OPERATING SYSTEM

ASSIGNMENT-2

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1. r/w/x permissions for the directory.

- Granting all permissions to a file "+rwx"

Prabhnoorsingh@ubuntu	$ editor assignment2.sh
Prabhnoorsingh@ubuntu	$ chmod +rwx assignment2.sh
Prabhnoorsingh@ubuntu	$ ./assignment2.sh
Prabhnoorsingh@ubuntu	$

- Allowing only read & write permissions "+rw"

Prabhnoorsingh@ubuntu	$ editor assi2.sh
Prabhnoorsingh@ubuntu	$ chmod +rw assi2.sh
	$ ./assi2.sh
	bash: ./assi2.sh: Permission denied
Prabhnoorsingh@ubuntu	$

- Restricting read permission "-r"

- Restricting write permission "-w"

2. touch command for modifying the access timings

```
Prabhnoorsingh@ubuntu   stat assign2.sh
  File: assign2.sh
  Size: 19              Blocks: 8           IO Block: 4096    regular file
Device: 803h/2051d      Inode: 1361869      Links: 1
Access: (0220/--w--w----)  Uid: ( 1000/vboxuser)   Gid: ( 1000/vboxuser)
Access: 2023-09-07 15:16:51.793306691 +0530
Modify: 2023-09-07 15:16:51.793306691 +0530
Change: 2023-09-07 15:17:02.121077377 +0530
 Birth: 2023-09-07 15:16:51.793306691 +0530
Prabhnoorsingh@ubuntu   touch -a assign2.sh
                        stat assign2.sh
  File: assign2.sh
  Size: 19              Blocks: 8           IO Block: 4096    regular file
Device: 803h/2051d      Inode: 1361869      Links: 1
Access: (0220/--w--w----)  Uid: ( 1000/vboxuser)   Gid: ( 1000/vboxuser)
Access: 2023-09-07 15:32:37.328764433 +0530
Modify: 2023-09-07 15:16:51.793306691 +0530
Change: 2023-09-07 15:32:37.328764433 +0530
 Birth: 2023-09-07 15:16:51.793306691 +0530
Prabhnoorsingh@ubuntu
```

3. find command

- Search for a File by Name:

```
Prabhnoorsingh@ubuntu    find assignment2.sh
assignment2.sh
Prabhnoorsingh@ubuntu  5 find asss2.sh
find:  asss2.sh : No such file or directory
Prabhnoorsingh@ubuntu
```

- Search for Files Matching a Pattern

```
Prabhnoorsingh@ubuntu    find *.sh
anant.sh
ass2.sh
assi2.sh
assign2.sh
assignment2.sh
Prabhnoorsingh@ubuntu
```

- Search for Files by Size

Prabhnoorsingh@ubuntu `find -size +1M`
```
./.cache/tracker3/files/http%3A%2F%2Ftracker.api.gnome.org%2Fontology%2Fv3%2Ftra
cker%23Audio.db
./.cache/tracker3/files/http%3A%2F%2Ftracker.api.gnome.org%2Fontology%2Fv3%2Ftra
cker%23FileSystem.db-wal
./.cache/tracker3/files/http%3A%2F%2Ftracker.api.gnome.org%2Fontology%2Fv3%2Ftra
cker%23Pictures.db
```

- Search for Empty Files or Directories:

Prabhnoorsingh@ubuntu `find -empty`
```
./.local/share/backgrounds
./.local/share/gnome-settings-daemon/input-sources-converted
./.local/share/icc
./.local/share/flatpak/db
./.local/share/evolution/memos/trash
./.local/share/evolution/mail/trash
```

4. umask command

Prabhnoorsingh@ubuntu `umask`
```
0002
```
Prabhnoorsingh@ubuntu `umask 022`
`umask`
```
0022
```
Prabhnoorsingh@ubuntu `(umask 027; ./assignment2.sh)`
```
Hello World
```

5. Hard link.

Prabhnoorsingh@ubuntu `$ editor assignment2.sh`
Prabhnoorsingh@ubuntu `$ chmod +rwx assignment2.sh`
`$ ./assignment2.sh`
```
Hello
My first hardlink creation
```
Prabhnoorsingh@ubuntu `$ ln assignment2.sh hlink.sh`
`$ ./hlink.sh`
```
Hello
My first hardlink creation
```
Prabhnoorsingh@ubuntu `$`

6. Symbolic links.

```
Prabhnoorsingh@ubuntu  $ editor assignment2.sh
Prabhnoorsingh@ubuntu  $ chmod +rwx assignment2.sh
                       $ ./assignment2.sh
Hello
My first symbolic link creation
Prabhnoorsingh@ubuntu  $ ln -s assignment2.sh slink.sh
                       $ ./slink.sh
Prabhnoorsingh@ubuntu
My first symbolic link creation
```

7. Directory and associated permissions.

- View Directory Permissions:

```
Prabhnoorsingh@ubuntu  :~$ mkdir assignment2
Prabhnoorsingh@ubuntu  ~$ cd assignment2
                       ~/assignment2$ editor assignment2.sh
Prabhnoorsingh@ubuntu  ~/assignment2$ chmod +rwx assignment2.sh
Prabhnoorsingh@ubuntu  ~/assignment2$ ./assignment2.sh
Hello World
Prabhnoorsingh@ubuntu  ~/assignment2$ cd ~
Prabhnoorsingh@ubuntu  ~$ ls -l assignment2
total 4
-rwxrwxr-x 1 vboxuser vboxuser 19 Sep  7 22:33 assignment2.sh
Prabhnoorsingh@ubuntu  :~$
```

