TRAINEE:X:1000:100:TRAINEE:/HOME/TRAINEE:/BIN/BASH
```

Command Line Switches



To do : Use the **-help** option of the **tr** command to view the command line switches.

The paste Command

The **paste** command concatenates lines from n files. For example:

```
root@debian8:~# paste -d: /etc/passwd /etc/shadow
root:x:0:0:root:/root:/bin/bash:root:$6$jxZolPSj$yHWmlcj8imvAXDzAoxZG3KEILb3ITQJgTPhqqlsUqjIuUrfc5Yhzrfl9KrVARr16
U0MZWTdqhb.FaSsRpfRRC1:16922:0:99999:7:::
daemon:x:1:1:daemon:/usr/sbin:/usr/sbin/nologin:daemon*:16922:0:99999:7:::
bin:x:2:2:bin:/bin:/usr/sbin/nologin:bin*:16922:0:99999:7:::
sys:x:3:3:sys:/dev:/usr/sbin/nologin:sys*:16922:0:99999:7:::
sync:x:4:65534:sync:/bin:/bin/sync:sync*:16922:0:99999:7:::
games:x:5:60:games:/usr/games:/usr/sbin/nologin:games*:16922:0:99999:7:::
```

```
man:x:6:12:man:/var/cache/man:/usr/sbin/nologin:man:*:16922:0:99999:7:::
lp:x:7:7:lp:/var/spool/lpd:/usr/sbin/nologin:lp:*:16922:0:99999:7:::
mail:x:8:8:mail:/var/mail:/usr/sbin/nologin:mail:*:16922:0:99999:7:::
news:x:9:9:news:/var/spool/news:/usr/sbin/nologin:news:*:16922:0:99999:7:::
uucp:x:10:10:uucp:/var/spool/uucp:/usr/sbin/nologin:uucp:*:16922:0:99999:7:::
proxy:x:13:13:proxy:/bin:/usr/sbin/nologin:proxy:*:16922:0:99999:7:::
www-data:x:33:33:www-data:/var/www:/usr/sbin/nologin:www-data:*:16922:0:99999:7:::
backup:x:34:34:backup:/var/backups:/usr/sbin/nologin:backup:*:16922:0:99999:7:::
list:x:38:38:Mailing List Manager:/var/list:/usr/sbin/nologin:list:*:16922:0:99999:7:::
irc:x:39:39:ircd:/var/run/ircd:/usr/sbin/nologin:irc:*:16922:0:99999:7:::
gnats:x:41:41:Gnats Bug-Reporting System (admin):/var/lib/gnats:/usr/sbin/nologin:gnats:*:16922:0:99999:7:::
nobody:x:65534:65534:nobody:/nonexistent:/usr/sbin/nologin:nobody:*:16922:0:99999:7:::
systemd-timesync:x:100:103:systemd Time Synchronization,,,:/run/systemd:/bin/false:systemd-
timesync:*:16922:0:99999:7:::
systemd-network:x:101:104:systemd Network Management,,,:/run/systemd/netif:/bin/false:systemd-
network:*:16922:0:99999:7:::
systemd-resolve:x:102:105:systemd Resolver,,,:/run/systemd/resolve:/bin/false:systemd-
resolve:*:16922:0:99999:7:::
systemd-bus-proxy:x:103:106:systemd Bus Proxy,,,:/run/systemd:/bin/false:systemd-bus-proxy:*:16922:0:99999:7:::
trainee:x:1000:1000:trainee,,,:/home/trainee:/bin/bash:trainee:$6$7S60reWb$t92Jj0RxWdCNyF.DtQVAotCxsWfRsvIQUaWjcn
fKX30oFh2GLX2dhtx.oeA0xEjqbff20Pb51VeVjBgwdPU4R0:16922:0:99999:7:::
sshd:x:104:65534::/var/run/sshd:/usr/sbin/nologin:sshd:*:16922:0:99999:7:::
Debian-exim:x:105:110::/var/spool/exim4:/bin/false:Debian-exim!:16922:0:99999:7:::
messagebus:x:106:111::/var/run/dbus:/bin/false:messagebus:*:16922:0:99999:7:::
statd:x:107:65534::/var/lib/nfs:/bin/false:statd:*:16922:0:99999:7:::
avahi-autoipd:x:108:113:Avahi autoip daemon,,,:/var/lib/avahi-autoipd:/bin/false:avahi-
autoipd:*:16922:0:99999:7:::
avahi:x:109:115:Avahi mDNS daemon,,,:/var/run/avahi-daemon:/bin/false:avahi:*:16922:0:99999:7:::
colord:x:110:117:colord colour management daemon,,,:/var/lib/colord:/bin/false:colord:*:16922:0:99999:7:::
dnsmasq:x:111:65534:dnsmasq,,,:/var/lib/misc:/bin/false:dnsmasq:*:16922:0:99999:7:::
speech-dispatcher:x:112:29:Speech Dispatcher,,,:/var/run/speech-dispatcher:/bin/sh:speech-
dispatcher!:16922:0:99999:7:::
pulse:x:113:119:PulseAudio daemon,,,:/var/run/pulse:/bin/false:pulse:*:16922:0:99999:7:::
rtkit:x:114:121:RealtimeKit,,,:/proc:/bin/false:rtkit:*:16922:0:99999:7:::
```

```
saned:x:115:122::/var/lib/saned:/bin/false:saned*:16922:0:99999:7:::
usbmux:x:116:46:usbmux daemon,,,:/var/lib/usbmux:/bin/false:usbmux*:16922:0:99999:7:::
lightdm:x:117:124:Light Display Manager:/var/lib/lightdm:/bin/false:lightdm*:16922:0:99999:7:::
```

```
root@ubuntu1604:~# paste -d: /etc/passwd /etc/shadow
root:x:0:0:root:/root:/bin/bash:root!:16924:0:99999:7:::
daemon:x:1:1:daemon:/usr/sbin:/usr/sbin/nologin:daemon*:16911:0:99999:7:::
bin:x:2:2:bin:/bin:/usr/sbin/nologin:bin*:16911:0:99999:7:::
sys:x:3:3:sys:/dev:/usr/sbin/nologin:sys*:16911:0:99999:7:::
sync:x:4:65534:sync:/bin:/bin/sync:sync*:16911:0:99999:7:::
games:x:5:60:games:/usr/games:/usr/sbin/nologin:games*:16911:0:99999:7:::
man:x:6:12:man:/var/cache/man:/usr/sbin/nologin:man*:16911:0:99999:7:::
lp:x:7:7:lp:/var/spool/lpd:/usr/sbin/nologin:lp*:16911:0:99999:7:::
mail:x:8:8:mail:/var/mail:/usr/sbin/nologin:mail*:16911:0:99999:7:::
news:x:9:9:news:/var/spool/news:/usr/sbin/nologin:news*:16911:0:99999:7:::
uucp:x:10:10:uucp:/var/spool/uucp:/usr/sbin/nologin:uucp*:16911:0:99999:7:::
proxy:x:13:13:proxy:/bin:/usr/sbin/nologin:proxy*:16911:0:99999:7:::
www-data:x:33:33:www-data:/var/www:/usr/sbin/nologin:www-data*:16911:0:99999:7:::
backup:x:34:34:backup:/var/backups:/usr/sbin/nologin:backup*:16911:0:99999:7:::
list:x:38:38:Mailing List Manager:/var/list:/usr/sbin/nologin:list*:16911:0:99999:7:::
irc:x:39:39:ircd:/var/run/ircd:/usr/sbin/nologin:irc*:16911:0:99999:7:::
gnats:x:41:41:Gnats Bug-Reporting System (admin):/var/lib/gnats:/usr/sbin/nologin:gnats*:16911:0:99999:7:::
nobody:x:65534:65534:nobody:/nonexistent:/usr/sbin/nologin:nobody*:16911:0:99999:7:::
systemd-timesync:x:100:102:systemd Time Synchronization,,,:/run/systemd:/bin/false:systemd-
timesync*:16911:0:99999:7:::
systemd-network:x:101:103:systemd Network Management,,,:/run/systemd/netif:/bin/false:systemd-
network*:16911:0:99999:7:::
systemd-resolve:x:102:104:systemd Resolver,,,:/run/systemd/resolve:/bin/false:systemd-
resolve*:16911:0:99999:7:::
systemd-bus-proxy:x:103:105:systemd Bus Proxy,,,:/run/systemd:/bin/false:systemd-bus-proxy*:16911:0:99999:7:::
syslog:x:104:108:./home/syslog:/bin/false:syslog*:16911:0:99999:7:::
_apt:x:105:65534:./nonexistent:/bin/false:_apt*:16911:0:99999:7:::
messagebus:x:106:110:./var/run/dbus:/bin/false:messagebus*:16911:0:99999:7:::
uidd:x:107:111:./run/uidd:/bin/false:uidd*:16911:0:99999:7:::
```

```
lightdm:x:108:114:Light Display Manager:/var/lib/lightdm:/bin/false:lightdm*:16911:0:99999:7:::
whoopsie:x:109:116::/nonexistent:/bin/false:whoopsie*:16911:0:99999:7:::
avahi-autoipd:x:110:119:Avahi autoip daemon,,,:/var/lib/avahi-autoipd:/bin/false:avahi-
autoipd*:16911:0:99999:7:::
avahi:x:111:120:Avahi mDNS daemon,,,:/var/run/avahi-daemon:/bin/false:avahi*:16911:0:99999:7:::
dnsmasq:x:112:65534:dnsmasq,,,:/var/lib/misc:/bin/false:dnsmasq*:16911:0:99999:7:::
colord:x:113:123:colord colour management daemon,,,:/var/lib/colord:/bin/false:colord*:16911:0:99999:7:::
speech-dispatcher:x:114:29:Speech Dispatcher,,,:/var/run/speech-dispatcher:/bin/false:speech-
dispatcher!:16911:0:99999:7:::
hplip:x:115:7:HPLIP system user,,,:/var/run/hplip:/bin/false:hplip*:16911:0:99999:7:::
kernoops:x:116:65534:Kernel Oops Tracking Daemon,,,:/bin/false:kernoops*:16911:0:99999:7:::
pulse:x:117:124:PulseAudio daemon,,,:/var/run/pulse:/bin/false:pulse*:16911:0:99999:7:::
rtkit:x:118:126:RealtimeKit,,,:/proc:/bin/false:rtkit*:16911:0:99999:7:::
saned:x:119:127::/var/lib/saned:/bin/false:saned*:16911:0:99999:7:::
usbmux:x:120:46:usbmux daemon,,,:/var/lib/usbmux:/bin/false:usbmux*:16911:0:99999:7:::
trainee:x:1000:1000:trainee,,,:/home/trainee:/bin/bash:trainee:$6$cloNcVp0$4BFXvmH./lvuhem.pWND1.XgChp/BuT4tHukwv
FR9ykdQM1Yt.WbM060lHdUR/E6D2bqUJ/n.BwX4gCMle/671:16924:0:99999:7:::
sshd:x:121:65534::/var/run/sshd:/usr/sbin/nologin:sshd*:16924:0:99999:7:::
```

```
[root@centos7 ~]# paste -d: /etc/passwd /etc/shadow
root:x:0:0:root:/root:/bin/bash:root:$6$r4px/s9L2uwGSFnI$NkK5mzNF.CMAFFqMc0.i.tnrMZQDkriDLyICsimsPaDWKFwUHS3NhDw
ZY5e7P3gIiu.gTBta0E.S00W/D.AU/:16502:0:99999:7:::
bin:x:1:1:bin:/bin:/sbin/nologin:bin*:16231:0:99999:7:::
daemon:x:2:2:daemon:/sbin:/sbin/nologin:daemon*:16231:0:99999:7:::
adm:x:3:4:adm:/var/adm:/sbin/nologin:adm*:16231:0:99999:7:::
lp:x:4:7:lp:/var/spool/lpd:/sbin/nologin:lp*:16231:0:99999:7:::
sync:x:5:0:sync:/sbin:/bin/sync:sync*:16231:0:99999:7:::
shutdown:x:6:0:shutdown:/sbin:/sbin/shutdown:shutdown*:16231:0:99999:7:::
halt:x:7:0:halt:/sbin:/sbin/halt:halt*:16231:0:99999:7:::
mail:x:8:12:mail:/var/spool/mail:/sbin/nologin:mail*:16231:0:99999:7:::
operator:x:11:0:operator:/root:/sbin/nologin:operator*:16231:0:99999:7:::
games:x:12:100:games:/usr/games:/sbin/nologin:games*:16231:0:99999:7:::
ftp:x:14:50:FTP User:/var/ftp:/sbin/nologin:ftp*:16231:0:99999:7:::
nobody:x:99:99:Nobody:./:/sbin/nologin:nobody*:16231:0:99999:7:::
```

```
dbus:x:81:81:System message bus:/:/sbin/nologin:dbus:!!:16502:~::~:
polkitd:x:999:998:User for polkitd:/:/sbin/nologin:polkitd:!!:16502:~::~:
unbound:x:998:997:Unbound DNS resolver:/etc/unbound:/sbin/nologin:unbound:!!:16502:~::~:
colord:x:997:996:User for colord:/var/lib/colord:/sbin/nologin:colord:!!:16502:~::~:
usbmuxd:x:113:113:usbmuxd user:/:/sbin/nologin:usbmuxd:!!:16502:~::~:
avahi:x:70:70:Avahi mDNS/DNS-SD Stack:/var/run/avahi-daemon:/sbin/nologin:avahi:!!:16502:~::~:
avahi-autoipd:x:170:170:Avahi IPv4LL Stack:/var/lib/avahi-autoipd:/sbin/nologin:avahi-autoipd:!!:16502:~::~:
saslauth:x:996:76:"Saslauthd user":/run/saslauthd:/sbin/nologin:saslauth:!!:16502:~::~:
qemu:x:107:107:qemu user:/:/sbin/nologin:qemu:!!:16502:~::~:
libstoragemgmt:x:995:994:daemon account for
libstoragemgmt:/var/run/lsm:/sbin/nologin:libstoragemgmt:!!:16502:~::~:
rpc:x:32:32:Rpcbind Daemon:/var/lib/rpcbind:/sbin/nologin:rpc:!!:16502:0:99999:7::~:
rpcuser:x:29:29:RPC Service User:/var/lib/nfs:/sbin/nologin:rpcuser:!!:16502:~::~:
nfsnobody:x:65534:65534:Anonymous NFS User:/var/lib/nfs:/sbin/nologin:nfsnobody:!!:16502:~::~:
rtkit:x:172:172:RealtimeKit:/proc:/sbin/nologin:rtkit:!!:16502:~::~:
radvd:x:75:75:radvd user:/:/sbin/nologin:radvd:!!:16502:~::~:
ntp:x:38:38::/etc/ntp:/sbin/nologin:ntp:!!:16502:~::~:
chrony:x:994:993::/var/lib/chrony:/sbin/nologin:chrony:!!:16502:~::~:
abrt:x:173:173::/etc/abrt:/sbin/nologin:abrt:!!:16502:~::~:
pulse:x:171:171:PulseAudio System Daemon:/var/run/pulse:/sbin/nologin:pulse:!!:16502:~::~:
gdm:x:42:42::/var/lib/gdm:/sbin/nologin:gdm:!!:16502:~::~:
gnome-initial-setup:x:993:991::/run/gnome-initial-setup:/sbin/nologin:gnome-initial-setup:!!:16502:~::~:
postfix:x:89:89::/var/spool/postfix:/sbin/nologin:postfix:!!:16502:~::~:
sshd:x:74:74:Privilege-separated SSH:/var/empty/ssh:/sbin/nologin:sshd:!!:16502:~::~:
tcpdump:x:72:72::/sbin/nologin:tcpdump:!!:16502:~::~:
trainee:x:1000:1000:trainee:/home/trainee:/bin/bash:trainee:$6$tMd44tmmFiitAS7.$sJSua3jhyKm2k0mIifYuTpU00d6q6/gS3
PDyuxbHadHVYLsoVslZ3Pn8m5X93rr64oj.KK80L6J.gvhxbQBrZ1:16502:0:99999:7::~:
vboxadd:x:992:1::/var/run/vboxadd:/bin/false:vboxadd:!!:16691:~::~:
tss:x:59:59:Account used by the trousers package to sandbox the tcsd
daemon:/dev/null:/sbin/nologin:tss:!!:16723:~::~:
```

```
SLES12SP1:~ # paste -d: /etc/passwd /etc/shadow
```

```
at:x:25:25:Batch jobs daemon:/var/spool/atjobs:/bin/bash:at:!:16922:~::~:
```

```
bin:x:1:1:bin:/bin:/bin/bash:bin:!:16765:~::~:
```

```
daemon:x:2:2:Daemon:/sbin:/bin/bash:daemon*:16765:::::::
ftp:x:40:49:FTP account:/srv/ftp:/bin/bash:ftp*:16765:::::::
ftpsecure:x:488:65534:Secure FTP User:/var/lib/empty:/bin/false:ftpsecure!:16922:::::::
games:x:12:100:Games account:/var/games:/bin/bash:games*:16765:::::::
gdm:x:486:485:Gnome Display Manager daemon:/var/lib/gdm:/bin/false:gdm!:16922:::::::
lp:x:4:7:Printing daemon:/var/spool/lpd:/bin/bash:lp*:16765:::::::
mail:x:8:12:Mailer daemon:/var/spool/clientmqueue:/bin/false:mail*:16765:::::::
man:x:13:62:Manual pages viewer:/var/cache/man:/bin/bash:man*:16765:::::::
messagebus:x:499:499:User for D-Bus:/var/run/dbus:/bin/false:messagebus!:16765:::::::
news:x:9:13:News system:/etc/news:/bin/bash:news*:16765:::::::
nobody:x:65534:65533:nobody:/var/lib/nobody:/bin/bash:nobody*:16765:::::::
nscd:x:496:495:User for nscd:/run/nscd:/sbin/nologin:nscd!:16765:::::::
ntp:x:74:492:NTP daemon:/var/lib/ntp:/bin/false:ntp!:16922:::::::
openslp:x:494:2:openslp daemon:/var/lib/empty:/sbin/nologin:openslp!:16765:::::::
polkitd:x:497:496:User for polkitd:/var/lib/polkit:/sbin/nologin:polkitd!:16765:::::::
postfix:x:51:51:Postfix Daemon:/var/spool/postfix:/bin/false:postfix!:16922:::::::
pulse:x:490:489:PulseAudio daemon:/var/lib/pulseaudio:/sbin/nologin:pulse!:16922:::::::
root:x:0:0:root:/root:/bin/bash:root:$6$g0tHJ9vyIfFt$rbm.rf7p6XZMxMqbqa/BGDeA7E7RkC9n89w8cWdpAxxUmwk7BPcMv7Zy9nVAN7f/7zQJzcRcsIqp5bRx1e8iX/:16922:::::::
rpc:x:495:65534:user for rpcbind:/var/lib/empty:/sbin/nologin:rpc!:16765:::::::
rtkit:x:491:490:RealtimeKit:/proc:/bin/false:rtkit!:16922:::::::
scard:x:487:487:Smart Card Reader:/var/run/pcscd:/usr/sbin/nologin:scard!:16922:::::::
sshd:x:498:498:SSH daemon:/var/lib/ssh:/bin/false:sshd!:16765:::::::
statd:x:489:65534:NFS statd daemon:/var/lib/nfs:/sbin/nologin:statd!:16922:::::::
usbmux:x:493:65534:usbmuxd daemon:/var/lib/usbmuxd:/sbin/nologin:usbmux!:16922:::::::
uucp:x:10:14:Unix-to-Unix CoPy system:/etc/uucp:/bin/bash:uucp*:16765:::::::
vnc:x:492:491:user for VNC:/var/lib/empty:/sbin/nologin:vnc!:16922:::::::
wwwrun:x:30:8:WWW daemon apache:/var/lib/wwwrun:/bin/false:wwwrun*:16765:::::::
trainee:x:1000:100:trainee:/home/trainee:/bin/bash:trainee:$6$0ZyVqj4ekgmu$Cw0T.n6gNv.vTdAT6dFxrrSeHW/V3r43jWFczPG0lxg5SB9iMUcQ6MFLz9NuTTas289xe/ULsJhE2HdJbraGA.:16922:0:99999:7:::
```



Important: Note that you need to be root to be able to execute this command. The reason is that normal users do not have the right to read the `/etc/shadow` file.

Command Line Switches



To do : Use the **-help** option of the **paste** command to view the command line switches.

The split Command

The split command is used to divide a large file into smaller segments. Create an empty 250 MB file as follows:

