LINUX AND SHELL PROGRAMMING - LAB

(Course Code: 22UPCSC1C04)

A laboratory record submitted to Periyar University, Salem In partial fulfillment of the requirements for the degree of

MASTER OF COMPUTER APPLICATIONS

By

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(NOVEMBER - 2022)

CERTIFICATE

This is to certify that the Programming Laboratory entitled "L	INUX
AND SHELL PROGRAMMING - LAB (22UPCSC1C04)" is a bo	onafide
record work done by Mr. / Ms	
Register No: in partial fulfillment of	of the
requirements for the degree of Master of Computer Applications,	
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S.NO	DATE	TITLE OF THE PROGRAM	PAGE NO	SIGNATURE
1.		CALCULATE THE NUMBER OF DAYS BETWEEN TWO DATES		
2.		CHECK SYSTEM ON LOCAL NETWORK USING CONTROLS STRUCTURE WITH USER INPUT		
3.		CHECK SYSTEM ON LOCAL NETWORK USING CONTROLS STRUCTURE WITH FILE INPUT		
4.		THE SCRIPT CONTROL COMMAND		
5.		SHELL SCRIPT FUNCTION		
6.		REGULAR EXPRESSIONS		
7.		SED AND GAWK COMMANDS		
8.		DEMOSTRATE FILE BACKUP PROCESS THROUGH CREATING A DAILY ARCHIEVE LOCATIONS		
9.		CREATE A FOLLOWING GUI TOOLS (A) CREATING TEXT MENUS. (B) BUILDING TEXT WINDOW WIDGETS		
10.		CONNECT A POSTGRESQL DATABASE AND PERFORMING CRUD OPERATIONS		

```
echo "Enter the date 1: " read d1 echo "Enter the date 2: " read d2 days=\$(( (\$(date -d \$d2 + \%s) - \$(date -d \$d1 + \%s)) / 86400))) echo "The different between $d1 and $d2 is $days day"
```

Enter the date 1: 2015-03-05 Enter the date 2: 2015-03-11 The different between 2015-03-05 and 2015-03-11 is 6 day

```
while getopts t: opt
     do
     case "$opt" in t)
     if [ $OPTARG = "IPv4" ]
     then
           pingcommand=$(which ping)
     elif [ $OPTARG = "IPv6" ]
     then
           pingcommand=$(which ping6)
     fi;;
     *) echo "Usage: -t IPv4 or -t IPv6"
     echo "Exiting script..."
     exit;;
     esac
     shift $(( $OPTIND - 1 ))
     if [ $# -eq 0 ]
     then
           echo "\nIP Address(es) parameters are missing."
           echo "\nExiting script..."
           exit
     fi
     for ipaddress in "$@"
     do
           echo "\nChecking system at $ipaddress..."
           echo
           $pingcommand -q -c 3 $ipaddress
           echo
     done
exit
done
```

```
elanchezhian@elanchezhian-virtual-machine:~/Desktop/Linux$ sh po2.sh -t IPv4 192.168.240.1
Checking system at 192.168.240.1...
PING 192.168.240.1 (192.168.240.1) 56(84) bytes of data.
--- 192.168.240.1 ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 2005ms
rtt min/avg/max/mdev = 1.744/2.015/2.421/0.292 ms
```

```
echo "\nPlease enter the file name with an absolute directory
reference...\n"
choice=0
while [$choice -eq 0]
do
     read -p "Enter name of file:" filename
     if [-z $filename]
     then
           quitanswer=""
     else
           choice=1
     fi
done
if [ -s $filename ] && [ -r $filename ]
then
     echo "$filename is a file, is readable, and is not empty."
     echo
     cat $filename | while read line
     do
     ipaddress=$line
     read line
     iptype=$line
     if [ $iptype = "IPv4" ]
     then
           pingcommand=$(which ping)
     else
           pingcommand=$(which ping6)
     fi
echo "Checking system at $ipaddress..."
$pingcommand -q -c 3 $ipaddress
done
```

echo "\nFinished processing the file. All systems checked." else echo "\n\$filename is either not a file, is empty, or is not readable by you. Exiting script" fi exit