- Modify Directory Permissions:

```
Prabhnoorsingh@ubuntu  ~$ chmod u+rwx assignment2
Prabhnoorsingh@ubuntu  ~$ chmod g+r assignment2
Prabhnoorsingh@ubuntu  ~$ chmod o+r assignment2
Prabhnoorsingh@ubuntu  ~$ chmod rwx assignment2
```

8. Modification and access times.

```
Prabhnoorsingh@ubuntu        ls -l assignment2
total 4
-rwxrwxr-x 1 vboxuser vboxuser 19 Sep  7 22:33 assignment2.sh
Prabhnoorsingh@ubuntu        stat assignment2
2
  Size: 4096          Blocks: 8          IO Block: 4096    directory
Device: 803h/2051d     Inode: 1461562    Links: 2
Access: (0775/drwxrwxr-x)  Uid: ( 1000/vboxuser)   Gid: ( 1000/vboxuser)
Access: 2023-09-07 22:42:24.533008114 +0530
Modify: 2023-09-07 22:33:29.888423171 +0530
Change: 2023-09-07 22:39:13.739633095 +0530
 Birth: 2023-09-07 22:32:30.637279721 +0530
Prabhnoorsingh@ubuntu        ls -lu assignment2

-rwxrwxr-x 1 vboxuser vboxuser 19 Sep  7 22:33 assignment2.sh
Prabhnoorsingh@ubuntu        ls -lt assignment2
total 4
-rwxrwxr-x 1 vboxuser vboxuser 19 Sep  7 22:33 assignment2.sh
Prabhnoorsingh@ubuntu
```

9. Locating files

```
find: '.sh': No such file or directory
vboxuser@Ubuntu:~$ find *.sh
anant.sh
ass2.sh
assi2.sh
assign2.sh
assignment2.sh
vboxuser@Ubuntu:~$
```

```
vboxuser@Ubuntu:~$ find assignment2.sh
assignment2.sh
vboxuser@Ubuntu:~$ find asss2.sh
find: 'asss2.sh': No such file or directory
vboxuser@Ubuntu:~$
```

```
vboxuser@Ubuntu:~$ find -size +1M
./.cache/mesa_shader_cache/index
./.cache/tracker3/files/http%3A%2F%2Ftracker.api.gnome.org%2Fontology%2Fv3%2Ftra
cker%23Audio.db
./.cache/tracker3/files/http%3A%2F%2Ftracker.api.gnome.org%2Fontology%2Fv3%2Ftra
cker%23FileSystem.db-wal
./.cache/tracker3/files/http%3A%2F%2Ftracker.api.gnome.org%2Fontology%2Fv3%2Ftra
cker%23Pictures.db
```

```
vboxuser@Ubuntu:~$ find -empty
./Documents
./.local/share/backgrounds
./.local/share/gnome-settings-daemon/input-sources-converted
./.local/share/icc
./.local/share/flatpak/db
./.local/share/evolution/memos/trash
./.local/share/evolution/mail/trash
```

10. expr – Computational and String handling

- Arithmetic Operations:

```
vboxuser@Ubuntu:~$ editor exprcode.sh
vboxuser@Ubuntu:~$ chmod +x exprcode.sh
vboxuser@Ubuntu:~$ ./exprcode.sh
8
vboxuser@Ubuntu:~$
```

```
  GNU nano 6.2                          exprcode.sh
result=$(expr 5 + 3)
echo $result
```

- Comparison:

```
vboxuser@Ubuntu:~$ editor exprcode.sh
vboxuser@Ubuntu:~$ chmod +x exprcode.sh
vboxuser@Ubuntu:~$ ./exprcode.sh
1
vboxuser@Ubuntu:~$
```

```
  GNU nano 6.2                          exprcode.sh
result=$(expr 5 \> 3)
echo $result
```

- String Length:

```
vboxuser@Ubuntu:~$ editor exprcode.sh
vboxuser@Ubuntu:~$ chmod +x exprcode.sh
vboxuser@Ubuntu:~$ ./exprcode.sh
11
vboxuser@Ubuntu:~$
```

```
  GNU nano 6.2                          exprcode.sh *
string="Hello World"
length=$(expr length "$string")
echo $length
```

- Substring Extraction:

```
vboxuser@Ubuntu:~$ editor exprcode.sh
vboxuser@Ubuntu:~$ chmod +x exprcode.sh
vboxuser@Ubuntu:~$ ./exprcode.sh
bcd
vboxuser@Ubuntu:~$
```

```
  GNU nano 6.2                        exprcode.sh *
string="abcdefg"
substring=$(expr substr "$string" 2 3)
echo $substring
```

- Conditional Expressions:

```
vboxuser@Ubuntu:~$ editor exprcode.sh
vboxuser@Ubuntu:~$ chmod +x exprcode.sh
vboxuser@Ubuntu:~$ ./exprcode.sh
5 is equal to 5
vboxuser@Ubuntu:~$
```

```
  GNU nano 6.2                        exprcode.sh *
result=$(expr 5 = 5)
if [ "$result" -eq 1 ]; then
    echo "5 is equal to 5"
fi
```