```
root@debian8:~# dd if=/dev/zero of=/file bs=1024k count=250
250+0 records in
250+0 records out
262144000 bytes (262 MB) copied, 0.57181 s, 458 MB/s
```

```
root@ubuntu1604:~# dd if=/dev/zero of=/file bs=1024k count=250
250+0 records in
250+0 records out
262144000 bytes (262 MB, 250 MiB) copied, 2.57217 s, 102 MB/s
```

```
[root@centos7 ~]# dd if=/dev/zero of=/file bs=1024k count=250
250+0 records in
250+0 records out
262144000 bytes (262 MB) copied, 0.215447 s, 1.2 GB/s
```

```
SLES12SP1:~ # dd if=/dev/zero of=/file bs=1024k count=250
250+0 records in
250+0 records out
262144000 bytes (262 MB) copied, 3.50609 s, 74.8 MB/s
```

Now use the split command to divide the file into 5 smaller files each of 50 MB:

```
root@debian8:~# split -b 50m /file filepart
root@debian8:~# ls -l | grep filepart
-rw-r--r-- 1 root root 52428800 Nov 30 18:41 filepartaa
-rw-r--r-- 1 root root 52428800 Nov 30 18:41 filepartab
-rw-r--r-- 1 root root 52428800 Nov 30 18:41 filepartac
-rw-r--r-- 1 root root 52428800 Nov 30 18:41 filepartad
-rw-r--r-- 1 root root 52428800 Nov 30 18:41 filepartae
```

```
root@ubuntu1604:~# split -b 50m /file filepart
root@ubuntu1604:~# ls -l | grep filepart
-rw-r--r-- 1 root root 52428800 déc. 17 11:31 filepartaa
-rw-r--r-- 1 root root 52428800 déc. 17 11:31 filepartab
-rw-r--r-- 1 root root 52428800 déc. 17 11:31 filepartac
-rw-r--r-- 1 root root 52428800 déc. 17 11:31 filepartad
-rw-r--r-- 1 root root 52428800 déc. 17 11:31 filepartae
```

```
[root@centos7 ~]# split -b 50m /file filepart
[root@centos7 ~]# ls -l | grep filepart
-rw-r--r-- 1 root root 52428800 Oct 19 15:31 filepartaa
-rw-r--r-- 1 root root 52428800 Oct 19 15:31 filepartab
-rw-r--r-- 1 root root 52428800 Oct 19 15:31 filepartac
-rw-r--r-- 1 root root 52428800 Oct 19 15:31 filepartad
-rw-r--r-- 1 root root 52428800 Oct 19 15:31 filepartae
```

```
SLES12SP1:~ # split -b 50m /file filepart
SLES12SP1:~ # ls -l | grep filepart
-rw-r--r-- 1 root root 52428800 Dec 14 15:10 filepartaa
-rw-r--r-- 1 root root 52428800 Dec 14 15:10 filepartab
-rw-r--r-- 1 root root 52428800 Dec 14 15:10 filepartac
-rw-r--r-- 1 root root 52428800 Dec 14 15:10 filepartad
-rw-r--r-- 1 root root 52428800 Dec 14 15:10 filepartae
```





Important: Note that the 5 files were created in the current working directory.

You can re-construct the original file by using the **cat** command:

```
root@debian8:~# cat fileparta* > newfile
root@debian8:~# ls -l | grep newf
-rw-r--r-- 1 root root 262144000 Nov 30 18:42 newfile
```

```
root@ubuntu1604:~# cat fileparta* > newfile
root@ubuntu1604:~# ls -l | grep newf
-rw-r--r-- 1 root root 262144000 déc. 17 11:32 newfile
```

```
[root@centos7 ~]# cat fileparta* > newfile
[root@centos7 ~]# ls -l | grep newf
-rw-r--r--. 1 root root 262144000 Oct 19 15:31 newfile
```

```
SLES12SP1:~ # cat fileparta* > newfile
SLES12SP1:~ # ls -l | grep newf
-rw-r--r-- 1 root root 262144000 Dec 14 15:11 newfile
```

Command Line Switches



To do : Use the **-help** option of the **split** command to view the command line switches.

The diff Command

The diff command compares two files and indicates what changes need to be made to the first file in order that it be identical to the second file.

Copy the **/etc/passwd** file to the **/root** directory:

```
root@debian8:~# cp /etc/passwd /root
```

```
root@ubuntu1604:~# cp /etc/passwd /root
```

```
[root@centos ~]# cp /etc/passwd /root
```

```
SLES12SP1:~ # cp /etc/passwd /root
```

Debian

Edit the ***/root/passwd** file as shown:

```
...  
trainee10:x:1000:1000:trainee:/home/trainee:/bin/bash  
...
```

Delete the **lp** entry and add the following line to the end of **/root/passwd**:

```
...  
Linux is great!
```

Now compare the two files:

```
root@debian8:~# diff /etc/passwd /root/passwd  
8d7  
< lp:x:7:7:lp:/var/spool/lpd:/usr/sbin/nologin  
23c22  
< trainee:x:1000:1000:trainee,,,:/home/trainee:/bin/bash  
---  
> trainee10:x:1000:1000:trainee,,,:/home/trainee:/bin/bash
```

```
37a37
> Linux is great!
```

In this output you will notice the < and > characters. The first makes reference to the first file, /etc/passwd, whilst the second makes reference to the second file, /root/passwd.

The output **8d7** means that line 8 needs to be deleted in /etc/passwd because it is missing in /root/passwd.

The output **23c22** means that at line 23 in /etc/passwd needs to be modified in order to be the same as line 22 in /root/passwd.

The output **37a37** means that line 37 in /root/passwd needs to be added after line 37 in /etc/passwd.

Ubuntu

Edit the ***/root/passwd** file as shown:

```
...
trainee10:x:1000:1000:trainee:/home/trainee:/bin/bash
...
```

Delete the **lp** entry and add the following line to the end of **/root/passwd**:

```
...
Linux is great!
```

Now compare the two files:

```
root@ubuntu1604:~# diff /etc/passwd /root/passwd
8d7
< lp:x:7:7:lp:/var/spool/lpd:/usr/sbin/nologin
40c39
< trainee:x:1000:1000:trainee,,,:/home/trainee:/bin/bash
---
```

```
> trainee10:x:1000:1000:trainee,,,:/home/trainee:/bin/bash
41a41
> Linux is great!
```

In this output you will notice the < and > characters. The first makes reference to the first file, /etc/passwd, whilst the second makes reference to the second file, /root/passwd.

The output **8d7** means that line 8 needs to be deleted in /etc/passwd because it is missing in /root/passwd.

The output **40c39** means that at line 40 in /etc/passwd needs to be modified in order to be the same as line 39 in /root/passwd.

The output **41a41** means that at line 41 in /root/passwd line 41 in /etc/passwd needs to be added because it is missing.

RHEL/CentOS

Edit the ***/root/passwd** file as shown:

```
...
trainee10:x:1000:1000:trainee:/home/trainee:/bin/bash
...
```

Delete the **tcpdump** entry and add the following line to the end of **/root/passwd**:

```
...
Linux est super!
```

Now compare the two files:

```
[root@centos7 ~]# diff /etc/passwd /root/passwd
38,39c38
< trainee:x:1000:1000:trainee:/home/trainee:/bin/bash
< vboxadd:x:992:1::/var/run/vboxadd:/bin/false
---
```

```
> trainee10:x:1000:1000:trainee:/home/trainee:/bin/bash
40a40
> Linux est super!
```

In this output you will notice the < and > characters. The first makes reference to the first file, /etc/passwd, whilst the second makes reference to the second file, /root/passwd.

The output **38,39c38** means that line 39 needs to be changed in /etc/passwd so that is the same as line 38 in /root/passwd.

The output **40a40** means that at line 40 in /etc/passwd line 40 from /root/passwd needs to be added.

SLES

Edit the ***/root/passwd** file as shown:

```
...
trainee10:x:1000:1000:trainee:/home/trainee:/bin/bash
...
```

Delete the **uucp** entry and add the following line to the end of **/root/passwd**:

```
...
Linux est super!
```

Now compare the two files:

```
SLES12SP1:~ # diff /etc/passwd /root/passwd
27d26
< uucp:x:10:14:Unix-to-Unix CoPy system:/etc/uucp:/bin/bash
30c29,30
< trainee:x:1000:100:trainee:/home/trainee:/bin/bash
---
> trainee10:x:1000:100:trainee:/home/trainee:/bin/bash
```

```
> Linux est super
```

In this output you will notice the < and > characters. The first makes reference to the first file, /etc/passwd, whilst the second makes reference to the second file, /root/passwd.

The output **27d26** means that line 27 needs to be deleted from /etc/passwd because it does not exist in /root/passwd.

The output **30c29,30** means that line 30 needs to be changed in /etc/passwd so that it is the same as line 29 in /root/passwd.

Command Line Switches



To do : Use the **-help** option of the **diff** command to view the command line switches.

The cmp Command

The **cmp** command compares two files character by character. By default, the command stops after finding the first difference:

```
root@debian8:~# cmp /root/passwd /etc/passwd
/root/passwd /etc/passwd differ: byte 286, line 8
```

```
root@ubuntu1604:~# cmp /root/passwd /etc/passwd
/root/passwd /etc/passwd differ: byte 286, line 8
```

```
[root@centos7 ~]# cmp /root/passwd /etc/passwd
/root/passwd /etc/passwd differ: byte 1873, line 38
```

```
SLES12SP1:~ # cmp /root/passwd /etc/passwd
/root/passwd /etc/passwd differ: char 1413, line 27
```

The **-l** switch shows all of the differences in a three column format:

```
root@debian8:~# cmp -l /root/passwd /etc/passwd | more
cmp: EOF on /root/passwd
 286 155 154
 287 141 160
 288 151  72
 289 154 170
 291 170  67
 293  70  67
 295  70 154
 296  72 160
 297 155  72
 298 141  57
 299 151 166
 300 154 141
 301  72 162
 303 166 163
 304 141 160
 305 162 157
 306  57 157
 307 155 154
 308 141  57
 309 151 154
 310 154 160
 311  72 144
 312  57  72
--More--
```

```
root@ubuntu1604:~# cmp -l /root/passwd /etc/passwd | more
cmp: EOF on /root/passwd
 286 155 154
 287 141 160
 288 151  72
```

```
289 154 170
291 170 67
293 70 67
295 70 154
296 72 160
297 155 72
298 141 57
299 151 166
300 154 141
301 72 162
303 166 163
304 141 160
305 162 157
306 57 157
307 155 154
308 141 57
309 151 154
310 154 160
311 72 144
312 57 72
--More--
```

```
[root@centos7 ~]# cmp -l /root/passwd /etc/passwd | more
```

```
cmp: EOF on /root/passwd
```

```
1873 61 72
1874 60 170
1876 170 61
1877 72 60
1878 61 60
1880 60 72
1881 60 61
1882 72 60
1883 61 60
1885 60 72
```

```
1886 60 164
1887 72 162
1888 164 141
1889 162 151
1890 141 156
1891 151 145
1892 156 145
1893 145 72
1894 145 57
1895 72 150
1896 57 157
1897 150 155
1898 157 145
1899 155 57
1900 145 164
1901 57 162
1902 164 141
1903 162 151
--More--
```

```
SLES12SP1:~ # cmp -l /root/passwd /etc/passwd | more
cmp: EOF on /root/passwd
1413 166 165
1414 156 165
1416 72 160
1417 170 72
1418 72 170
1419 64 72
1420 71 61
1421 62 60
1423 64 61
1424 71 64
1425 61 72
1426 72 125
```

```
1427 165 156
1428 163 151
1429 145 170
1430 162 55
1431 40 164
1432 146 157
1433 157 55
1434 162 125
1435 40 156
1436 126 151
1437 116 170
--More--
```

The first column represents the character **number**, the second column represents the **ASCII octal value** of the character in the **/root/passwd** file and the third column represents the **ASCII octal value** of the character in the **/etc/passwd** file.

Command Line Switches



To do : Use the **-help** option of the **cmp** command to view the command line switches.

The patch Command

The **patch** command is used to apply modifications contained within a patch file to an older version of a file so that it becomes the newer version of the file.

Debian

If you recall, you made some changes to the original **greptest** file that you downloaded:

```
root@debian8:~# cat /tmp/greptest
# Starting comment
^ This line will be used to demonstrate the use of fgrep
fenestr0S
fenestros
# Another comment
555-5555
f

.fenestros

.fe

£
# End comment
```

You also used `egrep` to remove all the comments and empty lines and save the result to **/tmp/greptest1**:

```
[root@centos ~]# cat /tmp/greptest1
fenestr0S
fenestros
555-5555
f
.fenestros
.fe
£
```

Now create a patch file containing the modifications that need to be applied to `/tmp/greptest` in order for it to be identical to `/tmp/greptest1`:

```
root@debian8:~# cd /tmp
root@debian8:/tmp# diff -u greptest greptest1 > greptest.patch
```

A look at the patch file shows the changes that need to be made to the **greptest** file:

```
root@debian8:/tmp# cat /tmp/greptest.patch
--- greptest      2016-11-30 18:54:52.732000000 +0000
+++ greptest1     2016-11-30 18:55:28.392000000 +0000
@@ -1,14 +1,7 @@
-# Starting comment
-^ This line will be used to demonstrate the use of fgrep
 fenestr0S
 fenestros
-# Another comment
 555-5555
 f
-
 .fenestros
-
 .fe
-
 f
-# End comment
```

Now apply the patch file:

```
root@debian8:/tmp# patch < greptest.patch
patching file greptest
```

Finally, check the contents of the patched **greptest** file:

```
root@debian8:/tmp# cat greptest
fenestr0S
fenestros
555-5555
f
.fenestros
.fe
```

```
£
```

Ubuntu

If you recall, you made some changes to the original **greptest** file that you downloaded:

```
root@ubuntu1604:~# cat /tmp/greptest
# Starting comment
^ This line will be used to demonstrate the use of fgrep
fenestr0S
fenestros
# Another comment
555-5555
f

.fenestros

.fe

£
# End comment
```

You also used `egrep` to remove all the comments and empty lines and save the result to **/tmp/greptest1**:

```
root@ubuntu1604:~# cat /tmp/greptest1
fenestr0S
fenestros
555-5555
f
.fenestros
.fe
£
```

Now create a patch file containing the modifications that need to be applied to /tmp/greptest in order for it to be identical to /tmp/greptest1:

```
root@ubuntu1604:~# cd /tmp
root@ubuntu1604:/tmp# diff -u greptest greptest1 > greptest.patch
```

A look at the patch file shows the changes that need to be made to the **greptest** file:

```
root@ubuntu1604:/tmp# cat /tmp/greptest.patch
--- greptest      2016-12-09 15:47:38.836983792 +0100
+++ greptest1    2016-12-09 15:46:15.976860968 +0100
@@ -1,14 +1,7 @@
-# Starting comment
-^ This line will be used to demonstrate the use of fgrep
 fenestr0S
 fenestros
-# Another comment
 555-5555
 f
-
 .fenestros
-
 .fe
-
 f
-# End comment
```

Now apply the patch file:

```
root@ubuntu1604:/tmp# patch < greptest.patch
patching file greptest
```

Finally, check the contents of the patched **greptest** file:

```
root@ubuntu1604:/tmp# cat greptest
```

```
fenestr0S
fenestros
555-5555
f
.fenestros
.fe
£
```

RHEL/CentOS

The **patch** command is not installed by default in RHEL/CentOS 7:

```
[root@centos7 ~]# yum install patch
Loaded plugins: fastestmirror, langpacks
Loading mirror speeds from cached hostfile
 * base: mirror.ibcp.fr
 * extras: mirrors.atosworldline.com
 * updates: mirror.ibcp.fr
Resolving Dependencies
--> Running transaction check
---> Package patch.x86_64 0:2.7.1-8.el7 will be installed
--> Finished Dependency Resolution
```

Dependencies Resolved

```
=====
Package Arch Version
Repository Size
=====
Installing:
patch x86_64 2.7.1-8.el7
```

```
base                110 k
```

```
Transaction Summary
```

```
=====
Install 1 Package
```

```
Total download size: 110 k
```

```
Installed size: 210 k
```

```
Is this ok [y/d/N]: y
```

```
Downloading packages:
```

```
patch-2.7.1-8.el7.x86_64.rpm
```

```
| 110 kB 00:00:00
```

```
Running transaction check
```

```
Running transaction test
```

```
Transaction test succeeded
```

```
Running transaction
```

```
  Installing : patch-2.7.1-8.el7.x86_64
```

```
1/1
```

```
  Verifying  : patch-2.7.1-8.el7.x86_64
```

```
1/1
```

```
Installed:
```

```
  patch.x86_64 0:2.7.1-8.el7
```

```
Complete!
```

If you recall, you made some changes to the original **greptest** file that you downloaded:

```
[root@centos7 ~]# cat /tmp/greptest
# Starting comment
^ This line will be used to demonstrate the use of fgrep
fenestr0S
fenestros
```

```
# Another comment
555-5555
f

.fenestros

.fe

£
# End comment
```

You also used `egrep` to remove all the comments and empty lines and save the result to **/tmp/greptest1**:

```
[root@centos ~]# cat /tmp/greptest1
fenestr0S
fenestros
555-5555
f
.fenestros
.fe
£
```

Now create a patch file containing the modifications that need to be applied to `/tmp/greptest` in order for it to be identical to `/tmp/greptest1`:

```
[root@centos7 ~]# cd /tmp
[root@centos7 tmp]# diff -u greptest greptest1 > greptest.patch
```

A look at the patch file shows the changes that need to be made to the **greptest** file:

```
[root@centos tmp]# cat /tmp/greptest.patch
--- greptest      2013-01-07 15:14:03.646565259 +0100
+++ greptest1    2013-01-07 15:07:05.657375635 +0100
@@ -1,14 +1,7 @@
-# Starting comment
```

```
- ^ This line will be used to demonstrate the use of fgrep
  fenestr0S
  fenestros
-# Another comment
  555-5555
  f
-
  .fenestros
-
  .fe
-
  £
-# End comment
```

Now apply the patch file:

```
[root@centos7 tmp]# patch < greptest.patch
patching file greptest
```

Finally, check the contents of the patched **greptest** file:

```
[root@centos7 tmp]# cat greptest
fenestr0S
fenestros
555-5555
f
.fenestros
.fe
£
```

SLES

If you recall, you made some changes to the original **greptest** file that you downloaded:

```
SLES12SP1:~ # cat /tmp/greptest
# Starting comment
^ This line will be used to demonstrate the use of fgrep
fenestr0S
fenestros
# Another comment
555-5555
f

.fenestros

.fe

£
# End comment
```

You also used `egrep` to remove all the comments and empty lines and save the result to **/tmp/greptest1**:

```
SLES12SP1:~ # cat /tmp/greptest1
fenestr0S
fenestros
555-5555
f
.fenestros
.fe
£
```

Now create a patch file containing the modifications that need to be applied to `/tmp/greptest` in order for it to be identical to `/tmp/greptest1`:

```
SLES12SP1:~ # cd /tmp
SLES12SP1:/tmp # diff -u greptest greptest1 > greptest.patch
```

A look at the patch file shows the changes that need to be made to the **greptest** file:

```
SLES12SP1:/tmp # cat /tmp/greptest.patch
--- greptest      2016-12-14 14:00:32.987471124 +0100
+++ greptest1     2016-12-14 13:59:12.319471124 +0100
@@ -1,14 +1,7 @@
-# Starting comment
-^ This line will be used to demonstrate the use of fgrep
 fenestr0S
 fenestros
-# Another comment
 555-5555
 f
-
 .fenestros
-
 .fe
-
 f
-# End comment
```

Now apply the patch file:

```
SLES12SP1:/tmp # patch < greptest.patch
patching file greptest
```

Finally, check the contents of the patched **greptest** file:

```
SLES12SP1:/tmp # cat greptest
fenestr0S
fenestros
555-5555
f
.fenestros
```

```
.fe  
£
```

Command Line Switches



To do : Use the **-help** option of the **patch** command to view the command line switches.

The strings Command

The **strings** Command is used to extract any printable string in one or more object files or executables. An object file is an intermediary file used when compiling.

The format of an object file is **ELF** (Executable and Linkable Format). This same format is also used for:

- executables,
- shared libraries,
- core dumps.

Debian

The strings command is not installed by default in Debian 8 :

```
root@debian8:/tmp# apt-get install binutils  
Reading package lists... Done  
Building dependency tree  
Reading state information... Done  
Suggested packages:  
  binutils-doc
```

```
The following NEW packages will be installed:
 binutils
0 upgraded, 1 newly installed, 0 to remove and 0 not upgraded.
Need to get 3,516 kB of archives.
After this operation, 21.1 MB of additional disk space will be used.
Get:1 http://ftp.fr.debian.org/debian/ jessie/main binutils amd64 2.25-5 [3,516 kB]
Fetched 3,516 kB in 0s (7,674 kB/s)
Selecting previously unselected package binutils.
(Reading database ... 82508 files and directories currently installed.)
Preparing to unpack ../binutils_2.25-5_amd64.deb ...
Unpacking binutils (2.25-5) ...
Processing triggers for man-db (2.7.0.2-5) ...
Setting up binutils (2.25-5) ...
Processing triggers for libc-bin (2.19-18+deb8u4) ...
root@debian8:/tmp# which strings
/usr/bin/strings
```

Used as is, the command extracts all strings greater than 4 characters in length:

```
root@debian8:/tmp# strings /usr/bin/passwd | more
/lib64/ld-linux-x86-64.so.2
libpam.so.0
_ITM_deregisterTMCloneTable
__gmon_start__
_Jv_RegisterClasses
_ITM_registerTMCloneTable
pam_start
pam_strerror
pam_chauthtok
pam_end
libpam_misc.so.0
misc_conv
libaudit.so.1
_fini
```

```
_init  
libselinux.so.1  
is_selinux_enabled  
security_getenforce  
context_user_get  
security_compute_av  
matchpathcon  
freecon  
context_free  
--More--
```

Print the offset within the file before each string:

```
root@debian8:/tmp# strings -t d /usr/bin/passwd | more  
 568 /lib64/ld-linux-x86-64.so.2  
3985 libpam.so.0  
3997 _ITM_deregisterTMCloneTable  
4025 __gmon_start__  
4040 _Jv_RegisterClasses  
4060 _ITM_registerTMCloneTable  
4086 pam_start  
4096 pam_strerror  
4109 pam_chauthtok  
4123 pam_end  
4131 libpam_misc.so.0  
4148 misc_conv  
4158 libaudit.so.1  
4172 _fini  
4178 _init  
4184 libselinux.so.1  
4200 is_selinux_enabled  
4219 security_getenforce  
4239 context_user_get  
4256 security_compute_av
```

```

4276 matchpathcon
4289 freecon
4297 context_free
--More--

```

The **-t** switch can take one of three arguments that specify the numbering system to use:

Argument	Numbering System
d	Decimal
o	Octal
x	Hexadecimal

The **-n** switch prints sequences of characters that are at least **min-len** characters long, instead of the default 4:

```

root@debian8:/tmp# strings -t d -n 15 /usr/bin/passwd | more
 568 /lib64/ld-linux-x86-64.so.2
3997 _ITM_deregisterTMCloneTable
4040 _Jv_RegisterClasses
4060 _ITM_registerTMCloneTable
4131 libpam_misc.so.0
4184 libselinux.so.1
4200 is_selinux_enabled
4219 security_getenforce
4239 context_user_get
4256 security_compute_av
4532 __stack_chk_fail
4693 __errno_location
5150 __libc_start_main
5246 LIBPAM_MISC_1.0
34104 Usage: %s [options] [LOGIN]
34144  -a, --all          report password status on all accounts
34216  -d, --delete      delete the password for the named account
t
34296  -e, --expire      force expire the password for the named

```

```
account
 34384  -h, --help          display this help message and exit
 34456  -k, --keep-tokens   change password only if expired
 34528  -i, --inactive INACTIVE set password inactive after expiration
--More--
```

The **-f** switch prints the name of the file before each string:

```
root@debian8:/tmp# strings -f /bin/* | grep "(c)"
/bin/ntfscat: Copyright (c) 2003-2005 Richard Russon
/bin/ntfscat: Copyright (c) 2003-2005 Anton Altaparmakov
/bin/ntfscat: Copyright (c) 2003-2005 Szabolcs Szakacsits
/bin/ntfscat: Copyright (c) 2007      Yura Pakhuchiy
/bin/ntfscluster: Copyright (c) 2002-2003 Richard Russon
/bin/ntfscluster: Copyright (c) 2005 Anton Altaparmakov
/bin/ntfscluster: Copyright (c) 2005-2006 Szabolcs Szakacsits
/bin/ntfsfallocate: Copyright (c) 2013-2014 Jean-Pierre Andre
/bin/ntfsfix: Copyright (c) 2000-2006 Anton Altaparmakov
/bin/ntfsfix: Copyright (c) 2002-2006 Szabolcs Szakacsits
/bin/ntfsfix: Copyright (c) 2007      Yura Pakhuchiy
/bin/ntfsfix: Copyright (c) 2011-2014 Jean-Pierre Andre
/bin/ntfsinfo: Copyright (c)
/bin/ntfsls: Copyright (c) 2003-2005 Anton Altaparmakov
/bin/ntfsls: Copyright (c) 2003 Richard Russon
/bin/ntfsls: Copyright (c) 2004 Carmelo Kintana
/bin/ntfsls: Copyright (c) 2004 Giang Nguyen
/bin/ntfsls: Copyright (c) 2003 Lode Leroy
/bin/ntfsmove: Copyright (c) 2003 Richard Russon
/bin/ntfstruncate: Copyright (c) 2002-2005 Anton Altaparmakov
/bin/ntfstruncate: Copyright (c) 2003 Richard Russon
/bin/ntfswipe: Copyright (c) 2002-2005 Richard Russon
/bin/ntfswipe: Copyright (c) 2004 Yura Pakhuchiy
/bin/ping: @(#) Copyright (c) 1989 The Regents of the University of California.
```

```
/bin/ping6: @(#) Copyright (c) 1989 The Regents of the University of California.
```

Ubuntu

Used as is, the command extracts all strings greater than 4 characters in length:

```
root@ubuntu1604:/tmp# strings /usr/bin/passwd | more
/lib64/ld-linux-x86-64.so.2
kgUa
libpam.so.0
_ITM_deregisterTMCloneTable
__gmon_start__
_Jv_RegisterClasses
_ITM_registerTMCloneTable
pam_start
pam_strerror
pam_chauthtok
pam_end
libpam_misc.so.0
misc_conv
libselinux.so.1
_init
is_selinux_enabled
security_getenforce
context_user_get
security_compute_av
matchpathcon
freecon
context_free
setfscreatecon
--More--
```

Print the offset within the file before each string:

```
root@ubuntu1604:/tmp# strings -t d /usr/bin/passwd | more
 568 /lib64/ld-linux-x86-64.so.2
 823 kgUa
4241 libpam.so.0
4253 _ITM_deregisterTMCloneTable
4281 __gmon_start__
4296 _Jv_RegisterClasses
4316 _ITM_registerTMCloneTable
4342 pam_start
4352 pam_strerror
4365 pam_chauthtok
4379 pam_end
4387 libpam_misc.so.0
4404 misc_conv
4414 libselinux.so.1
4430 _init
4436 is_selinux_enabled
4455 security_getenforce
4475 context_user_get
4492 security_compute_av
4512 matchpathcon
4525 freecon
4533 context_free
4546 setfscreatecon
--More--
```

The **-t** switch can take one of three arguments that specify the numbering system to use:

Argument	Numbering System
d	Decimal
o	Octal
x	Hexadecimal

The **-n** switch prints sequences of characters that are at least **min-len** characters long, instead of the default 4:

```
root@ubuntu1604:/tmp# strings -t d -n 15 /usr/bin/passwd | more
 568 /lib64/ld-linux-x86-64.so.2
4253 _ITM_deregisterTMCloneTable
4296 _Jv_RegisterClasses
4316 _ITM_registerTMCloneTable
4387 libpam_misc.so.0
4414 libselinux.so.1
4436 is_selinux_enabled
4455 security_getenforce
4475 context_user_get
4492 security_compute_av
4774 __stack_chk_fail
4942 __errno_location
5405 __libc_start_main
5537 LIBPAM_MISC_1.0
34456 Usage: %s [options] [LOGIN]
34496  -a, --all          report password status on all accounts
34568  -d, --delete       delete the password for the named account
t
34648  -e, --expire       force expire the password for the named
account
34736  -h, --help         display this help message and exit
34808  -k, --keep-tokens  change password only if expired
34880  -i, --inactive INACTIVE set password inactive after expiration
--More--
```

The **-f** switch prints the name of the file before each string:

```
root@ubuntu1604:/tmp# strings -f /bin/* | grep "(c)"
/bin/ntfscat: Copyright (c) 2003-2005 Richard Russon
/bin/ntfscat: Copyright (c) 2003-2005 Anton Altaparmakov
/bin/ntfscat: Copyright (c) 2003-2005 Szabolcs Szakacsits
/bin/ntfscat: Copyright (c) 2007      Yura Pakhuchiy
/bin/ntfscluster: Copyright (c) 2002-2003 Richard Russon
```

```
/bin/ntfscluster: Copyright (c) 2005 Anton Altaparmakov
/bin/ntfscluster: Copyright (c) 2005-2006 Szabolcs Szakacsits
/bin/ntfsfallocate: Copyright (c) 2013-2014 Jean-Pierre Andre
/bin/ntfsfix: Copyright (c) 2000-2006 Anton Altaparmakov
/bin/ntfsfix: Copyright (c) 2002-2006 Szabolcs Szakacsits
/bin/ntfsfix: Copyright (c) 2007 Yura Pakhuchiy
/bin/ntfsfix: Copyright (c) 2011-2015 Jean-Pierre Andre
/bin/ntfsinfo: Copyright (c)
/bin/ntfsls: Copyright (c) 2003-2005 Anton Altaparmakov
/bin/ntfsls: Copyright (c) 2003 Richard Russon
/bin/ntfsls: Copyright (c) 2004 Carmelo Kintana
/bin/ntfsls: Copyright (c) 2004 Giang Nguyen
/bin/ntfsls: Copyright (c) 2003 Lode Leroy
/bin/ntfsmove: Copyright (c) 2003 Richard Russon
/bin/ntfstruncate: Copyright (c) 2002-2005 Anton Altaparmakov
/bin/ntfstruncate: Copyright (c) 2003 Richard Russon
/bin/ntfswipe: Copyright (c) 2002-2005 Richard Russon
/bin/ntfswipe: Copyright (c) 2004 Yura Pakhuchiy
/bin/ping: @(#) Copyright (c) 1989 The Regents of the University of California.
/bin/ping6: @(#) Copyright (c) 1989 The Regents of the University of California..
```

RHEL/CentOS

Used as is, the command extracts all strings greater than 4 characters in length:

```
[root@centos7 tmp]# strings /usr/bin/passwd | more
/lib64/ld-linux-x86-64.so.2
{1~`
libuser.so.1
g_value_get_int64
is_selinux_enabled
_ITM_deregisterTMCloneTable
g_free
```

```
g_value_array_get_nth
__gmon_start__
g_value_get_string
g_type_check_value_holds
g_value_get_long
_Jv_RegisterClasses
freecon
_ITM_registerTMCloneTable
lu_ent_set_string
lu_ent_get_first_value_strdup
lu_error_free
lu_user_lock
_fini
_init
lu_strerror
lu_ent_free
lu_ent_new
lu_user_modify
lu_prompt_console
lu_start
lu_user_lookup_name
--More--
```

Print the offset within the file before each string:

```
[root@centos7 tmp]# strings -t d /usr/bin/passwd | more
 568 /lib64/ld-linux-x86-64.so.2
 648 {1~`
2833 libuser.so.1
2846 g_value_get_int64
2864 is_selinux_enabled
2883 _ITM_deregisterTMCloneTable
2911 g_free
2918 g_value_array_get_nth
```

```
2940 __gmon_start__
2955 g_value_get_string
2974 g_type_check_value_holds
2999 g_value_get_long
3016 _Jv_RegisterClasses
3036 freecon
3044 _ITM_registerTMCloneTable
3070 lu_ent_set_string
3088 lu_ent_get_first_value_strdup
3118 lu_error_free
3132 lu_user_lock
3145 _fini
3151 _init
3157 lu_strerror
3169 lu_ent_free
3181 lu_ent_new
3192 lu_user_modify
3207 lu_prompt_console
3225 lu_start
3234 lu_user_lookup_name
--More--
```

The **-t** switch can take one of three arguments that specify the numbering system to use:

Argument	Numbering System
d	Decimal
o	Octal
x	Hexadecimal

The **-n** switch prints sequences of characters that are at least **min-len** characters long, instead of the default 4:

```
[root@centos7 tmp]# strings -t d -n 15 /usr/bin/passwd | more
 568 /lib64/ld-linux-x86-64.so.2
2846 g_value_get_int64
```

```
2864 is_selinux_enabled
2883 _ITM_deregisterTMCloneTable
2918 g_value_array_get_nth
2955 g_value_get_string
2974 g_type_check_value_holds
2999 g_value_get_long
3016 _Jv_RegisterClasses
3044 _ITM_registerTMCloneTable
3070 lu_ent_set_string
3088 lu_ent_get_first_value_strdup
3207 lu_prompt_console
3234 lu_user_lookup_name
3261 lu_ent_set_long
3303 lu_user_removepass
3322 libgobject-2.0.so.0
3342 libglib-2.0.so.0
3372 poptSetOtherOptionHelp
3464 poptHelpOptions
3503 audit_log_acct_message
3599 libpam_misc.so.0
3640 audit_log_user_avc_message
3667 audit_log_user_message
3690 libselinux.so.1
3706 selinux_set_callback
3727 selinux_check_access
3759 libpthread.so.0
--More--
```

The **-f** switch prints the name of the file before each string:

```
[root@centos7 tmp]# strings -f /bin/* | grep "(c)"
/bin/btrace: # Copyright (c) 2005 Silicon Graphics, Inc.
/bin/cdda-player: (c) 1997,98 Gerd Knorr <kraxel@goldbach.in-berlin.de>
/bin/cdda-player: (c) 2005, 2006 Rocky Bernstein <rocky@gnu.org>
```

```
/bin/cd-drive: Copyright (c) 2003-2005, 2007-2008, 2011-2013 R. Bernstein
/bin/cd-info: Copyright (c) 2003-2005, 2007-2008, 2011-2013 R. Bernstein
/bin/cd-read: Copyright (c) 2003-2005, 2007-2008, 2011-2013 R. Bernstein
/bin/chcat:      if len(c) > 0 and ( c[0] == "+" or c[0] == "-" ):
/bin/chcat:      if len(c) > 0 and c[0] == "+":
/bin/chcat:      if len(c) > 0 and c[0] == "-":
/bin/crash:      (c) a pointer to the first item pointed to by the start address.
/bin/crash:      (c) a list_head that is embedded within a data structure that is
/bin/crash:      switch(c)
/bin/csh: @(#) Copyright (c) 1991 The Regents of the University of California.
/bin/diffpp: # Copyright (c) 1996-1998 Markku Rossi
/bin/drill: Copyright (c) 2004-2008 NLnet Labs.
/bin/festival_server: ##                      Copyright (c) 1996                      ##
/bin/festival_server_control: ##                Copyright (c) 1996                ##
/bin/gcm-calibrate: Copyright (c)
/bin/gprof: @(#) Copyright (c) 1983 Regents of the University of California.
/bin/hpijs: Copyright (c) 2001-2004, Hewlett-Packard Co.
/bin/ibus-setup: # Copyright (c) 2007-2010 Peng Huang <shawn.p.huang@gmail.com>
/bin/ibus-setup: # Copyright (c) 2007-2010 Red Hat, Inc.
/bin/ibus-table-createdb: # Copyright (c) 2008-2009 Yu Yuwei <acevery@gmail.com>
/bin/iso-info: Copyright (c) 2003-2005, 2007-2008, 2011-2013 R. Bernstein
/bin/iso-read: Copyright (c) 2003-2005, 2007-2008, 2011-2013 R. Bernstein
/bin/lsub.py: # (c) Kurt Garloff <garloff@suse.de>, 2/2009, GPL v2 or v3.
/bin/mmc-tool: Copyright (c) 2003-2005, 2007-2008, 2011-2013 R. Bernstein
/bin/orca: __copyright__ = "Copyright (c) 2010-2012 The Orca Team" \
/bin/orca:      "Copyright (c) 2012 Igalia, S.L."
/bin/pinentry: # Copyright (c) 2006 SUSE LINUX Products GmbH, Nuernberg, Germany.
/bin/pinentry: # Copyright (c) 2009 Fedora Project
/bin/ping: @(#) Copyright (c) 1989 The Regents of the University of California.
/bin/ping6: @(#) Copyright (c) 1989 The Regents of the University of California.
/bin/pod2usage: # Copyright (c) 1996-2000 by Bradford Appleton. All rights reserved.
/bin/qemu-img: qemu-img version 1.5.3, Copyright (c) 2004-2008 Fabrice Bellard
/bin/repclosure: # seth vidal 2005 (c) etc etc
/bin/repodiff: # (c) 2007 Red Hat. Written by skvidal@fedoraproject.org
```