> P03.txt file

```
Please enter the file name with an absolute directory reference...
Enter name of file:p03.txt
p03.txt is a file, is readable, and is not empty.
Checking system at 192.168.1.102...
PING 192.168.1.102 (192.168.1.102) 56(84) bytes of data.
--- 192.168.1.102 ping statistics ---
3 packets transmitted, 0 received, 100% packet loss, time 2035ms
Checking system at 192.168.1.103...
PING 192.168.1.103 (192.168.1.103) 56(84) bytes of data.
--- 192.168.1.103 ping statistics ---
3 packets transmitted, 0 received, 100% packet loss, time 2055ms
Checking system at 192.168.1.104...
PING 192.168.1.104 (192.168.1.104) 56(84) bytes of data.
--- 192.168.1.104 ping statistics ---
3 packets transmitted, 0 received, 100% packet loss, time 2054ms
Finished processing the file. All systems checked.
```

```
#SIGINT
trap "echo 'sorry! I have trapped ctrl+c'" INT
echo "This is a test script"
count=1
while [$count -le 5]
do
     echo "Loop #$count"
     sleep 2
     count=$(( $count+1 ))
done
echo "This is the end of the test script"
#SIGQUIT
trap "echo 'sorry! I have trapped ctrl+\'" QUIT
echo "This is Quit process"
count=1
while [$count -le 5]
do
     echo "Loop #$count"
     sleep 2
     count=$(( $count+1 ))
done
echo "Quit the Process"
```

```
#SIGSTOP
trap STOP
echo "This is Stop process"
count=1
while [ $count -le 5 ]
do
        echo "Loop #$count"
        sleep 2
        count=$(( $count+1 ))
done
echo "Stop the Process"
```

```
This is a test script
Loop #1
Loop #2
Loop #3
^C'sorry! I have trapped ctrl+c'
Loop #4
Loop #5
This is the end of the test script
This is Quit process
Loop #1
Loop #2
^\Quit (core dumped)
'sorry! I have trapped ctrl+'
Loop #3
Loop #4
Loop #5
Ouit the Process
This is Stop process
Loop #1
Loop #2
^Z
[1]+ Stopped
                            sh <u>p</u>06.sh
```

```
read -p "Enter the Fibonacci number: " n
fib(){
        i=0
        f1=0
        f2=1
        echo "The Fibonacci Series for $n is:"
        while [ $i -le $n ]
        do
            echo "$f1"
            temp=$(($f1+$f2))
            f1=$f2
            f2=$temp
            i=$((i+1))
            done
}
```

```
Enter the Fibonacci number: 5
The Fibonacci Series for 5 is:
0
1
2
3
5
```

```
fruits_file=$(cat fruit.txt | grep App.e)
echo "\n1. Using '.' to find out all the original word wheres given
word is 'App.e'"
echo "Output:\n$fruits_file"
fruits_file=$(cat fruit.txt | grep Ap*le)
echo "\n2. Using '*' to find out all the fruits name of 'Ap' one after
another in it"
echo "Output:\n$fruits file"
fruits_file=$(cat fruit.txt | grep ^B)
echo "\n3. Using '^' to find out all the words that start with the letter
'B'''
echo "output:\n$fruits file"
fruits_file=$(cat fruit.txt | grep "\")
echo "\n4. Using '\' to find out all the fruits name that has single space
in their full name"
echo "Output:\n$fruits file"
fruits_file=$(cat fruit.txt | grep -E Ch?)
echo "\n5. Using '?' to find out all the fruits name that has 'Ch' in it"
echo "Output:\n$fruits_file"
fruits_file=$(cat fruit.txt | grep -E "(fruit)")
echo "\n6. Using '()' to find out all the fruits name that has word
'fruit' in it"
echo "Output:\n$fruits_file"
```

> fruit.txt file

```
1. Using '.' to find out all the original word wheres given word is 'App.e'
Output:
Apple
custard Apple
2. Using '*' to find out all the fruits name of 'Ap' one after another in it
Output:
Apple
custard Apple

    Using '^' to find out all the words that start with the letter 'B'

output:
Banana
Bil Berry
Black Berry
4. Using '\' to find out all the fruits name that has single space in their full name
Output:
Bil Berry
Black Berry
custard Apple
Chico Fruit
Goji Berry
Juniper Berry
Passuib Fruit
Star Fruit
Salal Berry
Ugli Fruit
5. Using '?' to find out all the fruits name that has 'Ch' in it
Output:
Currant
Cherimoya
Chico Fruit
6. Using '()' to find out all the fruits name that has word 'fruit' in it
Output:
Drangonfruit
```

