ASSIGNMENT -1

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VLSI Design Flow (Submitted to Dr. Sneh Saurabh)

Q1): - 1. Write UNIX commands to perform the following tasks. Also show example that proves that it is working as expected (the UNIX command should be run with your login).

a) determine whether you have permission to execute a file

```
aryan22154@edaserver3:~$ ls -lah
total 40K
drwxr-x---  4 aryan22154 aryan22154 4.0K Jan 25 13:50 .
drwxr-xr-x 73 root       root       4.0K Jan 25 10:44 ..
-rw-r--r--  1 aryan22154 aryan22154  220 Jan 24 12:17 .bash_logout
-rw-r--r--  1 aryan22154 aryan22154 3.7K Jan 24 12:17 .bashrc
drwx------  2 aryan22154 aryan22154 4.0K Jan 25 13:50 .cache
-rw-r--r--  1 aryan22154 aryan22154 8.8K Jan 24 12:17 examples.desktop
drwx------  3 aryan22154 aryan22154 4.0K Jan 25 13:50 .gnupg
-rw-r--r--  1 aryan22154 aryan22154  807 Jan 24 12:17 .profile
aryan22154@edaserver3:~$ cd ..
aryan22154@edaserver3:/home$
```

```
aryan22154@edaserver3:~$
aryan22154@edaserver3:~$ ls -l INV.lib
-rw-rw-r-- 1 aryan22154 aryan22154 63 Jan 25 21:59 INV.lib
aryan22154@edaserver3:~$
```

b) go to the parent directory

```
examples.desktop  f2.txt  my_assignment  readme.txt
aryan22154@edaserver3:~$ cd ~
aryan22154@edaserver3:~$ cd my_assignment
aryan22154@edaserver3:~/my_assignment$ cd task1
aryan22154@edaserver3:~/my_assignment/task1$ cd ~
```

```
aryan22154@edaserver3:~$ cd ~
aryan22154@edaserver3:~$
```

c) rename a file

```
aryan22154@edaserver3:~$ cat f1.txt
aryan22154@edaserver3:~$ cat > f1.txt
I love india , india is a great country.
why we are doing this
aryan22154@edaserver3:~$ cat f1.txt
I love india , india is a great country.
why we are doing this
aryan22154@edaserver3:~$ mv f1.txt f2.txt
aryan22154@edaserver3:~$ ls
examples.desktop  f2.txt  readme.txt
aryan22154@edaserver3:~$ cat f2.txt
I love india , india is a great country.
why we are doing this
```

d) name of the processes that are being run by a given user ID

```
aryan22154@edaserver3:~$ ps -u
USER       PID %CPU %MEM    VSZ   RSS TTY      STAT START   TIME COMMAND
aryan22+ 56320  0.0  0.0  22688  4840 pts/0    Ss   13:50   0:00 -bash
aryan22+ 56342  0.0  0.0  30220  4500 pts/0    T    13:51   0:00 tclsh
aryan22+ 56738  0.0  0.0   7616   888 pts/0    T    13:57   0:00 cat
aryan22+ 56764  0.0  0.0  39672  3656 pts/0    R+   14:00   0:00 ps -u
aryan22154@edaserver3:~$ ps -u aryan22154
  PID TTY          TIME CMD
56226 ?        00:00:00 systemd
56227 ?        00:00:00 (sd-pam)
56319 ?        00:00:00 sshd
56320 pts/0    00:00:00 bash
56342 pts/0    00:00:00 tclsh
56738 pts/0    00:00:00 cat
56765 pts/0    00:00:00 ps
aryan22154@edaserver3:~$
```

e) the name of the file that was most recently created

```
aryan22154@edaserver3:~$ pwd
/home/aryan22154
aryan22154@edaserver3:~$ find /home/aryan22154 -type f -printf "%t - %p\n" | sort -n | tail -1
Wed Jan 25 13:59:00.5906367410 2023 - /home/aryan22154/f2.txt
aryan22154@edaserver3:~$
```

f) know the absolute path of the gcc compiler that is available on your system

```
aryan22154@edaserver3:~$ which gcc
/usr/bin/gcc
aryan22154@edaserver3:~$ realpath gcc
/home/aryan22154/gcc
aryan22154@edaserver3:~$ ls
```

g) create a file named “VDF.txt” at the following location:

$HOME/my_assignment/task1/VDF.txt

where $HOME is your home directory

```
aryan22154@edaserver3:~$ ls
examples.desktop  f2.txt  readme.txt
aryan22154@edaserver3:~$ mkdir my_assignment
aryan22154@edaserver3:~$ ls
examples.desktop  f2.txt  my_assignment  readme.txt
aryan22154@edaserver3:~$ cd my_assignment
aryan22154@edaserver3:~/my_assignment$ mkdir task1
aryan22154@edaserver3:~/my_assignment$ ls
task1
aryan22154@edaserver3:~/my_assignment$ cd task1
aryan22154@edaserver3:~/my_assignment/task1$ touch VDF.txt
aryan22154@edaserver3:~/my_assignment/task1$ ls
VDF.txt
```

h) check whether you typed the command “cat” previously in your current login shell.

```
aryan22154@edaserver3:~$ history | grep cat
   11  cat f1.txt
   14  cat > readme.txt
   15  cat f1.txt
   16  cat > f1.txt
   17  cat f1.txt
   20  cat f2.txt
   59  history | grep cat
   92  cat >>f3.txt
   97  cat VDF.txt
  100  cat SYNTHESIS.txt
  103  cat INV.lib
  111  cat >> a4.tcl
  113  cat a4.tcl
  117  cat >> a4.tcl
  118  cat a4.tcl
  124  cat >> a4.tcl
  126  cat a4.tcl
  130  cat >> a6.tcl
  134  cat >> INV.lib
  135  cat INV.lib
  136  cat >> INV.lib
  137  cat INV.lib
  140  cat >> f.lib
  147  cat >>f.lib
  173  history | grep cat
aryan22154@edaserver3:~$
```

i) see the last two lines of a text file in the terminal

```
aryan22154@edaserver3:~$ tail -2 a4.tcl
}
puts $var
aryan22154@edaserver3:~$
```

j) create an archive file for a given directory

```
aryan22154@edaserver3:~$ pwd
/home/aryan22154
aryan22154@edaserver3:~$ tar -czvf file.tar.gz home/aryan22154/my_assignment/task1
tar: home/aryan22154/my_assignment/task1: Cannot stat: No such file or directory
tar: Exiting with failure status due to previous errors
aryan22154@edaserver3:~$ ls
examples.desktop  f2.txt  file.tar.gz  my_assignment  readme.txt
aryan22154@edaserver3:~$ cd my_assignment
```

k) know the type of a file (whether it an ASCII text file, PDF file, archive file, etc.)

```
aryan22154@edaserver3:~$ file a4.tcl
a4.tcl: ASCII text
aryan22154@edaserver3:~$
```

l) know the amount of disk space available on the filesystem in human readable format.

```
aryan22154@edaserver3:~$ df -H
Filesystem      Size  Used Avail Use% Mounted on
udev            271G     0  271G   0% /dev
tmpfs            55G  3.1M   55G   1% /run
/dev/sda2        12T   21G   11T   1% /
tmpfs           271G     0  271G   0% /dev/shm
tmpfs           5.3M     0  5.3M   0% /run/lock
tmpfs           271G     0  271G   0% /sys/fs/cgroup
/dev/sda1       536M  4.6M  532M   1% /boot/efi
tmpfs            55G   29k   55G   1% /run/user/126
tmpfs            55G     0   55G   0% /run/user/1025
aryan22154@edaserver3:~$
```