```
/bin/repo-graph: # (c) 2005 Panu Matilainen <pmatilai@laiskiainen.org>
/bin/repomanage: # (c) Copyright Seth Vidal 2004
/bin/repoquery: # (c) pmatilai@laiskiainen.org
/bin/repo-rss: # seth vidal 2005 (c) etc etc
/bin/repotrack: # (c) 2005 seth vidal skvidal at phy.duke.edu
/bin/rngtest: Copyright (c) 2004 by Henrique de Moraes Holschuh
/bin/saytime: ;; Copyright (c) 1996,1997 ;;
/bin/sbcdec: Copyright (c) 2004-2010 Marcel Holtmann
/bin/sbcenc: Copyright (c) 2004-2010 Marcel Holtmann
/bin/screen: Copyright (c) 2010 Juergen Weigert, Sadrul Habib Chowdhury
/bin/screen: Copyright (c) 2008, 2009 Juergen Weigert, Michael Schroeder, Micah Cowan, Sadrul Habib Chowdhury
/bin/screen: Copyright (c) 1993-2002, 2003, 2005, 2006, 2007 Juergen Weigert, Michael Schroeder
/bin/screen: Copyright (c) 1987 Oliver Laumann
/bin/sliceprint: # Copyright (c) 1996-1999 Markku Rossi
/bin/soundstretch: Copyright (c) Olli Parviainen
/bin/ssh-copy-id: # Copyright (c) 1999-2013 Philip Hands <phil@hands.com>
/bin/tcptraceroute: # Copyright (c) 2007 Dmitry Butskoy
/bin/tcsh: @(#) Copyright (c) 1991 The Regents of the University of California.
/bin/text2wave: ;; Copyright (c) 1996,1997 ;;
/bin/traceroute: Copyright (c) 2008 Dmitry Butskoy, License: GPL v2 or any later
/bin/traceroute6: Copyright (c) 2008 Dmitry Butskoy, License: GPL v2 or any later
/bin/verifytree: # copyright (c) 2008 Red Hat, Inc - written by Seth Vidal and Will Woods
/bin/wavpack: Copyright (c) 1998 - 2009 Conifer Software. All Rights Reserved.
/bin/wvdial: Copyright (c) 1997-2005 Net Integration Technologies, Inc.
/bin/wvdialconf: Copyright (c) 1997-2005 Net Integration Technologies, Inc.
/bin/wvgain: Copyright (c) 2005 - 2009 Conifer Software. All Rights Reserved.
/bin/wvunpack: Copyright (c) 1998 - 2009 Conifer Software. All Rights Reserved.
/bin/yum-debug-dump: ## (c) 2008 Red Hat. Written by skvidal@fedoraproject.org
/bin/yum-debug-restore: ## (c) 2008 Red Hat. Written by skvidal@fedoraproject.org
/bin/zip: ight (c)H
/bin/zip: Copyright (c) 1990-2008 Info-ZIP. All rights reserved.
/bin/zip: Copyright (c) 1990-2008 Info-ZIP - Type '%s "-L"' for software license.
/bin/zipcloak: Copyright (c) 1990-2008 Info-ZIP. All rights reserved.
/bin/zipcloak: Copyright (c) 1990-2008 Info-ZIP - Type '%s "-L"' for software license.
```

```
/bin/zipnote: Copyright (c) 1990-2008 Info-ZIP. All rights reserved.  
/bin/zipnote: Copyright (c) 1990-2008 Info-ZIP - Type '%s "-L"' for software license.  
/bin/zipsplit: Copyright (c) 1990-2008 Info-ZIP. All rights reserved.  
/bin/zipsplit: Copyright (c) 1990-2008 Info-ZIP - Type '%s "-L"' for software license.
```

SLES

Used as is, the command extracts all strings greater than 4 characters in length:

```
SLES12SP1:/tmp # strings /usr/bin/passwd | more  
/lib64/ld-linux-x86-64.so.2  
cHc`  
libpam.so.0  
_ITM_deregisterTMCloneTable  
__gmon_start__  
_Jv_RegisterClasses  
_ITM_registerTMCloneTable  
pam_start  
pam_strerror  
pam_chauthtok  
pam_end  
libpam_misc.so.0  
misc_conv  
libselinux.so.1  
_init  
is_selinux_enabled  
security_getenforce  
context_user_get  
security_compute_av  
matchpathcon  
freecon  
context_free  
setfscreatecon
```

```
--More--
```

Print the offset within the file before each string:

```
SLES12SP1:/tmp # strings -t d /usr/bin/passwd | more
 568 /lib64/ld-linux-x86-64.so.2
 650 cHc`
4977 libpam.so.0
4989 _ITM_deregisterTMCloneTable
5017 __gmon_start__
5032 _Jv_RegisterClasses
5052 _ITM_registerTMCloneTable
5078 pam_start
5088 pam_strerror
5101 pam_chauthtok
5115 pam_end
5123 libpam_misc.so.0
5140 misc_conv
5150 libselinux.so.1
5166 _init
5172 is_selinux_enabled
5191 security_getenforce
5211 context_user_get
5228 security_compute_av
5248 matchpathcon
5261 freecon
5269 context_free
5282 setfscreatecon
--More--
```

The **-t** switch can take one of three arguments that specify the numbering system to use:

Argument	Numbering System
d	Decimal

Argument	Numbering System
o	Octal
x	Hexadecimal

The **-n** switch prints sequences of characters that are at least **min-len** characters long, instead of the default 4:

```
SLES12SP1:/tmp # strings -t d -n 15 /usr/bin/passwd | more
 568 /lib64/ld-linux-x86-64.so.2
4989 _ITM_deregisterTMCloneTable
5032 _Jv_RegisterClasses
5052 _ITM_registerTMCloneTable
5123 libpam_misc.so.0
5150 libselinux.so.1
5172 is_selinux_enabled
5191 security_getenforce
5211 context_user_get
5228 security_compute_av
5510 __stack_chk_fail
5671 __errno_location
6106 __libc_start_main
6202 LIBPAM_MISC_1.0
34104 Usage: %s [options] [LOGIN]
34144  -a, --all          report password status on all accounts
34216  -d, --delete      delete the password for the named account
34296  -e, --expire      force expire the password for the named account
34384  -h, --help       display this help message and exit
34456  -k, --keep-tokens change password only if expired
34528  -i, --inactive INACTIVE set password inactive after expiration
--More--
```

The **-f** switch prints the name of the file before each string:

```
SLES12SP1:/tmp # strings -f /bin/* | grep "(c)"
/bin/btrace: # Copyright (c) 2005 Silicon Graphics, Inc.
```

```
/bin/csh: @(#) Copyright (c) 1991 The Regents of the University of California.  
/bin/ping: @(#) Copyright (c) 1989 The Regents of the University of California.  
/bin/ping6: @(#) Copyright (c) 1989 The Regents of the University of California.  
/bin/tcsh: @(#) Copyright (c) 1991 The Regents of the University of California.
```

Command Line Switches



To do : Use the **-help** option of the **strings** command to view the command line switches.

The comm Command

This command compares two text files and prints the differences to standard output:

```
root@debian8:/tmp# comm /etc/passwd /root/passwd  
root:x:0:0:root:/root:/bin/bash  
daemon:x:1:1:daemon:/usr/sbin:/usr/sbin/nologin  
bin:x:2:2:bin:/bin:/usr/sbin/nologin  
sys:x:3:3:sys:/dev:/usr/sbin/nologin  
sync:x:4:65534:sync:/bin:/bin/sync  
games:x:5:60:games:/usr/games:/usr/sbin/nologin  
man:x:6:12:man:/var/cache/man:/usr/sbin/nologin  
lp:x:7:7:lp:/var/spool/lpd:/usr/sbin/nologin  
mail:x:8:8:mail:/var/mail:/usr/sbin/nologin  
news:x:9:9:news:/var/spool/news:/usr/sbin/nologin  
uucp:x:10:10:uucp:/var/spool/uucp:/usr/sbin/nologin  
comm: file 1 is not in sorted order  
comm: file 2 is not in sorted order  
proxy:x:13:13:proxy:/bin:/usr/sbin/nologin  
www-data:x:33:33:www-data:/var/www:/usr/sbin/nologin
```

```
backup:x:34:34:backup:/var/backups:/usr/sbin/nologin
list:x:38:38:Mailing List Manager:/var/list:/usr/sbin/nologin
irc:x:39:39:ircd:/var/run/ircd:/usr/sbin/nologin
gnats:x:41:41:Gnats Bug-Reporting System (admin):/var/lib/gnats:/usr/sbin/nologin
nobody:x:65534:65534:nobody:/nonexistent:/usr/sbin/nologin
systemd-timesync:x:100:103:systemd Time Synchronization,,,:/run/systemd:/bin/false
systemd-network:x:101:104:systemd Network Management,,,:/run/systemd/netif:/bin/false
systemd-resolve:x:102:105:systemd Resolver,,,:/run/systemd/resolve:/bin/false
systemd-bus-proxy:x:103:106:systemd Bus Proxy,,,:/run/systemd:/bin/false
trainee10:x:1000:1000:trainee,,,:/home/trainee:/bin/bash
sshd:x:104:65534::/var/run/sshd:/usr/sbin/nologin
Debian-exim:x:105:110::/var/spool/exim4:/bin/false
messagebus:x:106:111::/var/run/dbus:/bin/false
statd:x:107:65534::/var/lib/nfs:/bin/false
avahi-autoipd:x:108:113:Avahi autoip daemon,,,:/var/lib/avahi-autoipd:/bin/false
avahi:x:109:115:Avahi mDNS daemon,,,:/var/run/avahi-daemon:/bin/false
colord:x:110:117:colord colour management daemon,,,:/var/lib/colord:/bin/false
dnsmasq:x:111:65534:dnsmasq,,,:/var/lib/misc:/bin/false
speech-dispatcher:x:112:29:Speech Dispatcher,,,:/var/run/speech-dispatcher:/bin/sh
pulse:x:113:119:PulseAudio daemon,,,:/var/run/pulse:/bin/false
rtkit:x:114:121:RealtimeKit,,,:/proc:/bin/false
saned:x:115:122::/var/lib/saned:/bin/false
trainee:x:1000:1000:trainee,,,:/home/trainee:/bin/bash
sshd:x:104:65534::/var/run/sshd:/usr/sbin/nologin
Debian-exim:x:105:110::/var/spool/exim4:/bin/false
messagebus:x:106:111::/var/run/dbus:/bin/false
statd:x:107:65534::/var/lib/nfs:/bin/false
avahi-autoipd:x:108:113:Avahi autoip daemon,,,:/var/lib/avahi-autoipd:/bin/false
avahi:x:109:115:Avahi mDNS daemon,,,:/var/run/avahi-daemon:/bin/false
colord:x:110:117:colord colour management daemon,,,:/var/lib/colord:/bin/false
dnsmasq:x:111:65534:dnsmasq,,,:/var/lib/misc:/bin/false
speech-dispatcher:x:112:29:Speech Dispatcher,,,:/var/run/speech-dispatcher:/bin/sh
pulse:x:113:119:PulseAudio daemon,,,:/var/run/pulse:/bin/false
rtkit:x:114:121:RealtimeKit,,,:/proc:/bin/false
```

```
saned:x:115:122::/var/lib/saned:/bin/false
usbmux:x:116:46:usbmux daemon,,,:/var/lib/usbmux:/bin/false
lightdm:x:117:124:Light Display Manager:/var/lib/lightdm:/bin/false
Linux is great!
```

```
root@ubuntu1604:/tmp# comm /etc/passwd /root/passwd
root:x:0:0:root:/root:/bin/bash
daemon:x:1:1:daemon:/usr/sbin:/usr/sbin/nologin
bin:x:2:2:bin:/bin:/usr/sbin/nologin
sys:x:3:3:sys:/dev:/usr/sbin/nologin
sync:x:4:65534:sync:/bin:/bin/sync
games:x:5:60:games:/usr/games:/usr/sbin/nologin
man:x:6:12:man:/var/cache/man:/usr/sbin/nologin
lp:x:7:7:lp:/var/spool/lpd:/usr/sbin/nologin
mail:x:8:8:mail:/var/mail:/usr/sbin/nologin
news:x:9:9:news:/var/spool/news:/usr/sbin/nologin
uucp:x:10:10:uucp:/var/spool/uucp:/usr/sbin/nologin
comm: file 1 is not in sorted order
comm: file 2 is not in sorted order
proxy:x:13:13:proxy:/bin:/usr/sbin/nologin
www-data:x:33:33:www-data:/var/www:/usr/sbin/nologin
backup:x:34:34:backup:/var/backups:/usr/sbin/nologin
list:x:38:38:Mailing List Manager:/var/list:/usr/sbin/nologin
irc:x:39:39:ircd:/var/run/ircd:/usr/sbin/nologin
gnats:x:41:41:Gnats Bug-Reporting System (admin):/var/lib/gnats:/usr/sbin/nologin
nobody:x:65534:65534:nobody:/nonexistent:/usr/sbin/nologin
systemd-timesync:x:100:102:systemd Time Synchronization,,,:/run/systemd:/bin/false
systemd-network:x:101:103:systemd Network Management,,,:/run/systemd/netif:/bin/false
systemd-resolve:x:102:104:systemd Resolver,,,:/run/systemd/resolve:/bin/false
systemd-bus-proxy:x:103:105:systemd Bus Proxy,,,:/run/systemd:/bin/false
syslog:x:104:108::/home/syslog:/bin/false
_apt:x:105:65534::/nonexistent:/bin/false
messagebus:x:106:110::/var/run/dbus:/bin/false
uidd:x:107:111::/run/uidd:/bin/false
```

```
lightdm:x:108:114:Light Display Manager:/var/lib/lightdm:/bin/false
whoopsie:x:109:116::/nonexistent:/bin/false
avahi-autoipd:x:110:119:Avahi autoip daemon,,,:/var/lib/avahi-autoipd:/bin/false
avahi:x:111:120:Avahi mDNS daemon,,,:/var/run/avahi-daemon:/bin/false
dnsmasq:x:112:65534:dnsmasq,,,:/var/lib/misc:/bin/false
colord:x:113:123:colord colour management daemon,,,:/var/lib/colord:/bin/false
speech-dispatcher:x:114:29:Speech Dispatcher,,,:/var/run/speech-dispatcher:/bin/false
hplip:x:115:7:HPLIP system user,,,:/var/run/hplip:/bin/false
kernoops:x:116:65534:Kernel Oops Tracking Daemon,,,:/bin/false
pulse:x:117:124:PulseAudio daemon,,,:/var/run/pulse:/bin/false
rtkit:x:118:126:RealtimeKit,,,:/proc:/bin/false
saned:x:119:127::/var/lib/saned:/bin/false
usbmux:x:120:46:usbmux daemon,,,:/var/lib/usbmux:/bin/false
trainee10:x:1000:1000:trainee,,,:/home/trainee:/bin/bash
sshd:x:121:65534::/var/run/sshd:/usr/sbin/nologin
Linux is great!
trainee:x:1000:1000:trainee,,,:/home/trainee:/bin/bash
sshd:x:121:65534::/var/run/sshd:/usr/sbin/nologin
```

```
[root@centos7 tmp]# comm /etc/passwd /root/passwd
root:x:0:0:root:/root:/bin/bash
bin:x:1:1:bin:/bin:/sbin/nologin
daemon:x:2:2:daemon:/sbin:/sbin/nologin
adm:x:3:4:adm:/var/adm:/sbin/nologin
lp:x:4:7:lp:/var/spool/lpd:/sbin/nologin
sync:x:5:0:sync:/sbin:/bin/sync
shutdown:x:6:0:shutdown:/sbin:/sbin/shutdown
halt:x:7:0:halt:/sbin:/sbin/halt
mail:x:8:12:mail:/var/spool/mail:/sbin/nologin
operator:x:11:0:operator:/root:/sbin/nologin
games:x:12:100:games:/usr/games:/sbin/nologin
ftp:x:14:50:FTP User:/var/ftp:/sbin/nologin
nobody:x:99:99:Nobody:/:/sbin/nologin
dbus:x:81:81:System message bus:/:/sbin/nologin
```

```
polkitd:x:999:998:User for polkitd:/:/sbin/nologin
unbound:x:998:997:Unbound DNS resolver:/etc/unbound:/sbin/nologin
colord:x:997:996:User for colord:/var/lib/colord:/sbin/nologin
usbmuxd:x:113:113:usbmuxd user:/:/sbin/nologin
avahi:x:70:70:Avahi mDNS/DNS-SD Stack:/var/run/avahi-daemon:/sbin/nologin
avahi-autoipd:x:170:170:Avahi IPv4LL Stack:/var/lib/avahi-autoipd:/sbin/nologin
saslauthd:x:996:76:"Saslauthd user":/run/saslauthd:/sbin/nologin
qemu:x:107:107:qemu user:/:/sbin/nologin
libstoragemgmt:x:995:994:daemon account for libstoragemgmt:/var/run/lsm:/sbin/nologin
rpc:x:32:32:Rpcbind Daemon:/var/lib/rpcbind:/sbin/nologin
rpcuser:x:29:29:RPC Service User:/var/lib/nfs:/sbin/nologin
nfsnobody:x:65534:65534:Anonymous NFS User:/var/lib/nfs:/sbin/nologin
rtkit:x:172:172:RealtimeKit:/proc:/sbin/nologin
radvd:x:75:75:radvd user:/:/sbin/nologin
ntp:x:38:38:/:/etc/ntp:/sbin/nologin
chrony:x:994:993:/:/var/lib/chrony:/sbin/nologin
abrt:x:173:173:/:/etc/abrt:/sbin/nologin
pulse:x:171:171:PulseAudio System Daemon:/var/run/pulse:/sbin/nologin
gdm:x:42:42:/:/var/lib/gdm:/sbin/nologin
gnome-initial-setup:x:993:991:/:/run/gnome-initial-setup:/sbin/nologin
postfix:x:89:89:/:/var/spool/postfix:/sbin/nologin
sshd:x:74:74:Privilege-separated SSH:/var/empty/sshd:/sbin/nologin
tcpdump:x:72:72:/:/sbin/nologin
trainee10:x:1000:1000:trainee:/home/trainee:/bin/bash
trainee:x:1000:1000:trainee:/home/trainee:/bin/bash
tss:x:59:59:Account used by the trousers package to sandbox the tcsd daemon:/dev/null:/sbin/nologin
comm: file 2 is not in sorted order
Linux est super!
vboxadd:x:992:1:/:/var/run/vboxadd:/bin/false
comm: file 1 is not in sorted order
tss:x:59:59:Account used by the trousers package to sandbox the tcsd daemon:/dev/null:/sbin/nologin

SLES12SP1:/tmp # comm /etc/passwd /root/passwd
at:x:25:25:Batch jobs daemon:/var/spool/atjobs:/bin/bash
```

```
bin:x:1:1:bin:/bin:/bin/bash
daemon:x:2:2:Daemon:/sbin:/bin/bash
ftp:x:40:49:FTP account:/srv/ftp:/bin/bash
ftpsecure:x:488:65534:Secure FTP User:/var/lib/empty:/bin/false
games:x:12:100:Games account:/var/games:/bin/bash
gdm:x:486:485:Gnome Display Manager daemon:/var/lib/gdm:/bin/false
lp:x:4:7:Printing daemon:/var/spool/lpd:/bin/bash
mail:x:8:12:Mailer daemon:/var/spool/clientmqueue:/bin/false
man:x:13:62:Manual pages viewer:/var/cache/man:/bin/bash
messagebus:x:499:499:User for D-Bus:/var/run/dbus:/bin/false
news:x:9:13:News system:/etc/news:/bin/bash
nobody:x:65534:65533:nobody:/var/lib/nobody:/bin/bash
nscd:x:496:495:User for nscd:/run/nscd:/sbin/nologin
ntp:x:74:492:NTP daemon:/var/lib/ntp:/bin/false
openslp:x:494:2:openslp daemon:/var/lib/empty:/sbin/nologin
polkitd:x:497:496:User for polkitd:/var/lib/polkit:/sbin/nologin
postfix:x:51:51:Postfix Daemon:/var/spool/postfix:/bin/false
pulse:x:490:489:PulseAudio daemon:/var/lib/pulseaudio:/sbin/nologin
root:x:0:0:root:/root:/bin/bash
rpc:x:495:65534:user for rpcbind:/var/lib/empty:/sbin/nologin
rtkit:x:491:490:RealtimeKit:/proc:/bin/false
scard:x:487:487:Smart Card Reader:/var/run/pcscd:/usr/sbin/nologin
sshd:x:498:498:SSH daemon:/var/lib/sshd:/bin/false
statd:x:489:65534:NFS statd daemon:/var/lib/nfs:/sbin/nologin
usbmux:x:493:65534:usbmuxd daemon:/var/lib/usbmuxd:/sbin/nologin
uucp:x:10:14:Unix-to-Unix CoPy system:/etc/uucp:/bin/bash
vnc:x:492:491:user for VNC:/var/lib/empty:/sbin/nologin
wwwrun:x:30:8:WWW daemon apache:/var/lib/wwwrun:/bin/false
comm: file 1 is not in sorted order
comm: file 2 is not in sorted order
  trainee10:x:1000:100:trainee:/home/trainee:/bin/bash
  Linux est super
trainee:x:1000:100:trainee:/home/trainee:/bin/bash
```



Important: The lines to the left are those that only appear in the first file. The lines on the right are those that exist in both files. The lines in the middle are those that only exist in the second file.

If you only want to see the lines common to both files, use the following command:

```
root@debian8:/tmp# comm -12 /etc/passwd /root/passwd
root:x:0:0:root:/root:/bin/bash
daemon:x:1:1:daemon:/usr/sbin:/usr/sbin/nologin
bin:x:2:2:bin:/bin:/usr/sbin/nologin
sys:x:3:3:sys:/dev:/usr/sbin/nologin
sync:x:4:65534:sync:/bin:/bin/sync
games:x:5:60:games:/usr/games:/usr/sbin/nologin
man:x:6:12:man:/var/cache/man:/usr/sbin/nologin
mail:x:8:8:mail:/var/mail:/usr/sbin/nologin
news:x:9:9:news:/var/spool/news:/usr/sbin/nologin
uucp:x:10:10:uucp:/var/spool/uucp:/usr/sbin/nologin
comm: file 1 is not in sorted order
comm: file 2 is not in sorted order
proxy:x:13:13:proxy:/bin:/usr/sbin/nologin
www-data:x:33:33:www-data:/var/www:/usr/sbin/nologin
backup:x:34:34:backup:/var/backups:/usr/sbin/nologin
list:x:38:38:Mailing List Manager:/var/list:/usr/sbin/nologin
irc:x:39:39:ircd:/var/run/ircd:/usr/sbin/nologin
gnats:x:41:41:Gnats Bug-Reporting System (admin):/var/lib/gnats:/usr/sbin/nologin
nobody:x:65534:65534:nobody:/nonexistent:/usr/sbin/nologin
systemd-timesync:x:100:103:systemd Time Synchronization,,,:/run/systemd:/bin/false
systemd-network:x:101:104:systemd Network Management,,,:/run/systemd/netif:/bin/false
systemd-resolve:x:102:105:systemd Resolver,,,:/run/systemd/resolve:/bin/false
systemd-bus-proxy:x:103:106:systemd Bus Proxy,,,:/run/systemd:/bin/false
usbmux:x:116:46:usbmux daemon,,,:/var/lib/usbmux:/bin/false
lightdm:x:117:124:Light Display Manager:/var/lib/lightdm:/bin/false
```

```
root@ubuntu1604:/tmp# comm -12 /etc/passwd /root/passwd
root:x:0:0:root:/root:/bin/bash
daemon:x:1:1:daemon:/usr/sbin:/usr/sbin/nologin
bin:x:2:2:bin:/bin:/usr/sbin/nologin
sys:x:3:3:sys:/dev:/usr/sbin/nologin
sync:x:4:65534:sync:/bin:/bin/sync
games:x:5:60:games:/usr/games:/usr/sbin/nologin
man:x:6:12:man:/var/cache/man:/usr/sbin/nologin
mail:x:8:8:mail:/var/mail:/usr/sbin/nologin
news:x:9:9:news:/var/spool/news:/usr/sbin/nologin
uucp:x:10:10:uucp:/var/spool/uucp:/usr/sbin/nologin
comm: file 1 is not in sorted order
comm: file 2 is not in sorted order
proxy:x:13:13:proxy:/bin:/usr/sbin/nologin
www-data:x:33:33:www-data:/var/www:/usr/sbin/nologin
backup:x:34:34:backup:/var/backups:/usr/sbin/nologin
list:x:38:38:Mailing List Manager:/var/list:/usr/sbin/nologin
irc:x:39:39:ircd:/var/run/ircd:/usr/sbin/nologin
gnats:x:41:41:Gnats Bug-Reporting System (admin):/var/lib/gnats:/usr/sbin/nologin
nobody:x:65534:65534:nobody:/nonexistent:/usr/sbin/nologin
systemd-timesync:x:100:102:systemd Time Synchronization,,,:/run/systemd:/bin/false
systemd-network:x:101:103:systemd Network Management,,,:/run/systemd/netif:/bin/false
systemd-resolve:x:102:104:systemd Resolver,,,:/run/systemd/resolve:/bin/false
systemd-bus-proxy:x:103:105:systemd Bus Proxy,,,:/run/systemd:/bin/false
syslog:x:104:108:./home/syslog:/bin/false
_apt:x:105:65534:./nonexistent:/bin/false
messagebus:x:106:110:./var/run/dbus:/bin/false
uuidd:x:107:111:./run/uuidd:/bin/false
lightdm:x:108:114:Light Display Manager:/var/lib/lightdm:/bin/false
whoopsie:x:109:116:./nonexistent:/bin/false
avahi-autoipd:x:110:119:Avahi autoip daemon,,,:/var/lib/avahi-autoipd:/bin/false
avahi:x:111:120:Avahi mDNS daemon,,,:/var/run/avahi-daemon:/bin/false
dnsmasq:x:112:65534:dnsmasq,,,:/var/lib/misc:/bin/false
colord:x:113:123:colord colour management daemon,,,:/var/lib/colord:/bin/false
```

```
speech-dispatcher:x:114:29:Speech Dispatcher,,,:/var/run/speech-dispatcher:/bin/false
hplip:x:115:7:HPLIP system user,,,:/var/run/hplip:/bin/false
kernoops:x:116:65534:Kernel Oops Tracking Daemon,,,:/bin/false
pulse:x:117:124:PulseAudio daemon,,,:/var/run/pulse:/bin/false
rtkit:x:118:126:RealtimeKit,,,:/proc:/bin/false
saned:x:119:127::/var/lib/saned:/bin/false
usbmux:x:120:46:usbmux daemon,,,:/var/lib/usbmux:/bin/false
```

```
[root@centos7 tmp]# comm -12 /etc/passwd /root/passwd
root:x:0:0:root:/root:/bin/bash
bin:x:1:1:bin:/bin:/sbin/nologin
daemon:x:2:2:daemon:/sbin:/sbin/nologin
adm:x:3:4:adm:/var/adm:/sbin/nologin
lp:x:4:7:lp:/var/spool/lpd:/sbin/nologin
sync:x:5:0:sync:/sbin:/bin/sync
shutdown:x:6:0:shutdown:/sbin:/sbin/shutdown
halt:x:7:0:halt:/sbin:/sbin/halt
mail:x:8:12:mail:/var/spool/mail:/sbin/nologin
operator:x:11:0:operator:/root:/sbin/nologin
games:x:12:100:games:/usr/games:/sbin/nologin
ftp:x:14:50:FTP User:/var/ftp:/sbin/nologin
nobody:x:99:99:Nobody:/:/sbin/nologin
dbus:x:81:81:System message bus:/:/sbin/nologin
polkitd:x:999:998>User for polkitd:/:/sbin/nologin
unbound:x:998:997:Unbound DNS resolver:/etc/unbound:/sbin/nologin
colord:x:997:996>User for colord:/var/lib/colord:/sbin/nologin
usbmuxd:x:113:113:usbmuxd user:/:/sbin/nologin
avahi:x:70:70:Avahi mDNS/DNS-SD Stack:/var/run/avahi-daemon:/sbin/nologin
avahi-autoipd:x:170:170:Avahi IPv4LL Stack:/var/lib/avahi-autoipd:/sbin/nologin
saslauthd:x:996:76:"Saslauthd user":/run/saslauthd:/sbin/nologin
qemu:x:107:107:qemu user:/:/sbin/nologin
libstoragemgmt:x:995:994:daemon account for libstoragemgmt:/var/run/lsm:/sbin/nologin
rpc:x:32:32:Rpcbind Daemon:/var/lib/rpcbind:/sbin/nologin
rpcuser:x:29:29:RPC Service User:/var/lib/nfs:/sbin/nologin
```

```
nfsnobody:x:65534:65534:Anonymous NFS User:/var/lib/nfs:/sbin/nologin
rtkit:x:172:172:RealtimeKit:/proc:/sbin/nologin
radvd:x:75:75:radvd user:/:/sbin/nologin
ntp:x:38:38:./etc/ntp:/sbin/nologin
chrony:x:994:993:./var/lib/chrony:/sbin/nologin
abrt:x:173:173:./etc/abrt:/sbin/nologin
pulse:x:171:171:PulseAudio System Daemon:/var/run/pulse:/sbin/nologin
gdm:x:42:42:./var/lib/gdm:/sbin/nologin
gnome-initial-setup:x:993:991:./run/gnome-initial-setup:/sbin/nologin
postfix:x:89:89:./var/spool/postfix:/sbin/nologin
sshd:x:74:74:Privilege-separated SSH:/var/empty/sshd:/sbin/nologin
tcpdump:x:72:72:./:/sbin/nologin
comm: file 2 is not in sorted order
comm: file 1 is not in sorted order
```

```
SLES12SP1:/tmp # comm -12 /etc/passwd /root/passwd
at:x:25:25:Batch jobs daemon:/var/spool/atjobs:/bin/bash
bin:x:1:1:bin:/bin:/bin/bash
daemon:x:2:2:Daemon:/sbin:/bin/bash
ftp:x:40:49:FTP account:/srv/ftp:/bin/bash
ftppsecure:x:488:65534:Secure FTP User:/var/lib/empty:/bin/false
games:x:12:100:Games account:/var/games:/bin/bash
gdm:x:486:485:Gnome Display Manager daemon:/var/lib/gdm:/bin/false
lp:x:4:7:Printing daemon:/var/spool/lpd:/bin/bash
mail:x:8:12:Mailer daemon:/var/spool/clientmqueue:/bin/false
man:x:13:62:Manual pages viewer:/var/cache/man:/bin/bash
messagebus:x:499:499:User for D-Bus:/var/run/dbus:/bin/false
news:x:9:13:News system:/etc/news:/bin/bash
nobody:x:65534:65533:nobody:/var/lib/nobody:/bin/bash
nscd:x:496:495:User for nscd:/run/nscd:/sbin/nologin
ntp:x:74:492:NTP daemon:/var/lib/ntp:/bin/false
openslp:x:494:2:openslp daemon:/var/lib/empty:/sbin/nologin
polkitd:x:497:496:User for polkitd:/var/lib/polkit:/sbin/nologin
postfix:x:51:51:Postfix Daemon:/var/spool/postfix:/bin/false
```

```
pulse:x:490:489:PulseAudio daemon:/var/lib/pulseaudio:/sbin/nologin
root:x:0:0:root:/root:/bin/bash
rpc:x:495:65534:user for rpcbind:/var/lib/empty:/sbin/nologin
rtkit:x:491:490:RealtimeKit:/proc:/bin/false
scard:x:487:487:Smart Card Reader:/var/run/pcscd:/usr/sbin/nologin
sshd:x:498:498:SSH daemon:/var/lib/ssh:/bin/false
statd:x:489:65534:NFS statd daemon:/var/lib/nfs:/sbin/nologin
usbmux:x:493:65534:usbmuxd daemon:/var/lib/usbmuxd:/sbin/nologin
vnc:x:492:491:user for VNC:/var/lib/empty:/sbin/nologin
wwwrun:x:30:8:WWW daemon apache:/var/lib/wwwrun:/bin/false
comm: file 1 is not in sorted order
comm: file 2 is not in sorted order
```

Command Line Switches



To do : Use the **-help** option of the **comm** command to view the command line switches.

The head Command

The **head** command is used to display the first **x** lines of a file. The default value of **x** is 10:

```
root@debian8:/tmp# head /etc/passwd
root:x:0:0:root:/root:/bin/bash
daemon:x:1:1:daemon:/usr/sbin:/usr/sbin/nologin
bin:x:2:2:bin:/bin:/usr/sbin/nologin
sys:x:3:3:sys:/dev:/usr/sbin/nologin
sync:x:4:65534:sync:/bin:/bin/sync
games:x:5:60:games:/usr/games:/usr/sbin/nologin
man:x:6:12:man:/var/cache/man:/usr/sbin/nologin
```

```
lp:x:7:7:lp:/var/spool/lpd:/usr/sbin/nologin
mail:x:8:8:mail:/var/mail:/usr/sbin/nologin
news:x:9:9:news:/var/spool/news:/usr/sbin/nologin
```

```
root@ubuntu1604:/tmp# head /etc/passwd
root:x:0:0:root:/root:/bin/bash
daemon:x:1:1:daemon:/usr/sbin:/usr/sbin/nologin
bin:x:2:2:bin:/bin:/usr/sbin/nologin
sys:x:3:3:sys:/dev:/usr/sbin/nologin
sync:x:4:65534:sync:/bin:/bin/sync
games:x:5:60:games:/usr/games:/usr/sbin/nologin
man:x:6:12:man:/var/cache/man:/usr/sbin/nologin
lp:x:7:7:lp:/var/spool/lpd:/usr/sbin/nologin
mail:x:8:8:mail:/var/mail:/usr/sbin/nologin
news:x:9:9:news:/var/spool/news:/usr/sbin/nologin
```

```
[root@centos7 tmp]# head /etc/passwd
root:x:0:0:root:/root:/bin/bash
bin:x:1:1:bin:/bin:/sbin/nologin
daemon:x:2:2:daemon:/sbin:/sbin/nologin
adm:x:3:4:adm:/var/adm:/sbin/nologin
lp:x:4:7:lp:/var/spool/lpd:/sbin/nologin
sync:x:5:0:sync:/sbin:/bin/sync
shutdown:x:6:0:shutdown:/sbin:/sbin/shutdown
halt:x:7:0:halt:/sbin:/sbin/halt
mail:x:8:12:mail:/var/spool/mail:/sbin/nologin
operator:x:11:0:operator:/root:/sbin/nologin
```

```
SLES12SP1:/tmp # head /etc/passwd
at:x:25:25:Batch jobs daemon:/var/spool/atjobs:/bin/bash
bin:x:1:1:bin:/bin:/bin/bash
daemon:x:2:2:Daemon:/sbin:/bin/bash
ftp:x:40:49:FTP account:/srv/ftp:/bin/bash
ftppsecure:x:488:65534:Secure FTP User:/var/lib/empty:/bin/false
```

```
games:x:12:100:Games account:/var/games:/bin/bash
gdm:x:486:485:Gnome Display Manager daemon:/var/lib/gdm:/bin/false
lp:x:4:7:Printing daemon:/var/spool/lpd:/bin/bash
mail:x:8:12:Mailer daemon:/var/spool/clientmqueue:/bin/false
man:x:13:62:Manual pages viewer:/var/cache/man:/bin/bash
```

You can change the default value of x by using the **-n** switch:

```
root@debian8:/tmp# head -n 15 /etc/passwd
root:x:0:0:root:/root:/bin/bash
daemon:x:1:1:daemon:/usr/sbin:/usr/sbin/nologin
bin:x:2:2:bin:/bin:/usr/sbin/nologin
sys:x:3:3:sys:/dev:/usr/sbin/nologin
sync:x:4:65534:sync:/bin:/bin/sync
games:x:5:60:games:/usr/games:/usr/sbin/nologin
man:x:6:12:man:/var/cache/man:/usr/sbin/nologin
lp:x:7:7:lp:/var/spool/lpd:/usr/sbin/nologin
mail:x:8:8:mail:/var/mail:/usr/sbin/nologin
news:x:9:9:news:/var/spool/news:/usr/sbin/nologin
uucp:x:10:10:uucp:/var/spool/uucp:/usr/sbin/nologin
proxy:x:13:13:proxy:/bin:/usr/sbin/nologin
www-data:x:33:33:www-data:/var/www:/usr/sbin/nologin
backup:x:34:34:backup:/var/backups:/usr/sbin/nologin
list:x:38:38:Mailing List Manager:/var/list:/usr/sbin/nologin
```

```
root@ubuntu1604:/tmp# head -n 15 /etc/passwd
root:x:0:0:root:/root:/bin/bash
daemon:x:1:1:daemon:/usr/sbin:/usr/sbin/nologin
bin:x:2:2:bin:/bin:/usr/sbin/nologin
sys:x:3:3:sys:/dev:/usr/sbin/nologin
sync:x:4:65534:sync:/bin:/bin/sync
games:x:5:60:games:/usr/games:/usr/sbin/nologin
man:x:6:12:man:/var/cache/man:/usr/sbin/nologin
lp:x:7:7:lp:/var/spool/lpd:/usr/sbin/nologin
```

```
mail:x:8:8:mail:/var/mail:/usr/sbin/nologin
news:x:9:9:news:/var/spool/news:/usr/sbin/nologin
uucp:x:10:10:uucp:/var/spool/uucp:/usr/sbin/nologin
proxy:x:13:13:proxy:/bin:/usr/sbin/nologin
www-data:x:33:33:www-data:/var/www:/usr/sbin/nologin
backup:x:34:34:backup:/var/backups:/usr/sbin/nologin
list:x:38:38:Mailing List Manager:/var/list:/usr/sbin/nologin
```

```
[root@centos7 tmp]# head -n 15 /etc/passwd
root:x:0:0:root:/root:/bin/bash
bin:x:1:1:bin:/bin:/sbin/nologin
daemon:x:2:2:daemon:/sbin:/sbin/nologin
adm:x:3:4:adm:/var/adm:/sbin/nologin
lp:x:4:7:lp:/var/spool/lpd:/sbin/nologin
sync:x:5:0:sync:/sbin:/bin/sync
shutdown:x:6:0:shutdown:/sbin:/sbin/shutdown
halt:x:7:0:halt:/sbin:/sbin/halt
mail:x:8:12:mail:/var/spool/mail:/sbin/nologin
operator:x:11:0:operator:/root:/sbin/nologin
games:x:12:100:games:/usr/games:/sbin/nologin
ftp:x:14:50:FTP User:/var/ftp:/sbin/nologin
nobody:x:99:99:Nobody:/:/sbin/nologin
dbus:x:81:81:System message bus:/:/sbin/nologin
polkitd:x:999:998:User for polkitd:/:/sbin/nologin
```

```
SLES12SP1:/tmp # head -n 15 /etc/passwd
at:x:25:25:Batch jobs daemon:/var/spool/atjobs:/bin/bash
bin:x:1:1:bin:/bin:/bin/bash
daemon:x:2:2:Daemon:/sbin:/bin/bash
ftp:x:40:49:FTP account:/srv/ftp:/bin/bash
ftpsure:x:488:65534:Secure FTP User:/var/lib/empty:/bin/false
games:x:12:100:Games account:/var/games:/bin/bash
gdm:x:486:485:Gnome Display Manager daemon:/var/lib/gdm:/bin/false
lp:x:4:7:Printing daemon:/var/spool/lpd:/bin/bash
```

```
mail:x:8:12:Mailer daemon:/var/spool/clientmqueue:/bin/false
man:x:13:62:Manual pages viewer:/var/cache/man:/bin/bash
messagebus:x:499:499:User for D-Bus:/var/run/dbus:/bin/false
news:x:9:13:News system:/etc/news:/bin/bash
nobody:x:65534:65533:nobody:/var/lib/nobody:/bin/bash
nscd:x:496:495:User for nscd:/run/nscd:/sbin/nologin
ntp:x:74:492:NTP daemon:/var/lib/ntp:/bin/false
```

The command can also be used to display the first **y** bytes of a file by using the **-c** switch:

```
root@debian8:/tmp# head -c 150 /etc/passwd
root:x:0:0:root:/root:/bin/bash
daemon:x:1:1:daemon:/usr/sbin:/usr/sbin/nologin
bin:x:2:2:bin:/bin:/usr/sbin/nologin
sys:x:3:3:sys:/dev:/usr/sbin/nologin
root@debian8:/tmp#
```

```
root@ubuntu1604:/tmp# head -c 150 /etc/passwd
root:x:0:0:root:/root:/bin/bash
daemon:x:1:1:daemon:/usr/sbin:/usr/sbin/nologin
bin:x:2:2:bin:/bin:/usr/sbin/nologin
sys:x:3:3:sys:/dev:/usr/sbin/nologin
root@ubuntu1604:/tmp#
```