SOURCE CODE (sed command):

```
echo "1.Replacing or substituting string:"
echo "-----"
sed 's/unix/linux/' sed.txt
echo
echo "2. Replacing the nth occurrence of a pattern in a line:"
echo "-----"
sed 's/unix/linux/2' sed.txt
echo
echo "3. Replacing all the occurrence of the pattern in a line:"
echo "-----"
sed 's/unix/linux/g' sed.txt
echo
echo "4.Replacing from nth occurrence to all occurrences in a line:"
echo "-----"
sed 's/unix/linux/3g' sed.txt
echo
echo "5.Replacing string on a specific line number:"
echo "-----"
sed '3 s/unix/linux/' sed.txt
echo
echo "6.Duplicating the replaced line with /p flag:"
echo "-----"
sed 's/unix/linux/p' sed.txt
echo
echo "7. Printing only the replaced lines:"
echo "-----"
sed -n 's/unix/linux/p' sed.txt
echo
echo "8. Replacing string on a range of lines:"
echo "-----"
sed '2,$ s/unix/linux/' sed.txt
echo
```

```
echo "9.Deleting lines from a particular file:" echo "-----" sed '2,4d' sed.txt
```

SOURCE CODE (gawk command):

```
gawk 'BEGIN { print "Enter the mark:" getline mark < "-" if (mark >= 90) print "A+" else if( mark >= 80) print "A" else if( mark >= 70) print "B+" else if( mark >= 60) print "B" else if( mark >= 50) print "C+" else print "Fail" }'
```

OUTPUT (sed command):

> Sed.txt file:

```
Open 

I unix is great os. unix is opensource. unix is free os.

learn operating system.

unix linux which one you choose.

unix is easy to learn.unix is a multiuser os.Learn unix .unix is a powerful.
```

```
1.Replacing or substituting string:
linux is great os. unix is opensource. unix is free os.
learn operating system.
linux linux which one you choose.
linux is easy to learn.unix is a multiuser os.Learn unix .unix is a powerful.
2.Replacing the nth occurrence of a pattern in a line:
unix is great os. linux is opensource. unix is free os.
learn operating system.
unix linux which one you choose.
unix is easy to learn linux is a multiuser os. Learn unix .unix is a powerful.
3.Replacing all the occurrence of the pattern in a line:
linux is great os. linux is opensource. linux is free os.
learn operating system.
linux linux which one you choose.
linux is easy to learn.linux is a multiuser os.Learn linux .linux is a powerful.
4.Replacing from nth occurrence to all occurrences in a line:
unix is great os. unix is opensource. linux is free os.
learn operating system.
unix linux which one you choose.
unix is easy to learn.unix is a multiuser os.Learn linux .linux is a powerful.
5.Replacing string on a specific line number:
unix is great os. unix is opensource. unix is free os.
learn operating system.
linux linux which one you choose.
unix is easy to learn unix is a multiuser os. Learn unix .unix is a powerful.
6.Duplicating the replaced line with /p flag:
linux is great os. unix is opensource. unix is free os.
linux is great os. unix is opensource. unix is free os.
learn operating system.
linux linux which one you choose.
linux linux which one you choose.
linux is easy to learn.unix is a multiuser os.Learn unix .unix is a powerful. linux is easy to learn.unix is a multiuser os.Learn unix .unix is a powerful.
7.Printing only the replaced lines:
linux is great os. unix is opensource. unix is free os.
linux linux which one you choose.
linux is easy to learn.unix is a multiuser os.Learn unix .unix is a powerful.
8.Replacing string on a range of lines:
unix is great os. unix is opensource. unix is free os.
learn operating system.
linux linux which one you choose.
linux is easy to learn.unix is a multiuser os.Learn unix .unix is a powerful.
9.Deleting lines from a particular file:
unix is great os. unix is opensource. unix is free os.
```

OUTPUT (gawk command):

Enter the mark:

90 A+

```
DATE=\$(date + \%y\%m\%d)
read -p "Give name to the archive file:" file
FILE=$file$DATE.tgz
read -p "Enter the Filename: " SOURCE
read -p "Enter the Destination path: " des
DESTINATION=$des/$FILE
if [ -f $SOURCE ]
then
     echo
else
     echo "$SOURCE doesn't exist, BACKUP INCOMPLETE"
     exit
fi
FILE NO=1
exec < $SOURCE
read FILE NAME
while [ $? -eq 0 ]
do
     if [ -f $FILE NAME -o -d $FILE NAME ]
     then
         FILE_LIST="$FILE_LIST $FILE_NAME"
     else
          echo "$FILE NAME doesn't exit, thus it is not included"
         echo "BACKUP is still on process"
          echo
     fi
FILE_NO=$[$FILE_NO+1]
read FILE NAME
done
echo "Starting Archive..."
tar -czf $DESTINATION $FILE LIST 2>/dev/null
echo "Archive COMPLETED at $DESTINATION"
exit
```