2. Write a UNIX command to find the word “INV” in all the files with “.lib” extension in the current directory and its subdirectories [You need to use the UNIX pipe to achieve this]. Also show example that proves that it is working as expected (the UNIX command should be run with your login).

```
aryan22154@edaserver3:~$ find . -name "*.lib" -type f -print0 | xargs -0 grep -rnw '.' -e "INV"
./INV.lib:1:INV IS WHAT
./INV.lib:2:I AM INV
./INV.lib:3:INV CAN BE WRITTEN IN ANY FORM
./INV.lib:5:INV
./my_assignment/f.lib:1:INV IS GREAT
./my_assignment/f.lib:2:INV CAN BE WRITTEN IN ANY FORM
./INV.lib:1:INV IS WHAT
./INV.lib:2:I AM INV
./INV.lib:3:INV CAN BE WRITTEN IN ANY FORM
./INV.lib:5:INV
./my_assignment/f.lib:1:INV IS GREAT
./my_assignment/f.lib:2:INV CAN BE WRITTEN IN ANY FORM
aryan22154@edaserver3:~$ find . -name "*.lib" -type f -print0 | xargs -0 grep -rnw '.' -e "INV"
```

3. In a file named VDF, word “RTL” is appearing many times? Write a one-line UNIX command to append all the lines containing “RTL” in the file VDF to a file named SYNTHESIS. Also show example that proves that it is working as expected (the UNIX command should be run with your login).

```
aryan22154@edaserver3:~$ touch f3.txt
aryan22154@edaserver3:~$ cat >>f3.txt
RTL
RTL IS GREAT
I LIKE MY COUNTRY
IS IT ROOM NO 21
CAN I COME THERE
RTL
RTL BASS
RTL BASH
aryan22154@edaserver3:~$ LS

Command 'LS' not found, but can be installed with:

apt install sl
Please ask your administrator.

aryan22154@edaserver3:~$ ls
examples.desktop  f2.txt  f3.txt  file.tar.gz  INV.lib  my_assignment  readme.txt
aryan22154@edaserver3:~$ mv f3.txt VDF.txt
aryan22154@edaserver3:~$ ls
examples.desktop  f2.txt  file.tar.gz  INV.lib  my_assignment  readme.txt  VDF.txt
aryan22154@edaserver3:~$ cat VDF.txt
RTL
RTL IS GREAT
I LIKE MY COUNTRY
IS IT ROOM NO 21
CAN I COME THERE
RTL
RTL BASS
RTL BASH
aryan22154@edaserver3:~$
```

```
aryan22154@edaserver3:~$ grep "RTL" VDF.txt | tee -a SYNTHESIS.txt
RTL
RTL IS GREAT
RTL
RTL BASS
RTL BASH
aryan22154@edaserver3:~$ ls
examples.desktop  f2.txt  file.tar.gz  INV.lib  my_assignment  readme.txt  SYNTHESIS.txt  VDF.txt
aryan22154@edaserver3:~$ cat SYNTHESIS.txt
RTL
RTL IS GREAT
RTL
RTL BASS
RTL BASH
aryan22154@edaserver3:~$
```

4. Write a TCL script that takes a name in small letter as input and prints it with the first letter in each word in capital (example: input is “ravi kumar sharma”, output is “Ravi Kumar Sharma”)? Show the output of the program in the report [the program should be run in UNIX and it should show your login].

```
aryan22154@edaserver3:~$ ls
examples.desktop  f2.txt  file.tar.gz  INV.lib  my_assignment  readme.txt  SYNTHESIS.txt  VDF.txt
aryan22154@edaserver3:~$ touch a4.tcl
aryan22154@edaserver3:~$ ls
a4.tcl  examples.desktop  f2.txt  file.tar.gz  INV.lib  my_assignment  readme.txt  SYNTHESIS.txt  VDF.txt
aryan22154@edaserver3:~$ cat >> a4.tcl
gets stdin str
set var ""
foreach value $str {
append var [string totitle $value]
append var " "
}
puts $var
aryan22154@edaserver3:~$ ls
a4.tcl  examples.desktop  f2.txt  file.tar.gz  INV.lib  my_assignment  readme.txt  SYNTHESIS.txt  VDF.txt
aryan22154@edaserver3:~$ cat a4.tcl
gets stdin str
set var ""
foreach value $str {
append var [string totitle $value]
append var " "
}
puts $var
aryan22154@edaserver3:~$ tclsh a4.tcl
aryan gupta krishna
Aryan Gupta Krishna
aryan22154@edaserver3:~$
```