```
[root@centos7 tmp]# head -c 150 /etc/passwd
root:x:0:0:root:/root:/bin/bash
bin:x:1:1:bin:/bin:/sbin/nologin
daemon:x:2:2:daemon:/sbin:/sbin/nologin
adm:x:3:4:adm:/var/adm:/sbin/nologin
lp:x:4:7:lp:/var/spool/lpd:/sbin/nologin
[root@centos7 tmp]#
```

```
SLES12SP1:/tmp # head -c 150 /etc/passwd
at:x:25:25:Batch jobs daemon:/var/spool/atjobs:/bin/bash
bin:x:1:1:bin:/bin:/bin/bash
daemon:x:2:2:Daemon:/sbin:/bin/bash
```

```
ftp:x:40:49:FTP account:/srvSLES12SP1:/tmp #
```

If the value of **y** is negative, head displays all bytes in the file **except** the last y bytes:

```
root@debian8:/tmp# head -c -150 /etc/passwd
root:x:0:0:root:/root:/bin/bash
daemon:x:1:1:daemon:/usr/sbin:/usr/sbin/nologin
bin:x:2:2:bin:/bin:/usr/sbin/nologin
sys:x:3:3:sys:/dev:/usr/sbin/nologin
sync:x:4:65534:sync:/bin:/bin/sync
games:x:5:60:games:/usr/games:/usr/sbin/nologin
man:x:6:12:man:/var/cache/man:/usr/sbin/nologin
lp:x:7:7:lp:/var/spool/lpd:/usr/sbin/nologin
mail:x:8:8:mail:/var/mail:/usr/sbin/nologin
news:x:9:9:news:/var/spool/news:/usr/sbin/nologin
uucp:x:10:10:uucp:/var/spool/uucp:/usr/sbin/nologin
proxy:x:13:13:proxy:/bin:/usr/sbin/nologin
www-data:x:33:33:www-data:/var/www:/usr/sbin/nologin
backup:x:34:34:backup:/var/backups:/usr/sbin/nologin
list:x:38:38:Mailing List Manager:/var/list:/usr/sbin/nologin
irc:x:39:39:ircd:/var/run/ircd:/usr/sbin/nologin
gnats:x:41:41:Gnats Bug-Reporting System (admin):/var/lib/gnats:/usr/sbin/nologin
nobody:x:65534:65534:nobody:/nonexistent:/usr/sbin/nologin
systemd-timesync:x:100:103:systemd Time Synchronization,,,:/run/systemd:/bin/false
systemd-network:x:101:104:systemd Network Management,,,:/run/systemd/netif:/bin/false
systemd-resolve:x:102:105:systemd Resolver,,,:/run/systemd/resolve:/bin/false
systemd-bus-proxy:x:103:106:systemd Bus Proxy,,,:/run/systemd:/bin/false
trainee:x:1000:1000:trainee,,,:/home/trainee:/bin/bash
sshd:x:104:65534::/var/run/sshd:/usr/sbin/nologin
Debian-exim:x:105:110::/var/spool/exim4:/bin/false
messagebus:x:106:111::/var/run/dbus:/bin/false
statd:x:107:65534::/var/lib/nfs:/bin/false
avahi-autoipd:x:108:113:Avahi autoip daemon,,,:/var/lib/avahi-autoipd:/bin/false
avahi:x:109:115:Avahi mDNS daemon,,,:/var/run/avahi-daemon:/bin/false
```

```
colord:x:110:117:colord colour management daemon,,,:/var/lib/colord:/bin/false
dnsmasq:x:111:65534:dnsmasq,,,:/var/lib/misc:/bin/false
speech-dispatcher:x:112:29:Speech Dispatcher,,,:/var/run/speech-dispatcher:/bin/sh
pulse:x:113:119:PulseAudio daemon,,,:/var/run/pulse:/bin/false
rtkit:x:114:121:RealtimeKit,,,:/proc:/bin/false
```

```
root@ubuntu1604:/tmp# head -c 150 /etc/passwd
root:x:0:0:root:/root:/bin/bash
daemon:x:1:1:daemon:/usr/sbin:/usr/sbin/nologin
bin:x:2:2:bin:/bin:/usr/sbin/nologin
sys:x:3:3:sys:/dev:/usr/sbin/nologin
root@ubuntu1604:/tmp# head -c -150 /etc/passwd
root:x:0:0:root:/root:/bin/bash
daemon:x:1:1:daemon:/usr/sbin:/usr/sbin/nologin
bin:x:2:2:bin:/bin:/usr/sbin/nologin
sys:x:3:3:sys:/dev:/usr/sbin/nologin
sync:x:4:65534:sync:/bin:/bin/sync
games:x:5:60:games:/usr/games:/usr/sbin/nologin
man:x:6:12:man:/var/cache/man:/usr/sbin/nologin
lp:x:7:7:lp:/var/spool/lpd:/usr/sbin/nologin
mail:x:8:8:mail:/var/mail:/usr/sbin/nologin
news:x:9:9:news:/var/spool/news:/usr/sbin/nologin
uucp:x:10:10:uucp:/var/spool/uucp:/usr/sbin/nologin
proxy:x:13:13:proxy:/bin:/usr/sbin/nologin
www-data:x:33:33:www-data:/var/www:/usr/sbin/nologin
backup:x:34:34:backup:/var/backups:/usr/sbin/nologin
list:x:38:38:Mailing List Manager:/var/list:/usr/sbin/nologin
irc:x:39:39:ircd:/var/run/ircd:/usr/sbin/nologin
gnats:x:41:41:Gnats Bug-Reporting System (admin):/var/lib/gnats:/usr/sbin/nologin
nobody:x:65534:65534:nobody:/nonexistent:/usr/sbin/nologin
systemd-timesync:x:100:102:systemd Time Synchronization,,,:/run/systemd:/bin/false
systemd-network:x:101:103:systemd Network Management,,,:/run/systemd/netif:/bin/false
systemd-resolve:x:102:104:systemd Resolver,,,:/run/systemd/resolve:/bin/false
systemd-bus-proxy:x:103:105:systemd Bus Proxy,,,:/run/systemd:/bin/false
```

```
syslog:x:104:108:./home/syslog:/bin/false
_apt:x:105:65534:./nonexistent:/bin/false
messagebus:x:106:110:./var/run/dbus:/bin/false
uidd:x:107:111:./run/uidd:/bin/false
lightdm:x:108:114:Light Display Manager:/var/lib/lightdm:/bin/false
whoopsie:x:109:116:./nonexistent:/bin/false
avahi-autoipd:x:110:119:Avahi autoip daemon,,,:/var/lib/avahi-autoipd:/bin/false
avahi:x:111:120:Avahi mDNS daemon,,,:/var/run/avahi-daemon:/bin/false
dnsmasq:x:112:65534:dnsmasq,,,:/var/lib/misc:/bin/false
colord:x:113:123:colord colour management daemon,,,:/var/lib/colord:/bin/false
speech-dispatcher:x:114:29:Speech Dispatcher,,,:/var/run/speech-dispatcher:/bin/false
hplip:x:115:7:HPLIP system user,,,:/var/run/hplip:/bin/false
kernoops:x:116:65534:Kernel Oops Tracking Daemon,,,:/bin/false
pulse:x:117:124:PulseAudio daemon,,,:/var/run/pulse:/bin/false
rtkit:x:118:126:RealtimeKit,,,:/proc:/bin/false
saned:x:119:127:./var/lib/saned:/bin/false
usbmux:x:120:46root@ubuntul604:/tmp#
```

```
lp:x:4:7[root@centos7 tmp]# head -c -150 /etc/passwd
root:x:0:0:root:/root:/bin/bash
bin:x:1:1:bin:/bin:/sbin/nologin
daemon:x:2:2:daemon:/sbin:/sbin/nologin
adm:x:3:4:adm:/var/adm:/sbin/nologin
lp:x:4:7:lp:/var/spool/lpd:/sbin/nologin
sync:x:5:0:sync:/sbin:/bin/sync
shutdown:x:6:0:shutdown:/sbin:/sbin/shutdown
halt:x:7:0:halt:/sbin:/sbin/halt
mail:x:8:12:mail:/var/spool/mail:/sbin/nologin
operator:x:11:0:operator:/root:/sbin/nologin
games:x:12:100:games:/usr/games:/sbin/nologin
ftp:x:14:50:FTP User:/var/ftp:/sbin/nologin
nobody:x:99:99:Nobody:./sbin/nologin
dbus:x:81:81:System message bus:./sbin/nologin
polkitd:x:999:998>User for polkitd:./sbin/nologin
```

```
unbound:x:998:997:Unbound DNS resolver:/etc/unbound:/sbin/nologin
colord:x:997:996:User for colord:/var/lib/colord:/sbin/nologin
usbmuxd:x:113:113:usbmuxd user:/:/sbin/nologin
avahi:x:70:70:Avahi mDNS/DNS-SD Stack:/var/run/avahi-daemon:/sbin/nologin
avahi-autoipd:x:170:170:Avahi IPv4LL Stack:/var/lib/avahi-autoipd:/sbin/nologin
saslauth:x:996:76:"Saslauthd user":/run/saslauthd:/sbin/nologin
qemu:x:107:107:qemu user:/:/sbin/nologin
libstoragemgmt:x:995:994:daemon account for libstoragemgmt:/var/run/lsm:/sbin/nologin
rpc:x:32:32:Rpcbind Daemon:/var/lib/rpcbind:/sbin/nologin
rpcuser:x:29:29:RPC Service User:/var/lib/nfs:/sbin/nologin
nfsnobody:x:65534:65534:Anonymous NFS User:/var/lib/nfs:/sbin/nologin
rtkit:x:172:172:RealtimeKit:/proc:/sbin/nologin
radvd:x:75:75:radvd user:/:/sbin/nologin
ntp:x:38:38::/etc/ntp:/sbin/nologin
chrony:x:994:993::/var/lib/chrony:/sbin/nologin
abrt:x:173:173::/etc/abrt:/sbin/nologin
pulse:x:171:171:PulseAudio System Daemon:/var/run/pulse:/sbin/nologin
gdm:x:42:42::/var/lib/gdm:/sbin/nologin
gnome-initial-setup:x:993:991::/run/gnome-initial-setup:/sbin/nologin
postfix:x:89:89::/var/spool/postfix:/sbin/nologin
sshd:x:74:74:Privilege-separated SSH:/var/empty/sshd:/sbin/nologin
tcpdump:x:72:72::/sbin/nologin
trainee:x:1000:1000:trainee:/home/trainee:/bin/[root@centos7 tmp]#
```

```
SLES12SP1:/tmp # head -c -150 /etc/passwd
at:x:25:25:Batch jobs daemon:/var/spool/atjobs:/bin/bash
bin:x:1:1:bin:/bin:/bin/bash
daemon:x:2:2:Daemon:/sbin:/bin/bash
ftp:x:40:49:FTP account:/srv/ftp:/bin/bash
ftpsecure:x:488:65534:Secure FTP User:/var/lib/empty:/bin/false
games:x:12:100:Games account:/var/games:/bin/bash
gdm:x:486:485:Gnome Display Manager daemon:/var/lib/gdm:/bin/false
lp:x:4:7:Printing daemon:/var/spool/lpd:/bin/bash
mail:x:8:12:Mailer daemon:/var/spool/clientmqueue:/bin/false
```

```
man:x:13:62:Manual pages viewer:/var/cache/man:/bin/bash
messagebus:x:499:499:User for D-Bus:/var/run/dbus:/bin/false
news:x:9:13:News system:/etc/news:/bin/bash
nobody:x:65534:65533:nobody:/var/lib/nobody:/bin/bash
nscd:x:496:495:User for nscd:/run/nscd:/sbin/nologin
ntp:x:74:492:NTP daemon:/var/lib/ntp:/bin/false
openslp:x:494:2:openslp daemon:/var/lib/empty:/sbin/nologin
polkitd:x:497:496:User for polkitd:/var/lib/polkit:/sbin/nologin
postfix:x:51:51:Postfix Daemon:/var/spool/postfix:/bin/false
pulse:x:490:489:PulseAudio daemon:/var/lib/pulseaudio:/sbin/nologin
root:x:0:0:root:/root:/bin/bash
rpc:x:495:65534:user for rpcbind:/var/lib/empty:/sbin/nologin
rtkit:x:491:490:RealtimeKit:/proc:/bin/false
scard:x:487:487:Smart Card Reader:/var/run/pcscd:/usr/sbin/nologin
sshd:x:498:498:SSH daemon:/var/lib/ssh:/bin/false
statd:x:489:65534:NFS statd daemon:/var/lib/nfs:/sbin/nologin
usbmux:x:493:65534:usbmuxd daemon:/var/lib/usbmuxd:/sbin/nologin
uucp:x:10:14:Unix-to-Unix CoPy system:/etc/uucp:/bin/bash
vnc:x:492:491:usSLES12SP1:/tmp #
```

Both x and y can accept multipliers:

```
root@debian8:/tmp# head -c 1b /etc/passwd
root:x:0:0:root:/root:/bin/bash
daemon:x:1:1:daemon:/usr/sbin:/usr/sbin/nologin
bin:x:2:2:bin:/bin:/usr/sbin/nologin
sys:x:3:3:sys:/dev:/usr/sbin/nologin
sync:x:4:65534:sync:/bin:/bin/sync
games:x:5:60:games:/usr/games:/usr/sbin/nologin
man:x:6:12:man:/var/cache/man:/usr/sbin/nologin
lp:x:7:7:lp:/var/spool/lpd:/usr/sbin/nologin
mail:x:8:8:mail:/var/mail:/usr/sbin/nologin
news:x:9:9:news:/var/spool/news:/usr/sbin/nologin
uucp:x:10:10:uucp:/var/spool/uucp:/usr/sbin/nologin
```

```
proxy:x:13:13:proxy:/bin:/usr/sbin/nroot@debian8:/tmp#
root@debian8:/tmp#
root@debian8:/tmp# head -c 512 /etc/passwd
root:x:0:0:root:/root:/bin/bash
daemon:x:1:1:daemon:/usr/sbin:/usr/sbin/nologin
bin:x:2:2:bin:/bin:/usr/sbin/nologin
sys:x:3:3:sys:/dev:/usr/sbin/nologin
sync:x:4:65534:sync:/bin:/bin/sync
games:x:5:60:games:/usr/games:/usr/sbin/nologin
man:x:6:12:man:/var/cache/man:/usr/sbin/nologin
lp:x:7:7:lp:/var/spool/lpd:/usr/sbin/nologin
mail:x:8:8:mail:/var/mail:/usr/sbin/nologin
news:x:9:9:news:/var/spool/news:/usr/sbin/nologin
uucp:x:10:10:uucp:/var/spool/uucp:/usr/sbin/nologin
proxy:x:13:13:proxy:/bin:/usr/sbin/nroot@debian8:/tmp#
```

```
root@ubuntu1604:/tmp# head -c 1b /etc/passwd
root:x:0:0:root:/root:/bin/bash
daemon:x:1:1:daemon:/usr/sbin:/usr/sbin/nologin
bin:x:2:2:bin:/bin:/usr/sbin/nologin
sys:x:3:3:sys:/dev:/usr/sbin/nologin
sync:x:4:65534:sync:/bin:/bin/sync
games:x:5:60:games:/usr/games:/usr/sbin/nologin
man:x:6:12:man:/var/cache/man:/usr/sbin/nologin
lp:x:7:7:lp:/var/spool/lpd:/usr/sbin/nologin
mail:x:8:8:mail:/var/mail:/usr/sbin/nologin
news:x:9:9:news:/var/spool/news:/usr/sbin/nologin
uucp:x:10:10:uucp:/var/spool/uucp:/usr/sbin/nologin
proxy:x:13:13:proxy:/bin:/usr/sbin/nroot@ubuntu1604:/tmp#
root@ubuntu1604:/tmp#
root@ubuntu1604:/tmp# head -c 512 /etc/passwd
root:x:0:0:root:/root:/bin/bash
daemon:x:1:1:daemon:/usr/sbin:/usr/sbin/nologin
bin:x:2:2:bin:/bin:/usr/sbin/nologin
```

```
sys:x:3:3:sys:/dev:/usr/sbin/nologin
sync:x:4:65534:sync:/bin:/bin/sync
games:x:5:60:games:/usr/games:/usr/sbin/nologin
man:x:6:12:man:/var/cache/man:/usr/sbin/nologin
lp:x:7:7:lp:/var/spool/lpd:/usr/sbin/nologin
mail:x:8:8:mail:/var/mail:/usr/sbin/nologin
news:x:9:9:news:/var/spool/news:/usr/sbin/nologin
uucp:x:10:10:uucp:/var/spool/uucp:/usr/sbin/nologin
proxy:x:13:13:proxy:/bin:/usr/sbin/nroot@ubuntu1604:/tmp
```

```
[root@centos7 tmp]# head -c 1b /etc/passwd
root:x:0:0:root:/root:/bin/bash
bin:x:1:1:bin:/bin:/sbin/nologin
daemon:x:2:2:daemon:/sbin:/sbin/nologin
adm:x:3:4:adm:/var/adm:/sbin/nologin
lp:x:4:7:lp:/var/spool/lpd:/sbin/nologin
sync:x:5:0:sync:/sbin:/bin/sync
shutdown:x:6:0:shutdown:/sbin:/sbin/shutdown
halt:x:7:0:halt:/sbin:/sbin/halt
mail:x:8:12:mail:/var/spool/mail:/sbin/nologin
operator:x:11:0:operator:/root:/sbin/nologin
games:x:12:100:games:/usr/games:/sbin/nologin
ftp:x:14:50:FTP User:/var/ftp:/sbin/nologin
nobody:x:99:99:Nobody:/:/sbin/nologin[root@centos7 tmp]#
[root@centos7 tmp]# head -c 512 /etc/passwd
root:x:0:0:root:/root:/bin/bash
bin:x:1:1:bin:/bin:/sbin/nologin
daemon:x:2:2:daemon:/sbin:/sbin/nologin
adm:x:3:4:adm:/var/adm:/sbin/nologin
lp:x:4:7:lp:/var/spool/lpd:/sbin/nologin
sync:x:5:0:sync:/sbin:/bin/sync
shutdown:x:6:0:shutdown:/sbin:/sbin/shutdown
halt:x:7:0:halt:/sbin:/sbin/halt
mail:x:8:12:mail:/var/spool/mail:/sbin/nologin
```

```
operator:x:11:0:operator:/root:/sbin/nologin
games:x:12:100:games:/usr/games:/sbin/nologin
ftp:x:14:50:FTP User:/var/ftp:/sbin/nologin
nobody:x:99:99:Nobody:/:/sbin/nologin[root@centos7 tmp]#
```

```
SLES12SP1:/tmp # head -c 1b /etc/passwd
at:x:25:25:Batch jobs daemon:/var/spool/atjobs:/bin/bash
bin:x:1:1:bin:/bin:/bin/bash
daemon:x:2:2:Daemon:/sbin:/bin/bash
ftp:x:40:49:FTP account:/srv/ftp:/bin/bash
ftpsecure:x:488:65534:Secure FTP User:/var/lib/empty:/bin/false
games:x:12:100:Games account:/var/games:/bin/bash
gdm:x:486:485:Gnome Display Manager daemon:/var/lib/gdm:/bin/false
lp:x:4:7:Printing daemon:/var/spool/lpd:/bin/bash
mail:x:8:12:Mailer daemon:/var/spool/clientmqueue:/bin/false
man:x:13:62:Manual pages viewer:/var/cache/man:/bin/basSLES12SP1:/tmp #
```

The common multipliers are:

Multiplier	Number of bytes
b	512
KB	1000
K	1024
MB	1000*1000
M	1024*1024
GB	1000*1000*1000
G	1024*1024*1024

Command Line Switches



To do : Use the **-help** option of the **head** command to view the command line switches.

The tail Command

The **tail** command is used to display the last **x** lines of a file. The default value of **x** is 10:

```
root@debian8:/tmp# tail /etc/passwd
avahi-autoipd:x:108:113:Avahi autoip daemon,,,:/var/lib/avahi-autoipd:/bin/false
avahi:x:109:115:Avahi mDNS daemon,,,:/var/run/avahi-daemon:/bin/false
colord:x:110:117:colord colour management daemon,,,:/var/lib/colord:/bin/false
dnsmasq:x:111:65534:dnsmasq,,,:/var/lib/misc:/bin/false
speech-dispatcher:x:112:29:Speech Dispatcher,,,:/var/run/speech-dispatcher:/bin/sh
pulse:x:113:119:PulseAudio daemon,,,:/var/run/pulse:/bin/false
rtkit:x:114:121:RealtimeKit,,,:/proc:/bin/false
saned:x:115:122:./var/lib/saned:/bin/false
usbmux:x:116:46:usbmux daemon,,,:/var/lib/usbmux:/bin/false
lightdm:x:117:124:Light Display Manager:/var/lib/lightdm:/bin/false
```

```
root@ubuntu1604:/tmp# tail /etc/passwd
colord:x:113:123:colord colour management daemon,,,:/var/lib/colord:/bin/false
speech-dispatcher:x:114:29:Speech Dispatcher,,,:/var/run/speech-dispatcher:/bin/false
hplip:x:115:7:HPLIP system user,,,:/var/run/hplip:/bin/false
kernoops:x:116:65534:Kernel Oops Tracking Daemon,,,:/bin/false
pulse:x:117:124:PulseAudio daemon,,,:/var/run/pulse:/bin/false
rtkit:x:118:126:RealtimeKit,,,:/proc:/bin/false
saned:x:119:127:./var/lib/saned:/bin/false
usbmux:x:120:46:usbmux daemon,,,:/var/lib/usbmux:/bin/false
trainee:x:1000:1000:trainee,,,:/home/trainee:/bin/bash
sshd:x:121:65534:./var/run/sshd:/usr/sbin/nolog
```

```
[root@centos7 tmp]# tail /etc/passwd
abrt:x:173:173:./etc/abrt:/sbin/nologin
pulse:x:171:171:PulseAudio System Daemon:/var/run/pulse:/sbin/nologin
gdm:x:42:42:./var/lib/gdm:/sbin/nologin
gnome-initial-setup:x:993:991:./run/gnome-initial-setup:/sbin/nologin
```

```
postfix:x:89:89::/var/spool/postfix:/sbin/nologin
sshd:x:74:74:Privilege-separated SSH:/var/empty/sshd:/sbin/nologin
tcpdump:x:72:72:::/sbin/nologin
trainee:x:1000:1000:trainee:/home/trainee:/bin/bash
vboxadd:x:992:1::/var/run/vboxadd:/bin/false
tss:x:59:59:Account used by the trousers package to sandbox the tcsd daemon:/dev/null:/sbin/nologin
```

```
SLES12SP1:/tmp # tail /etc/passwd
rpc:x:495:65534:user for rpcbind:/var/lib/empty:/sbin/nologin
rtkit:x:491:490:RealtimeKit:/proc:/bin/false
scard:x:487:487:Smart Card Reader:/var/run/pcscd:/usr/sbin/nologin
sshd:x:498:498:SSH daemon:/var/lib/ssh:/bin/false
statd:x:489:65534:NFS statd daemon:/var/lib/nfs:/sbin/nologin
usbmux:x:493:65534:usbmuxd daemon:/var/lib/usbmuxd:/sbin/nologin
uucp:x:10:14:Unix-to-Unix CoPy system:/etc/uucp:/bin/bash
vnc:x:492:491:user for VNC:/var/lib/empty:/sbin/nologin
wwwrun:x:30:8:WWW daemon apache:/var/lib/wwwrun:/bin/false
trainee:x:1000:100:trainee:/home/trainee:/bin/bash
```

You can change the default value of x by using the **-n** switch:

```
root@debian8:/tmp# tail -n 15 /etc/passwd
trainee:x:1000:1000:trainee,,,:/home/trainee:/bin/bash
sshd:x:104:65534::/var/run/sshd:/usr/sbin/nologin
Debian-exim:x:105:110::/var/spool/exim4:/bin/false
messagebus:x:106:111::/var/run/dbus:/bin/false
statd:x:107:65534::/var/lib/nfs:/bin/false
avahi-autoipd:x:108:113:Avahi autoip daemon,,,:/var/lib/avahi-autoipd:/bin/false
avahi:x:109:115:Avahi mDNS daemon,,,:/var/run/avahi-daemon:/bin/false
colord:x:110:117:colord colour management daemon,,,:/var/lib/colord:/bin/false
dnsmasq:x:111:65534:dnsmasq,,,:/var/lib/misc:/bin/false
speech-dispatcher:x:112:29:Speech Dispatcher,,,:/var/run/speech-dispatcher:/bin/sh
pulse:x:113:119:PulseAudio daemon,,,:/var/run/pulse:/bin/false
rtkit:x:114:121:RealtimeKit,,,:/proc:/bin/false
```

```
saned:x:115:122::/var/lib/saned:/bin/false
usbmux:x:116:46:usbmux daemon,,,:/var/lib/usbmux:/bin/false
lightdm:x:117:124:Light Display Manager:/var/lib/lightdm:/bin/false
```

```
root@ubuntu1604:/tmp# tail -n 15 /etc/passwd
lightdm:x:108:114:Light Display Manager:/var/lib/lightdm:/bin/false
whoopsie:x:109:116::/nonexistent:/bin/false
avahi-autoipd:x:110:119:Avahi autoip daemon,,,:/var/lib/avahi-autoipd:/bin/false
avahi:x:111:120:Avahi mDNS daemon,,,:/var/run/avahi-daemon:/bin/false
dnsmasq:x:112:65534:dnsmasq,,,:/var/lib/misc:/bin/false
colord:x:113:123:colord colour management daemon,,,:/var/lib/colord:/bin/false
speech-dispatcher:x:114:29:Speech Dispatcher,,,:/var/run/speech-dispatcher:/bin/false
hplip:x:115:7:HPLIP system user,,,:/var/run/hplip:/bin/false
kernoops:x:116:65534:Kernel Oops Tracking Daemon,,,:/bin/false
pulse:x:117:124:PulseAudio daemon,,,:/var/run/pulse:/bin/false
rtkit:x:118:126:RealtimeKit,,,:/proc:/bin/false
saned:x:119:127::/var/lib/saned:/bin/false
usbmux:x:120:46:usbmux daemon,,,:/var/lib/usbmux:/bin/false
trainee:x:1000:1000:trainee,,,:/home/trainee:/bin/bash
sshd:x:121:65534::/var/run/sshd:/usr/sbin/nologin
```

```
[root@centos7 tmp]# tail -n 15 /etc/passwd
nfsnobody:x:65534:65534:Anonymous NFS User:/var/lib/nfs:/sbin/nologin
rtkit:x:172:172:RealtimeKit:/proc:/sbin/nologin
radvd:x:75:75:radvd user:/sbin/nologin
ntp:x:38:38::/etc/ntp:/sbin/nologin
chrony:x:994:993::/var/lib/chrony:/sbin/nologin
abrt:x:173:173::/etc/abrt:/sbin/nologin
pulse:x:171:171:PulseAudio System Daemon:/var/run/pulse:/sbin/nologin
gdm:x:42:42::/var/lib/gdm:/sbin/nologin
gnome-initial-setup:x:993:991::/run/gnome-initial-setup:/sbin/nologin
postfix:x:89:89::/var/spool/postfix:/sbin/nologin
sshd:x:74:74:Privilege-separated SSH:/var/empty/sshd:/sbin/nologin
tcpdump:x:72:72:::/sbin/nologin
```

```
trainee:x:1000:1000:trainee:/home/trainee:/bin/bash
vboxadd:x:992:1::/var/run/vboxadd:/bin/false
tss:x:59:59:Account used by the trousers package to sandbox the tcsd daemon:/dev/null:/sbin/nologin
```

```
SLES12SP1:/tmp # tail -n 15 /etc/passwd
openslp:x:494:2:openslp daemon:/var/lib/empty:/sbin/nologin
polkitd:x:497:496:User for polkitd:/var/lib/polkit:/sbin/nologin
postfix:x:51:51:Postfix Daemon:/var/spool/postfix:/bin/false
pulse:x:490:489:PulseAudio daemon:/var/lib/pulseaudio:/sbin/nologin
root:x:0:0:root:/root:/bin/bash
rpc:x:495:65534:user for rpcbind:/var/lib/empty:/sbin/nologin
rtkit:x:491:490:RealtimeKit:/proc:/bin/false
scard:x:487:487:Smart Card Reader:/var/run/pcscd:/usr/sbin/nologin
sshd:x:498:498:SSH daemon:/var/lib/sshd:/bin/false
statd:x:489:65534:NFS statd daemon:/var/lib/nfs:/sbin/nologin
usbmux:x:493:65534:usbmuxd daemon:/var/lib/usbmuxd:/sbin/nologin
uucp:x:10:14:Unix-to-Unix CoPy system:/etc/uucp:/bin/bash
vnc:x:492:491:user for VNC:/var/lib/empty:/sbin/nologin
wwwrun:x:30:8:WWW daemon apache:/var/lib/wwwrun:/bin/false
trainee:x:1000:100:trainee:/home/trainee:/bin/bash
```

The command can also be used to display the last **y** bytes of a file by using the **-c** switch:

```
root@debian8:/tmp# tail -c 150 /etc/passwd
/lib/saned:/bin/false
usbmux:x:116:46:usbmux daemon,,,:/var/lib/usbmux:/bin/false
lightdm:x:117:124:Light Display Manager:/var/lib/lightdm:/bin/false
```

```
root@ubuntu1604:/tmp# tail -c 150 /etc/passwd
:usbmux daemon,,,:/var/lib/usbmux:/bin/false
trainee:x:1000:1000:trainee,,,:/home/trainee:/bin/bash
sshd:x:121:65534::/var/run/sshd:/usr/sbin/nologin
```

```
[root@centos7 tmp]# tail -c 150 /etc/passwd
```

```
bash
vboxadd:x:992:1::/var/run/vboxadd:/bin/false
tss:x:59:59:Account used by the trousers package to sandbox the tcsd daemon:/dev/null:/sbin/nologin
```

```
SLES12SP1:/tmp # tail -c 150 /etc/passwd
er for VNC:/var/lib/empty:/sbin/nologin
wwwrun:x:30:8:WWW daemon apache:/var/lib/wwwrun:/bin/false
trainee:x:1000:100:trainee:/home/trainee:/bin/bash
```

If the value of **y** is positive, tail displays all bytes in the file after the yth byte:

```
root@debian8:/tmp# tail -c +150 /etc/passwd
ogin
sync:x:4:65534:sync:/bin:/bin/sync
games:x:5:60:games:/usr/games:/usr/sbin/nologin
man:x:6:12:man:/var/cache/man:/usr/sbin/nologin
lp:x:7:7:lp:/var/spool/lpd:/usr/sbin/nologin
mail:x:8:8:mail:/var/mail:/usr/sbin/nologin
news:x:9:9:news:/var/spool/news:/usr/sbin/nologin
uucp:x:10:10:uucp:/var/spool/uucp:/usr/sbin/nologin
proxy:x:13:13:proxy:/bin:/usr/sbin/nologin
www-data:x:33:33:www-data:/var/www:/usr/sbin/nologin
backup:x:34:34:backup:/var/backups:/usr/sbin/nologin
list:x:38:38:Mailing List Manager:/var/list:/usr/sbin/nologin
irc:x:39:39:ircd:/var/run/ircd:/usr/sbin/nologin
gnats:x:41:41:Gnats Bug-Reporting System (admin):/var/lib/gnats:/usr/sbin/nologin
nobody:x:65534:65534:nobody:/nonexistent:/usr/sbin/nologin
systemd-timesync:x:100:103:systemd Time Synchronization,,,:/run/systemd:/bin/false
systemd-network:x:101:104:systemd Network Management,,,:/run/systemd/netif:/bin/false
systemd-resolve:x:102:105:systemd Resolver,,,:/run/systemd/resolve:/bin/false
systemd-bus-proxy:x:103:106:systemd Bus Proxy,,,:/run/systemd:/bin/false
trainee:x:1000:1000:trainee,,,:/home/trainee:/bin/bash
sshd:x:104:65534::/var/run/sshd:/usr/sbin/nologin
Debian-exim:x:105:110::/var/spool/exim4:/bin/false
```

```
messagebus:x:106:111:./var/run/dbus:/bin/false
statd:x:107:65534:./var/lib/nfs:/bin/false
avahi-autoipd:x:108:113:Avahi autoip daemon,,,:/var/lib/avahi-autoipd:/bin/false
avahi:x:109:115:Avahi mDNS daemon,,,:/var/run/avahi-daemon:/bin/false
colord:x:110:117:colord colour management daemon,,,:/var/lib/colord:/bin/false
dnsmasq:x:111:65534:dnsmasq,,,:/var/lib/misc:/bin/false
speech-dispatcher:x:112:29:Speech Dispatcher,,,:/var/run/speech-dispatcher:/bin/sh
pulse:x:113:119:PulseAudio daemon,,,:/var/run/pulse:/bin/false
rtkit:x:114:121:RealtimeKit,,,:/proc:/bin/false
saned:x:115:122:./var/lib/saned:/bin/false
usbmux:x:116:46:usbmux daemon,,,:/var/lib/usbmux:/bin/false
lightdm:x:117:124:Light Display Manager:/var/lib/lightdm:/bin/false
```

```
root@ubuntu1604:/tmp# tail -c +150 /etc/passwd
ogin
sync:x:4:65534:sync:/bin:/bin/sync
games:x:5:60:games:/usr/games:/usr/sbin/nologin
man:x:6:12:man:/var/cache/man:/usr/sbin/nologin
lp:x:7:7:lp:/var/spool/lpd:/usr/sbin/nologin
mail:x:8:8:mail:/var/mail:/usr/sbin/nologin
news:x:9:9:news:/var/spool/news:/usr/sbin/nologin
uucp:x:10:10:uucp:/var/spool/uucp:/usr/sbin/nologin
proxy:x:13:13:proxy:/bin:/usr/sbin/nologin
www-data:x:33:33:www-data:/var/www:/usr/sbin/nologin
backup:x:34:34:backup:/var/backups:/usr/sbin/nologin
list:x:38:38:Mailing List Manager:/var/list:/usr/sbin/nologin
irc:x:39:39:ircd:/var/run/ircd:/usr/sbin/nologin
gnats:x:41:41:Gnats Bug-Reporting System (admin):/var/lib/gnats:/usr/sbin/nologin
nobody:x:65534:65534:nobody:/nonexistent:/usr/sbin/nologin
systemd-timesync:x:100:102:systemd Time Synchronization,,,:/run/systemd:/bin/false
systemd-network:x:101:103:systemd Network Management,,,:/run/systemd/netif:/bin/false
systemd-resolve:x:102:104:systemd Resolver,,,:/run/systemd/resolve:/bin/false
systemd-bus-proxy:x:103:105:systemd Bus Proxy,,,:/run/systemd:/bin/false
syslog:x:104:108:./home/syslog:/bin/false
```

```
_apt:x:105:65534:./nonexistent:/bin/false
messagebus:x:106:110:./var/run/dbus:/bin/false
uidd:x:107:111:./run/uidd:/bin/false
lightdm:x:108:114:Light Display Manager:/var/lib/lightdm:/bin/false
whoopsie:x:109:116:./nonexistent:/bin/false
avahi-autoipd:x:110:119:Avahi autoip daemon,,,:/var/lib/avahi-autoipd:/bin/false
avahi:x:111:120:Avahi mDNS daemon,,,:/var/run/avahi-daemon:/bin/false
dnsmasq:x:112:65534:dnsmasq,,,:/var/lib/misc:/bin/false
colord:x:113:123:colord colour management daemon,,,:/var/lib/colord:/bin/false
speech-dispatcher:x:114:29:Speech Dispatcher,,,:/var/run/speech-dispatcher:/bin/false
hplip:x:115:7:HPLIP system user,,,:/var/run/hplip:/bin/false
kernoops:x:116:65534:Kernel Oops Tracking Daemon,,,:/bin/false
pulse:x:117:124:PulseAudio daemon,,,:/var/run/pulse:/bin/false
rtkit:x:118:126:RealtimeKit,,,:/proc:/bin/false
saned:x:119:127:./var/lib/saned:/bin/false
usbmux:x:120:46:usbmux daemon,,,:/var/lib/usbmux:/bin/false
trainee:x:1000:1000:trainee,,,:/home/trainee:/bin/bash
sshd:x:121:65534:./var/run/sshd:/usr/sbin/nologin
```

```
[root@centos7 tmp]# tail -c +150 /etc/passwd
7:lp:/var/spool/lpd:/sbin/nologin
sync:x:5:0:sync:/sbin:/bin/sync
shutdown:x:6:0:shutdown:/sbin:/sbin/shutdown
halt:x:7:0:halt:/sbin:/sbin/halt
mail:x:8:12:mail:/var/spool/mail:/sbin/nologin
operator:x:11:0:operator:/root:/sbin/nologin
games:x:12:100:games:/usr/games:/sbin/nologin
ftp:x:14:50:FTP User:/var/ftp:/sbin/nologin
nobody:x:99:99:Nobody:./sbin/nologin
dbus:x:81:81:System message bus:./sbin/nologin
polkitd:x:999:998>User for polkitd:./sbin/nologin
unbound:x:998:997:Unbound DNS resolver:/etc/unbound:/sbin/nologin
colord:x:997:996>User for colord:/var/lib/colord:/sbin/nologin
usbmuxd:x:113:113:usbmuxd user:./sbin/nologin
```

```
avahi:x:70:70:Avahi mDNS/DNS-SD Stack:/var/run/avahi-daemon:/sbin/nologin
avahi-autoipd:x:170:170:Avahi IPv4LL Stack:/var/lib/avahi-autoipd:/sbin/nologin
saslauth:x:996:76:"Saslauthd user":/run/saslauthd:/sbin/nologin
qemu:x:107:107:qemu user:/:/sbin/nologin
libstoragemgmt:x:995:994:daemon account for libstoragemgmt:/var/run/lsm:/sbin/nologin
rpc:x:32:32:Rpcbind Daemon:/var/lib/rpcbind:/sbin/nologin
rpcuser:x:29:29:RPC Service User:/var/lib/nfs:/sbin/nologin
nfsnobody:x:65534:65534:Anonymous NFS User:/var/lib/nfs:/sbin/nologin
rtkit:x:172:172:RealtimeKit:/proc:/sbin/nologin
radvd:x:75:75:radvd user:/:/sbin/nologin
ntp:x:38:38::/etc/ntp:/sbin/nologin
chrony:x:994:993::/var/lib/chrony:/sbin/nologin
abrt:x:173:173::/etc/abrt:/sbin/nologin
pulse:x:171:171:PulseAudio System Daemon:/var/run/pulse:/sbin/nologin
gdm:x:42:42::/var/lib/gdm:/sbin/nologin
gnome-initial-setup:x:993:991::/run/gnome-initial-setup:/sbin/nologin
postfix:x:89:89::/var/spool/postfix:/sbin/nologin
sshd:x:74:74:Privilege-separated SSH:/var/empty/sshd:/sbin/nologin
tcpdump:x:72:72:/:/sbin/nologin
trainee:x:1000:1000:trainee:/home/trainee:/bin/bash
vboxadd:x:992:1::/var/run/vboxadd:/bin/false
tss:x:59:59:Account used by the trousers package to sandbox the tcsd daemon:/dev/null:/sbin/nologin
```