> Creating the file to Store the backup file:

elanchezhian@elanchezhian-virtual-machine:~/Desktop/Linux\$ gedit backup.txt

➤ Backup Files:



> Running the Script to Backup the Files

```
Give name to the archive file:ElanBackup
Enter the Filename: backup.txt
Enter the Destination path: /home/elanchezhian/Desktop
Starting Archive...
Archive COMPLETED at /home/elanchezhian/Desktop/ElanBackup221030.tgz
```

➤ Archive file (ElanBakup221030.tgz):



Listing of the Archive contents from a Terminal Prompt Type:

```
elanchezhian@elanchezhian-virtual-machine:~/Desktop/Linux$ tar -tzvf /home/elanchezhian/Desktop/ElanBackup221030.tgz drwxrwxr-x elanchezhian/elanchezhian 0 2022-10-30 09:25 home/elanchezhian/Desktop/Linux/Backup/-rw-rw-r-- elanchezhian/elanchezhian 239 2022-10-29 12:06 home/elanchezhian/Desktop/Linux/Backup/sample1.sh-rw-rw-r-- elanchezhian/elanchezhian 166 2022-10-28 22:06 home/elanchezhian/Desktop/Linux/fruit.txt-rw-rw-r-- elanchezhian/elanchezhian 133 2022-10-28 22:21 home/elanchezhian/Desktop/Linux/sed.txt
```

A) Creating Text Menus

```
diskspace() {
                clear
                df -k
diskspace
whoseon() {
                clear
                who
whoseon
memusage() {
                clear
                cat /proc/meminfo
memusage
menu(){
                clear
                echo
                echo "\t \t \t \ Admin Menu\n "
                echo "\t\t1. Display disk space"
                echo "\t\t2. Display logged on users"
                echo "\t\t3. Display memory usage"
                echo "\t\t0. Exit program\n\n"
                echo
                echo "\t\tEnter option: "
                read option
                echo
menu
```

```
while [ True ]
do
     menu
     case $option in
     0)
     break;;
     1)
     diskspace;;
     2)
     whoseon;;
     3)
     memusage;;
     *)
     clear
     echo "Sorry, wrong selection";;
     esac
echo "\n\n\t\tHit any key to continue"
read line
done
clear
```

B) Text window widgets

```
temp=$(mktemp -t test.XXXXXXX)
temp2=$(mktemp -t test2.XXXXXXX)
function diskspace {
    clear
    df -k> $temp
    dialog --textbox $temp 20 50
}
function whoseon {
    clear
    who> $temp
    dialog --textbox $temp 20 50
```

```
function memusage {
     clear
     cat /proc/meminfo> $temp
      dialog --textbox $temp 20 50
while [1]
do
     clear
     dialog --menu "Sys Admin Menu" 20 30 10 1 "Display
     diskspace" 2 "Display users" 3 "Display memory usage"
     2> $temp2
     if [ $? -eq 1 ]
      then
           break
      fi
selection=$(cat $temp2)
case $selection in
      1) diskspace;;
      2) whoseon;;
      3) memusage;;
      *) dialog --msgbox "Sorry, invalid selection" 10 30
esac
done
clear
rm -f $temp 2> /dev/null
rm -f $temp2 2> /dev/null
```

A) Text Menus

```
Sys Admin Menu

1. Display disk space
2. Display logged on users
3. Display memory usage
0. Exit program

Enter option:
```

1. Displaying Disk Space

```
Enter option:
Filesystem
              1K-blocks
                           Used Available Use% Mounted on
tmpfs
                           1820
                                   197004
                                          1% /run
                 198824
               91789000 14707824 72372620 17% /
/dev/sda3
tmpfs
                 994120
                           0
                                   994120 0% /dev/shm
                                     5116 1% /run/lock
tmpfs
                   5120
                             4
                                   518888 2% /boot/efi
/dev/sda2
                 524252
                           5364
tmpfs
                198824
                           4728 194096 3% /run/user/1000
/dev/sr0
                129778 129778
                                        0 100% /media/elanchezhian/CDROM
/dev/sr1
                3737140 3737140
                                        0 100% /media/elanchezhian/Ubuntu 22.04.1 LTS amd64
/dev/fd0
                   1424
                                     1415
                                            1% /media/floppy0
                      Hit any key to continue
```

