

## 6. File permissions

### Viewing Permissions from the Command-Line

- File permissions may be viewed using **ls -l**

```
$ ls -l /bin/login  
-rwxr-xr-x 1 root root 19080 Apr 1 18:26 /bin/login
```

- Four symbols are used when displaying permissions:
  - r: permission to read a file or list a directory's contents
  - w: permission to write to a file or create and remove files from a directory
  - x: permission to execute a program or change into a directory and do a long listing of the directory
  - -: no permission (in place of the r, w, or x)

### Changing File Ownership

- Only root can change a file's owner
- Only root or the owner can change a file's group
- Ownership is changed with **chown**:
  - **chown [-R] user\_name file|directory ...**
- Group-Ownership is changed with **chgrp**:
  - **chgrp [-R] group\_name file|directory ...**

```

File Edit View Search Terminal Help
imran@DevOps:~/linux-practices$ sudo adduser sam
[sudo] password for imran:
Adding user 'sam' ...
Adding new group 'sam' (1002) ...
Adding new user 'sam' (1002) with group 'sam' ...
Creating home directory '/home/sam' ...
Copying files from '/etc/skel' ...
Enter new UNIX password:
Retype new UNIX password:
passwd: password updated successfully
Changing the user information for sam
Enter the new value, or press ENTER for the default
    Full Name []:
    Room Number []:
    Work Phone []:
    Home Phone []:
    Other []:
Is the information correct? [Y/n] Y
imran@DevOps:~/linux-practices$ id sam
uid=1002(sam) gid=1002(sam) groups=1002(sam)
imran@DevOps:~/linux-practices$ ls -l devopstools
-rw-rw-r-- 1 imran imran 53 Apr  2 19:09 devopstools
imran@DevOps:~/linux-practices$ chown sam.sam devopstools
chown: changing ownership of 'devopstools': Operation not permitted
imran@DevOps:~/linux-practices$ sudo chown sam.sam devopstools
imran@DevOps:~/linux-practices$ ls -l devopstools
-rw-rw-r-- 1 sam sam 53 Apr  2 19:09 devopstools
imran@DevOps:~/linux-practices$ ls
devopstools  file2  firstfile.txt  logdir  newtools.txt  vpdire
imran@DevOps:~/linux-practices$ ls -l vpdire/
total 8
drwxrwxr-x 4 imran imran 4096 Apr  2 18:14 devopsdire
-rw-rw-r-- 1 imran imran  0 Apr  2 18:00 file3
-rw-rw-r-- 1 imran imran  0 Apr  2 18:00 file4
drwxrwxr-x 2 imran imran 4096 Apr  2 18:17 testdire
imran@DevOps:~/linux-practices$ chown sam.sam vpdire/ -R
chown: changing ownership of 'vpdire/devopsdire/ansible': Operation not permitted
chown: changing ownership of 'vpdire/devopsdire/aws': Operation not permitted
chown: changing ownership of 'vpdire/devopsdire': Operation not permitted
chown: changing ownership of 'vpdire/file4': Operation not permitted
chown: changing ownership of 'vpdire/file3': Operation not permitted

```

## Changing Permissions - Symbolic Method

- To change access modes:
  - **chmod [-OPTION]... mode[,mode] *file* *directory* ...**
- *mode* includes:
  - **u,g** or **o** for user, group and other
  - **+** - or **=** for grant, deny or set
  - **r, w** or **x** for read, write and execute
- Options include:
  - **-R** Recursive
  - **-v** Verbose
  - **--reference** Reference another file for its mode
- Examples:
  - **chmod ugo+r *file***: Grant read access to all for *file*
  - **chmod o-wx *dir***: Deny write and execute to others for *dir*

## Changing Permissions - Numeric Method

- Uses a three-digit mode number
  - first digit specifies owner's permissions
  - second digit specifies group permissions
  - third digit represents others' permissions
- Permissions are calculated by adding:
  - 4 (for read)
  - 2 (for write)
  - 1 (for execute)
- Example:
  - **chmod 640 myfile**

```
imran@DevOps:~/linux-practices$ ls -l
total 16
-rw-rw-r-- 1 sam sam 53 Apr 2 19:09 devopstools
-rw-rw-r-- 1 imran imran 0 Apr 2 18:00 file2
-rw-rw-r-- 1 imran imran 73 Apr 2 18:29 firstfile.txt
lrwxrwxrwx 1 imran imran 9 Apr 2 18:41 logdir -> /var/log/
-rw-rw-r-- 1 imran imran 612 Apr 2 19:14 newtools.txt
drwxrwxr-x 4 sam sam 4096 Apr 2 18:21 vpdire
imran@DevOps:~/linux-practices$ chmod u+x newtools.txt
imran@DevOps:~/linux-practices$ ls -l newtools.txt
-rwxrw-r-- 1 imran imran 612 Apr 2 19:14 newtools.txt
imran@DevOps:~/linux-practices$ chmod o-r newtools.txt
imran@DevOps:~/linux-practices$ ls -l newtools.txt
-rwxrw---- 1 imran imran 612 Apr 2 19:14 newtools.txt
imran@DevOps:~/linux-practices$ chmod 700 newtools.txt
imran@DevOps:~/linux-practices$ ls -l newtools.txt
-rwx----- 1 imran imran 612 Apr 2 19:14 newtools.txt
imran@DevOps:~/linux-practices$ chmod 755 newtools.txt
imran@DevOps:~/linux-practices$ ls -l newtools.txt
-rwxr-xr-x 1 imran imran 612 Apr 2 19:14 newtools.txt
imran@DevOps:~/linux-practices$
```