```
SLES12SP1:/tmp # tail -c 150 /etc/passwd
er for VNC:/var/lib/empty:/sbin/nologin
wwwrun:x:30:8:WWW daemon apache:/var/lib/wwwrun:/bin/false
trainee:x:1000:100:trainee:/home/trainee:/bin/bash
SLES12SP1:/tmp # tail -c +150 /etc/passwd
v/ftp:/bin/bash
ftpsecure:x:488:65534:Secure FTP User:/var/lib/empty:/bin/false
games:x:12:100:Games account:/var/games:/bin/bash
gdm:x:486:485:Gnome Display Manager daemon:/var/lib/gdm:/bin/false
lp:x:4:7:Printing daemon:/var/spool/lpd:/bin/bash
mail:x:8:12:Mailer daemon:/var/spool/clientmqueue:/bin/false
```

```
man:x:13:62:Manual pages viewer:/var/cache/man:/bin/bash
messagebus:x:499:499:User for D-Bus:/var/run/dbus:/bin/false
news:x:9:13:News system:/etc/news:/bin/bash
nobody:x:65534:65533:nobody:/var/lib/nobody:/bin/bash
nscd:x:496:495:User for nscd:/run/nscd:/sbin/nologin
ntp:x:74:492:NTP daemon:/var/lib/ntp:/bin/false
openslp:x:494:2:openslp daemon:/var/lib/empty:/sbin/nologin
polkitd:x:497:496:User for polkitd:/var/lib/polkit:/sbin/nologin
postfix:x:51:51:Postfix Daemon:/var/spool/postfix:/bin/false
pulse:x:490:489:PulseAudio daemon:/var/lib/pulseaudio:/sbin/nologin
root:x:0:0:root:/root:/bin/bash
rpc:x:495:65534:user for rpcbind:/var/lib/empty:/sbin/nologin
rtkit:x:491:490:RealtimeKit:/proc:/bin/false
scard:x:487:487:Smart Card Reader:/var/run/pcscd:/usr/sbin/nologin
sshd:x:498:498:SSH daemon:/var/lib/ssh:/bin/false
statd:x:489:65534:NFS statd daemon:/var/lib/nfs:/sbin/nologin
usbmux:x:493:65534:usbmuxd daemon:/var/lib/usbmuxd:/sbin/nologin
uucp:x:10:14:Unix-to-Unix CoPy system:/etc/uucp:/bin/bash
vnc:x:492:491:user for VNC:/var/lib/empty:/sbin/nologin
wwwrun:x:30:8:WWW daemon apache:/var/lib/wwwrun:/bin/false
trainee:x:1000:100:trainee:/home/trainee:/bin/bash
```

Both x and y can accept multipliers:

```
root@debian8:/tmp# tail -c 1b /etc/passwd
:/bin/false
colord:x:110:117:colord colour management daemon,,,:/var/lib/colord:/bin/false
dnsmasq:x:111:65534:dnsmasq,,,:/var/lib/misc:/bin/false
speech-dispatcher:x:112:29:Speech Dispatcher,,,:/var/run/speech-dispatcher:/bin/sh
pulse:x:113:119:PulseAudio daemon,,,:/var/run/pulse:/bin/false
rtkit:x:114:121:RealtimeKit,,,:/proc:/bin/false
saned:x:115:122::/var/lib/saned:/bin/false
usbmux:x:116:46:usbmux daemon,,,:/var/lib/usbmux:/bin/false
lightdm:x:117:124:Light Display Manager:/var/lib/lightdm:/bin/false
```

```
root@debian8:/tmp#
root@debian8:/tmp# tail -c 512 /etc/passwd
:/bin/false
colord:x:110:117:colord colour management daemon,,,:/var/lib/colord:/bin/false
dnsmasq:x:111:65534:dnsmasq,,,:/var/lib/misc:/bin/false
speech-dispatcher:x:112:29:Speech Dispatcher,,,:/var/run/speech-dispatcher:/bin/sh
pulse:x:113:119:PulseAudio daemon,,,:/var/run/pulse:/bin/false
rtkit:x:114:121:RealtimeKit,,,:/proc:/bin/false
saned:x:115:122::/var/lib/saned:/bin/false
usbmux:x:116:46:usbmux daemon,,,:/var/lib/usbmux:/bin/false
lightdm:x:117:124:Light Display Manager:/var/lib/lightdm:/bin/false
```

```
root@ubuntu1604:/tmp# tail -c 1b /etc/passwd
:114:29:Speech Dispatcher,,,:/var/run/speech-dispatcher:/bin/false
hplip:x:115:7:HPLIP system user,,,:/var/run/hplip:/bin/false
kernoops:x:116:65534:Kernel Oops Tracking Daemon,,,:/bin/false
pulse:x:117:124:PulseAudio daemon,,,:/var/run/pulse:/bin/false
rtkit:x:118:126:RealtimeKit,,,:/proc:/bin/false
saned:x:119:127::/var/lib/saned:/bin/false
usbmux:x:120:46:usbmux daemon,,,:/var/lib/usbmux:/bin/false
trainee:x:1000:1000:trainee,,,:/home/trainee:/bin/bash
sshd:x:121:65534::/var/run/sshd:/usr/sbin/nologin
root@ubuntu1604:/tmp#
root@ubuntu1604:/tmp# tail -c 512 /etc/passwd
:114:29:Speech Dispatcher,,,:/var/run/speech-dispatcher:/bin/false
hplip:x:115:7:HPLIP system user,,,:/var/run/hplip:/bin/false
kernoops:x:116:65534:Kernel Oops Tracking Daemon,,,:/bin/false
pulse:x:117:124:PulseAudio daemon,,,:/var/run/pulse:/bin/false
rtkit:x:118:126:RealtimeKit,,,:/proc:/bin/false
saned:x:119:127::/var/lib/saned:/bin/false
usbmux:x:120:46:usbmux daemon,,,:/var/lib/usbmux:/bin/false
trainee:x:1000:1000:trainee,,,:/home/trainee:/bin/bash
sshd:x:121:65534::/var/run/sshd:/usr/sbin/nologin
```

```
[root@centos7 tmp]# tail -c 1b /etc/passwd
PulseAudio System Daemon:/var/run/pulse:/sbin/nologin
gdm:x:42:42::/var/lib/gdm:/sbin/nologin
gnome-initial-setup:x:993:991::/run/gnome-initial-setup:/sbin/nologin
postfix:x:89:89::/var/spool/postfix:/sbin/nologin
sshd:x:74:74:Privilege-separated SSH:/var/empty/sshd:/sbin/nologin
tcpdump:x:72:72:::/sbin/nologin
trainee:x:1000:1000:trainee:/home/trainee:/bin/bash
vboxadd:x:992:1::/var/run/vboxadd:/bin/false
tss:x:59:59:Account used by the trousers package to sandbox the tcsd daemon:/dev/null:/sbin/nologin
[root@centos7 tmp]#
[root@centos7 tmp]# tail -c 512 /etc/passwd
PulseAudio System Daemon:/var/run/pulse:/sbin/nologin
gdm:x:42:42::/var/lib/gdm:/sbin/nologin
gnome-initial-setup:x:993:991::/run/gnome-initial-setup:/sbin/nologin
postfix:x:89:89::/var/spool/postfix:/sbin/nologin
sshd:x:74:74:Privilege-separated SSH:/var/empty/sshd:/sbin/nologin
tcpdump:x:72:72:::/sbin/nologin
trainee:x:1000:1000:trainee:/home/trainee:/bin/bash
vboxadd:x:992:1::/var/run/vboxadd:/bin/false
tss:x:59:59:Account used by the trousers package to sandbox the tcsd daemon:/dev/null:/sbin/nologin
```

```
SLES12SP1:/tmp # tail -c 1b /etc/passwd
kit:x:491:490:RealtimeKit:/proc:/bin/false
scard:x:487:487:Smart Card Reader:/var/run/pcscd:/usr/sbin/nologin
sshd:x:498:498:SSH daemon:/var/lib/sshd:/bin/false
statd:x:489:65534:NFS statd daemon:/var/lib/nfs:/sbin/nologin
usbmux:x:493:65534:usbmuxd daemon:/var/lib/usbmuxd:/sbin/nologin
uucp:x:10:14:Unix-to-Unix CoPy system:/etc/uucp:/bin/bash
vnc:x:492:491:user for VNC:/var/lib/empty:/sbin/nologin
wwwrun:x:30:8:WWW daemon apache:/var/lib/wwwrun:/bin/false
trainee:x:1000:100:trainee:/home/trainee:/bin/bash
```

The common multipliers are:

Multiplier	Number of bytes
b	512
KB	1000
K	1024
MB	1000*1000
M	1024*1024
GB	1000*1000*1000
G	1024*1024*1024

A useful switch to use with the tail command is **-f**. This switch continually updates the output:

```
root@debian8:/tmp# tail -f /var/log/messages
Nov 30 16:19:14 debian8 kernel: [182064.453711] usb 2-1: new full-speed USB device number 4 using ohci-pci
Nov 30 16:19:14 debian8 kernel: [182064.716207] usb 2-1: New USB device found, idVendor=80ee, idProduct=0021
Nov 30 16:19:14 debian8 kernel: [182064.716213] usb 2-1: New USB device strings: Mfr=1, Product=3, SerialNumber=0
Nov 30 16:19:14 debian8 kernel: [182064.716215] usb 2-1: Product: USB Tablet
Nov 30 16:19:14 debian8 kernel: [182064.716217] usb 2-1: Manufacturer: VirtualBox
Nov 30 16:19:14 debian8 kernel: [182064.732384] input: VirtualBox USB Tablet as
/devices/pci0000:00/0000:00:06.0/usb2/2-1/2-1:1.0/0003:80EE:0021.0003/input/input9
Nov 30 16:19:14 debian8 mtp-probe: checking bus 2, device 4: "/sys/devices/pci0000:00/0000:00:06.0/usb2/2-1"
Nov 30 16:19:14 debian8 mtp-probe: bus: 2, device: 4 was not an MTP device
Nov 30 16:19:14 debian8 kernel: [182064.734594] hid-generic 0003:80EE:0021.0003: input,hidraw0: USB HID v1.10
Mouse [VirtualBox USB Tablet] on usb-0000:00:06.0-1/input0
Nov 30 16:19:20 debian8 kernel: [182070.401997] e1000: eth0 NIC Link is Up 1000 Mbps Full Duplex, Flow Control:
RX
^C
```

```
root@ubuntu1604:/tmp# tail -f /var/log/syslog
Dec 17 13:22:35 ubuntu1604 sh[870]: Sleeping '888' '888'
Dec 17 14:16:59 ubuntu1604 sh[870]: message repeated 465 times: [ Sleeping '888' '888']
Dec 17 14:17:01 ubuntu1604 CRON[17224]: (root) CMD ( cd / && run-parts --report /etc/cron.hourly)
Dec 17 14:17:06 ubuntu1604 sh[870]: Sleeping '888' '888'
Dec 17 15:17:00 ubuntu1604 sh[870]: message repeated 512 times: [ Sleeping '888' '888']
```

```
Dec 17 15:17:01 ubuntu1604 CRON[30516]: (root) CMD ( cd / && run-parts --report /etc/cron.hourly)
Dec 17 15:17:07 ubuntu1604 sh[870]: Sleeping '888' '888'
Dec 17 15:30:00 ubuntu1604 sh[870]: message repeated 110 times: [ Sleeping '888' '888']
Dec 17 15:30:00 ubuntu1604 systemd[1]: snapd.refresh.timer: Adding 4h 29min 43.172868s random time.
Dec 17 15:30:07 ubuntu1604 sh[870]: Sleeping '888' '888'
^C
```

```
[root@centos7 tmp]# tail -f /var/log/messages
Oct 19 15:58:06 centos7 dbus-daemon: dbus[542]: [system] Activating service name='org.freedesktop.PackageKit'
(using servicehelper)
Oct 19 15:58:06 centos7 dbus[542]: [system] Activating service name='org.freedesktop.PackageKit' (using
servicehelper)
Oct 19 15:58:06 centos7 dbus-daemon: dbus[542]: [system] Successfully activated service
'org.freedesktop.PackageKit'
Oct 19 15:58:06 centos7 dbus[542]: [system] Successfully activated service 'org.freedesktop.PackageKit'
Oct 19 16:00:01 centos7 systemd: Created slice user-0.slice.
Oct 19 16:00:01 centos7 systemd: Starting Session 17 of user root.
Oct 19 16:00:01 centos7 systemd: Started Session 17 of user root.
Oct 19 16:01:01 centos7 systemd: Created slice user-0.slice.
Oct 19 16:01:01 centos7 systemd: Starting Session 18 of user root.
Oct 19 16:01:01 centos7 systemd: Started Session 18 of user root.
^C
```

```
SLES12SP1:/tmp # tail -f /var/log/messages
2016-12-14T20:45:01.238708+01:00 SLES12SP1 systemd: pam_unix(systemd-user:session): session opened for user root
by (uid=0)
2016-12-14T20:45:01.275146+01:00 SLES12SP1 CRON[17392]: pam_unix(cron:session): session closed for user root
2016-12-14T20:45:01.288315+01:00 SLES12SP1 systemd: pam_unix(systemd-user:session): session closed for user root
2016-12-14T20:45:41.689270+01:00 SLES12SP1 sh[1320]: Sleeping '' ''
2016-12-14T20:58:07.757988+01:00 SLES12SP1 sh[1320]: message repeated 4 times: [ Sleeping '' '' ]
2016-12-14T21:00:01.284105+01:00 SLES12SP1 cron[23239]: pam_unix(cron:session): session opened for user root by
(uid=0)
2016-12-14T21:00:01.291722+01:00 SLES12SP1 systemd: pam_unix(systemd-user:session): session opened for user root
by (uid=0)
```

```
2016-12-14T21:00:01.338305+01:00 SLES12SP1 CRON[23239]: pam_unix(cron:session): session closed for user root
2016-12-14T21:00:01.351426+01:00 SLES12SP1 systemd: pam_unix(systemd-user:session): session closed for user root
2016-12-14T21:01:14.285113+01:00 SLES12SP1 sh[1320]: Sleeping ' ' ' '
^C
```

Command Line Switches



To do : Use the **-help** option of the **head** command to view the command line switches.

LAB #4 - Use the grep, tr and cut to extract your IP address from the output of ifconfig

```
root@debian8:/tmp# ifconfig eth0
eth0      Link encap:Ethernet  HWaddr 08:00:27:c4:c9:56
          inet addr:10.0.2.15  Bcast:10.0.2.255  Mask:255.255.255.0
          inet6 addr: fe80::a00:27ff:fec4:c956/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:68601 errors:0 dropped:0 overruns:0 frame:0
          TX packets:140516 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:8392325 (8.0 MiB)  TX bytes:10525989 (10.0 MiB)

root@debian8:/tmp# ifconfig eth0 | grep "inet"
          inet addr:10.0.2.15  Bcast:10.0.2.255  Mask:255.255.255.0
          inet6 addr: fe80::a00:27ff:fec4:c956/64 Scope:Link

root@debian8:/tmp# ifconfig eth0 | grep "inet" | grep -v "inet6"
          inet addr:10.0.2.15  Bcast:10.0.2.255  Mask:255.255.255.0

root@debian8:/tmp# ifconfig eth0 | grep "inet" | grep -v "inet6" | tr -s " " ":"
```

```
:inet:addr:10.0.2.15:Bcast:10.0.2.255:Mask:255.255.255.0
```

```
root@debian8:/tmp# ifconfig eth0 | grep "inet" | grep -v "inet6" | tr -s " " ":" | cut -d: -f4  
10.0.2.15
```

```
root@ubuntu1604:/tmp# ifconfig enp0s3  
enp0s3    Link encap:Ethernet  HWaddr 08:00:27:20:4b:97  
          inet  addr:10.0.2.15  Bcast:10.0.2.255  Mask:255.255.255.0  
          inet6 addr: fe80::c4db:2b29:aedd:e7ed/64 Scope:Link  
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1  
          RX packets:230127 errors:0 dropped:0 overruns:0 frame:0  
          TX packets:149877 errors:0 dropped:0 overruns:0 carrier:0  
          collisions:0 txqueuelen:1000  
          RX bytes:238004530 (238.0 MB)  TX bytes:10864892 (10.8 MB)
```

```
root@ubuntu1604:/tmp# ifconfig enp0s3 | grep "inet"  
          inet  addr:10.0.2.15  Bcast:10.0.2.255  Mask:255.255.255.0  
          inet6 addr: fe80::c4db:2b29:aedd:e7ed/64 Scope:Link
```

```
root@ubuntu1604:/tmp# ifconfig enp0s3 | grep "inet" | grep -v "inet6"  
          inet  addr:10.0.2.15  Bcast:10.0.2.255  Mask:255.255.255.0
```

```
root@ubuntu1604:/tmp# ifconfig enp0s3 | grep "inet" | grep -v "inet6" | tr -s " " ":"  
:inet:addr:10.0.2.15:Bcast:10.0.2.255:Mask:255.255.255.0
```

```
root@ubuntu1604:/tmp# ifconfig enp0s3 | grep "inet" | grep -v "inet6" | tr -s " " ":" | cut -d: -f4  
10.0.2.15
```

```
[root@centos7 tmp]# ifconfig enp0s3  
enp0s3: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500  
          inet 10.0.2.15  netmask 255.255.255.0  broadcast 10.0.2.255  
          inet6 fe80::a00:27ff:febd:f523  prefixlen 64  scopeid 0x20<link>  
          ether 08:00:27:bd:f5:23  txqueuelen 1000  (Ethernet)  
          RX packets 7462  bytes 6158140 (5.8 MiB)
```

```
RX errors 0 dropped 0 overruns 0 frame 0
TX packets 4130 bytes 555287 (542.2 KiB)
TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
```

```
[root@centos7 tmp]# ifconfig enp0s3 | grep "inet"
inet 10.0.2.15 netmask 255.255.255.0 broadcast 10.0.2.255
inet6 fe80::a00:27ff:febd:f523 prefixlen 64 scopeid 0x20<link>
```

```
[root@centos7 tmp]# ifconfig enp0s3 | grep "inet" | grep -v "inet6"
inet 10.0.2.15 netmask 255.255.255.0 broadcast 10.0.2.255
```

```
[root@centos7 tmp]# ifconfig enp0s3 | grep "inet" | grep -v "inet6" | tr -s " " ":"
:inet:10.0.2.15:netmask:255.255.255.0:broadcast:10.0.2.255
```

```
[root@centos7 tmp]# ifconfig enp0s3 | grep "inet" | grep -v "inet6" | tr -s " " ":" | cut -d: -f3
10.0.2.15
```

```
SLES12SP1:/tmp # ifconfig eth0
eth0      Link encap:Ethernet  HWaddr 08:00:27:10:B5:86
          inet addr:10.0.2.15 Bcast:10.0.2.255 Mask:255.255.255.0
          inet6 addr: fe80::a00:27ff:fe10:b586/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:8226 errors:0 dropped:0 overruns:0 frame:0
          TX packets:16490 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:588832 (575.0 Kb)  TX bytes:1303594 (1.2 Mb)
```

```
SLES12SP1:/tmp # ifconfig eth0 | grep "inet"
inet addr:10.0.2.15 Bcast:10.0.2.255 Mask:255.255.255.0
inet6 addr: fe80::a00:27ff:fe10:b586/64 Scope:Link
```

```
SLES12SP1:/tmp # ifconfig eth0 | grep "inet" | grep -v "inet6"
inet addr:10.0.2.15 Bcast:10.0.2.255 Mask:255.255.255.0
```

```
SLES12SP1:/tmp # ifconfig eth0 | grep "inet" | grep -v "inet6" | tr -s " " ":"  
:inet:addr:10.0.2.15:Bcast:10.0.2.255:Mask:255.255.255.0
```

```
SLES12SP1:/tmp # ifconfig eth0 | grep "inet" | grep -v "inet6" | tr -s " " ":" | cut -d: -f4  
10.0.2.15
```



Important : Note the use of the **-s** switch with the **tr** command. This switch replaces a string of x identical characters with a single character.

<html>

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