2. Displaying Logged Users

```
elanchezhian tty2 2022-10-29 09:05 (tty2)

Hit any key to continue
```

3. Displaying Memory Usage

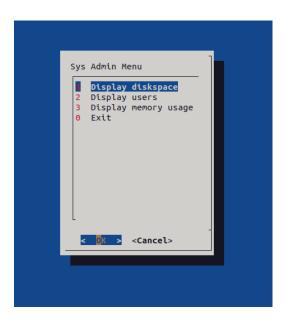
```
1988240 kB
129276 kB
706512 kB
33924 kB
   emFree:
emAvailable:
 Buffers:
                                                  642028 kB
19632 kB
506536 kB
 Cached:
SwapCached:
 Active:
Active:
Inactive:
Active(anon):
Inactive(anon):
Active(file):
Inactive(file):
Unevictable:
                                                 778100 kB
111568 kB
509876 kB
394968 kB
268224 kB
                                               268224 kB
16 kB
16 kB
6191100 kB
5980936 kB
0 kB
0 kB
 Mlocked:
SwapTotal:
SwapFree:
Dirty:
Writeback:
                                                 599248 kB
175428 kB
17116 kB
90708 kB
180548 kB
90708 kB
   apped:
  (Reclaimable:
Slab:
SReclaimable:
SUnreclaim:

KernelStack:

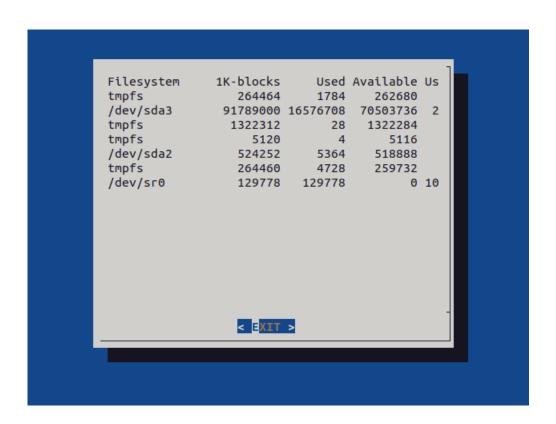
PageTables:

NFS_Unstable:
                                                    89840 kB
10984 kB
16364 kB
                                                              0 kB
0 kB
0 kB
 Bounce:
WritebackTmp:
 CommitLimit:
Committed_AS:
VmallocTotal:
VmallocUsed:
                                            7185220 kB
4025280 kB
34359738367 kB
                                                 62544 kB
0 kB
112128 kB
  mallocChunk:
   ercpu:
                                                              0 kB
0 kB
0 kB
  lardwareCorrupted:
 narowarecorrupted
AnonHugePages:
ShmemHugePages:
ShmemPmdMapped:
FilePmdMapped:
FilePmdMapped:
HugePages_Frae:
                                                                0 kB
0 kB
0 kB
 HugePages_Free:
HugePages_Rsvd:
HugePages_Surp:
HugePagesize:
Hugetlb:
                                                       2048 kB
0 kB
DirectMap4k:
DirectMap2M:
DirectMap1G:
                                               280448 kB
1816576 kB
0 kB
                                                                   Hit any key to continue
```

B) Text Window Widgets



1. Displaying Disk Space:



2. Displaying Logged Users:



3. Displaying Memory Usage

```
MemTotal:
                             2644624 kB
                             210904 kB
MemFree:
MemFree: 210904 kB
MemAvailable: 1269612 kB
Buffers: 54428 kB
Cached: 1157524 kB
SwapCached: 0 kB
Active: 515600 kB
Inactive: 1273644 kB
Active(anon): 5224 kB
Inactive(anon): 633234 kB
Inactive(anon): 633224 kB
Active(file): 510376 kB Inactive(file): 640420 kB
Unevictable:
                                       0 kB
                                       0 kB
Mlocked:
SwapTotal: 6191100 kB
SwapFree:
                             6191100 kB
      1(+)
                                                                   31%
                               < EXIT >
```

