Experiment-1

AIM-: Study of Basic commands of Linux

1. pwd Command

The pwd command is used to display the location of the current working directory.

Syntax: pwd

output:

2. mkdir Command

The mkdir command is used to create a new directory under any directory.

Syntax:

mkdir <directory name>

output:

3. rmdir Command

The rmdir command is used to delete a directory.

Syntax:

rmdir <directory name>

output:

4. ls Command

The ls command is used to display a list of content of a directory.
Syntax:

ls

output:

5. cd Command

The cd command is used to change the current directory.

Syntax:

cd <directory name>

output:

6. touch Command

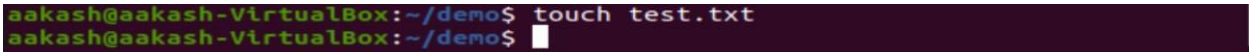
The touch command is used to create empty files. We can create multiple empty files by executing it once.

Syntax:

touch <file name> touch

<file1> <file2> ....

output:



7. cat Command

The cat command is a multi-purpose utility in the Linux system. It can be used to create a file, display content of the file, copy the content of one file to another file, and more.

Syntax:

cat [OPTION]… [FILE]..

output:

```
aakash@aakash-VirtualBox:~/demo$ cat >demo1.txt
Namaste London!!!
^C
aakash@aakash-VirtualBox:~/demo$ cat demo1.txt
Namaste London!!!
```

8. rm Command

The rm command is used to remove a file.

Syntax:

rm <file name>

output:

```
aakash@aakash-VirtualBox:~/demo$ rm demo3.txt
aakash@aakash-VirtualBox:~/demo$
```

9. cp Command

The cp command is used to copy a file or directory.

Syntax:

cp <existing file name> <new file name>

output:

```
aakash@aakash-VirtualBox:~/demo$ cat demo1.txt
Namaste London!!!
aakash@aakash-VirtualBox:~/demo$ cat >demo2.txt
^C
aakash@aakash-VirtualBox:~/demo$ cp demo1.txt demo2.txt
aakash@aakash-VirtualBox:~/demo$ cat demo2.txt
Namaste London!!!
```

10. mv Command

The mv command is used to move a file or a directory form one location to another location.

Syntax:
mv <file name> <directory path>

output:

```
aakash@aakash-VirtualBox:~/demo$ mv demo1.txt test
aakash@aakash-VirtualBox:~/demo$ cat test
Namaste London!!!
```

11. rename Command

The rename command is used to rename files. It is useful for renaming a large group of files.

Syntax:

rename 's/old-name/new-name/' files

output:

```
aakash@aakash-VirtualBox:~/demo$ rename 's/\.txt$/\.pdf/' *.txt
aakash@aakash-VirtualBox:~/demo$ ls
demo2.pdf  test  test.pdf
aakash@aakash-VirtualBox:~/demo$
```

12. head Command

The head command is used to display the content of a file. It displays the first 10 lines of a file.

Syntax:

head <file name>

output:

```
aakash@aakash-VirtualBox:~/demo$ cat >apple.txt
a
b
c
d
e
f
g
h
i
j
k
l^C
aakash@aakash-VirtualBox:~/demo$ head apple.txt
a
b
c
d
e
f
g
h
i
j
```

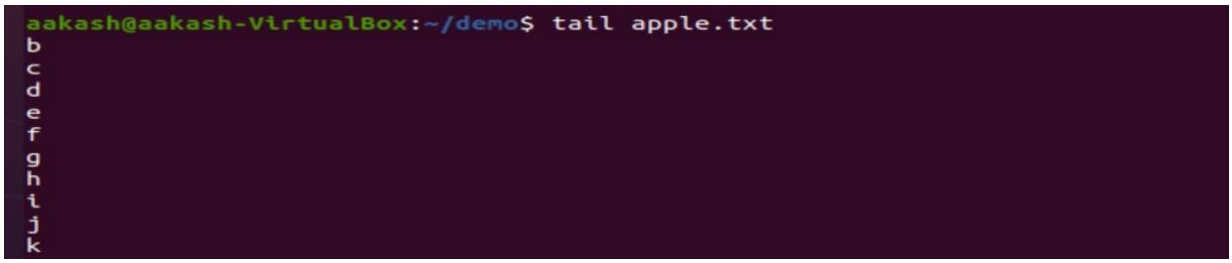
13. tail <file name>

The tail command is similar to the head command. The difference between both commands is that it displays the last ten lines of the file content. It is useful for reading the error message.