5. Write a TCL script to accomplish what is done in Q-2 “Write a UNIX ...”. Do not simply execute the shell script. Show the output of the program in the report [the program should be run in UNIX and it should show your login].

```
aryan22154@edaserver3:~$ touch a5.tcl
aryan22154@edaserver3:~$ cat >> a5.tcl
set dir "."
set files [exec find . -name "*.lib"]

foreach file $files {
    set fd [open $file]
    set data [read $fd]
    close $fd
    if {[regexp "INV" $data]} {
        puts "Found INV in $file"
    }
}aryan22154@edaserver3:~$ ls
a4.tcl  a5.tcl  a6.tcl  examples.desktop  f2.txt  file.tar.gz  INV.lib  my_assignment  readme.txt  SYNTHESIS.txt  VDF.txt
aryan22154@edaserver3:~$ tclsh a5.tcl
Found INV in ./INV.lib
Found INV in ./my_assignment/f.lib
aryan22154@edaserver3:~$
```

6. Write a TCL script to print multiplication table from 2 to 10 [Format should be as taught in the primary schools]. Show the output of the program in the report [the program should be run in UNIX and it should show your login].

```
aryan22154@edaserver3:~$ touch a6.tcl
aryan22154@edaserver3:~$ ls
a4.tcl  a6.tcl  examples.desktop  f2.txt  file.tar.gz  INV.lib  my_assignment  readme.txt  SYNTHESIS.txt  VDF.txt
aryan22154@edaserver3:~$ cat >> a6.tcl
for { set a 2}  {$a < 11} {incr a} {
   for { set b 1}  {$b < 11} {incr b} {
   puts "$a X $b :[expr $a*$b]"
  }
}aryan22154@edaserver3:~$ ls
a4.tcl  a6.tcl  examples.desktop  f2.txt  file.tar.gz  INV.lib  my_assignment  readme.txt  SYNTHESIS.txt  VDF.txt
aryan22154@edaserver3:~$ tclsh a6.tcl
2 X 1 :2
2 X 2 :4
2 X 3 :6
2 X 4 :8
2 X 5 :10
2 X 6 :12
2 X 7 :14
2 X 8 :16
```

```
}aryan22154@edaserver3:~$ ls
a4.tcl  a6.tcl  examples.desktop  f2.txt  file.tar.gz  INV.lib  my_assignment  readme.txt  SYNTHESIS.txt  VDF.txt
aryan22154@edaserver3:~$ tclsh a6.tcl
2 X 1 :2
2 X 2 :4
2 X 3 :6
2 X 4 :8
2 X 5 :10
2 X 6 :12
2 X 7 :14
2 X 8 :16
2 X 9 :18
2 X 10 :20
3 X 1 :3
3 X 2 :6
3 X 3 :9
3 X 4 :12
3 X 5 :15
3 X 6 :18
3 X 7 :21
3 X 8 :24
3 X 9 :27
3 X 10 :30
4 X 1 :4
4 X 2 :8
4 X 3 :12
4 X 4 :16
4 X 5 :20
4 X 6 :24
4 X 7 :28
4 X 8 :32
4 X 9 :36
4 X 10 :40
5 X 1 :5
5 X 2 :10
```

```
7 X 5 :35
7 X 6 :42
7 X 7 :49
7 X 8 :56
7 X 9 :63
7 X 10 :70
8 X 1 :8
8 X 2 :16
8 X 3 :24
8 X 4 :32
8 X 5 :40
8 X 6 :48
8 X 7 :56
8 X 8 :64
8 X 9 :72
8 X 10 :80
9 X 1 :9
9 X 2 :18
9 X 3 :27
9 X 4 :36
9 X 5 :45
9 X 6 :54
9 X 7 :63
9 X 8 :72
9 X 9 :81
9 X 10 :90
10 X 1 :10
10 X 2 :20
10 X 3 :30
10 X 4 :40
10 X 5 :50
10 X 6 :60
10 X 7 :70
10 X 8 :80
10 X 9 :90
10 X 10 :100
aryan22154@edaserver3:~$
```