SOURCE CODEAND OUTPUTS:

➤ To view the list of databases by using \1 command:

```
elanchezhian@elanchezhian-virtual-machine:~$ sudo -i -u postgres
[sudo] password for elanchezhian:
postgres@elanchezhian-virtual-machine:~$ psql
psql (14.5 (Ubuntu 14.5-0ubuntu0.2<u>2.04.1)</u>)
Type "help" for help.
postgres=# \l
                             List of databases
                      | Encoding | Collate | Ctype | Access privileges
  Name
           | Owner
                                              en_IN
                        UTF8
                                    en IN
postgres
             postgres
                                    en IN
template0
             postgres
                        UTF8
                                              en_IN |
                                                      =c/postgres
                                                      postgres=CTc/postgres
template1
             postgres
                        UTF8
                                    en_IN
                                              en IN
                                                      =c/postgres
                                                      postgres=CTc/postgres
(3 rows)
```

> Creating Database:

➤ Listing the Database and Checking Database Which Created by User:

```
postgres=# \l
                              List of databases
                         | Encoding | Collate | Ctype |
                                                           Access privileges
     Name
              Owner
 bank details | postgres |
                           UTF8
                                      en IN
                                                 en_IN
 postgres
                postgres
                           UTF8
                                      en_IN
                                                 en_IN
 template0
                postgres
                           UTF8
                                      en_IN
                                                 en_IN |
                                                         =c/postgres
                                                         postgres=CTc/postgres
 template1
                postgres
                           UTF8
                                      en_IN
                                                 en_IN
                                                         =c/postgres
                                                         postgres=CTc/postgres
(4 rows)
```

Changing Path to the Created Database(bank_details):

```
postgres=# \c bank_details;
You are now connected to database "bank_details" as user "postgres".
```

> Creating Table:

```
bank_details=# CREATE TABLE BankDetails(acc_no integer, name text, balance numeric, acc_type text);
CREATE TABLE
```

➤ Inserting Values to Table:

➤ Inserting Multiple Values to Table:

```
bank_details=# INSERT INTO BankDetails VALUES(50707,'Hariharan',500.00,'Savings'),(50708,'Lachu',5000.00,'Current'),(50709,'Sanjai',800 0.00,'Current'),(50710,'Mahadevan',7000.00,'Savings');
INSERT 0 4
bank_details=# SELECT * FROM BankDetails;
acc_no | name | balance | acc_type

50706 | Elanchezhian | 1000.00 | Savings
50707 | Hariharan | 500.00 | Savings
50708 | Lachu | 5000.00 | Current
50709 | Sanjai | 8000.00 | Current
50710 | Mahadevan | 7000.00 | Savings
(5 rows)
```

> Updating the Colum in Table:

```
bank details=# UPDATE BankDetails SET balance=3000.00 WHERE balance=500.00;
UPDATE 1
bank details=# SELECT * FROM BankDetails;
 acc no
              name
                       | balance | acc type
  50706 | Elanchezhian | 1000.00 | Savings
                         5000.00 | Current
 50708 | Lachu
 50709
        | Sanjai
                       | 8000.00 | Current
  50710 | Mahadevan
                       | 7000.00 | Savings
 50707 | Hariharan
                       | 3000.00 | Savings
(5 rows)
```

➤ Deleting the Colum in Table:

➤ Deleting the Table:

```
bank_details=# DROP TABLE BankDetails;
DROP TABLE
```

➤ Checking the Table if Exist or Not:

➤ Deleting the Database and Listing of Databases:

```
bank details=# \c postgres;
You are now connected to database "postgres" as user "postgres".
postgres=# DROP DATABASE bank_details;
DROP DATABASE
postgres=# \l
                            List of databases
           Owner
                     | Encoding | Collate | Ctype | Access privileges
  Name
           | postgres | UTF8
                                 en_IN
                                           en_IN
 postgres
                                            en_IN | =c/postgres
 template0 | postgres
                       UTF8
                                  en_IN
                                                   postgres=CTc/postgres
 template1 | postgres | UTF8
                                            en IN | =c/postgres
                                  en IN
                                                    postgres=CTc/postgres
(3 rows)
```

➤ Quit from Database:

➤ Logout from psql:

```
postgres@elanchezhian-virtual-machine:~$
logout
elanchezhian@elanchezhian-virtual-machine:~$
```