Syntax:

tail <file name>

output:



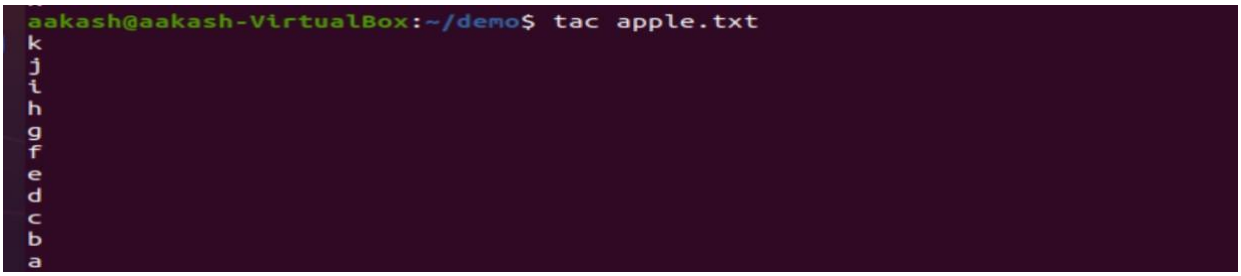
14. tac Command

The tac command is the reverse of cat command, as its name specified. It displays the file content in reverse order (from the last line).

Syntax:

tac <file name>

output:



15. date Command

The date command is used to display date, time, time zone, and more.

Syntax: date

output:

16. su Command

The su command provides administrative access to another user. In other words, it allows access of the Linux shell to another user.

Syntax:

su <user name>

output:

```
aakash@aakash-VirtualBox:~/demo$ su aakash
Password:
```

17. passwd Command

The passwd command is used to create and change the password for a user.

Syntax:

passwd <username>

output:

```
aakash@aakash-VirtualBox:~/demo$ passwd aakash
Changing password for aakash.
Current password:
New password:
Retype new password:
passwd: password updated successfully
```

18. grep Command

The grep is the most powerful and used filter in a Linux system. The 'grep' stands for "**global regular expression print**." It is useful for searching the content from a file. Generally, it is used with the pipe.

Syntax:

command | grep <searchWord>

output:

```
aakash@aakash-VirtualBox:~/demo$ cat demo2.pdf | grep Namaste
Namaste London!!!
```

19. wc Command

The wc command is used to count the lines, words, and characters in a file.

Syntax:

wc <file name>

output:

```
aakash@aakash-VirtualBox:~/demo$ wc demo2.pdf
 1  2 18 demo2.pdf
```

20. clear Command

Linux **clear** command is used to clear the terminal screen.

Syntax: clear

output:

```
aakash@aakash-VirtualBox:~/demo$ cat demo2.pdf | grep Namaste
Namaste London!!!
aakash@aakash-VirtualBox:~/demo$ wc demo2.pdf
 1  2 18 demo2.pdf
aakash@aakash-VirtualBox:~/demo$ clear
```

Experiment-2

AIM-: Study the basics of shell programming.

1.Program Code ECHO:

```
echo "What is your name?"
read PERSON echo "Hello,
$PERSON"
```

Output:

```
aakash@aakash-VirtualBox:~/demo$ gedit practicle1.sh
aakash@aakash-VirtualBox:~/demo$ bash practicle1.sh
What is your name?
Aakash shah
hello,Aakash shah
```

2.Program Code SWAP:

```
echo "value of a->"

read a echo "value of b->"

read b temp=$a a=$b b=$temp
```

echo "a=$a b=$b"

Output:

```
aakash@aakash-VirtualBox:~$ bash swapg.sh
value of a->
10
value of b->
30
a=30 b=10
```

3.Program Code FACTORIAL:

```
echo "Enter the factorial of number you want->"

read n fact=1

while [ $n -ne 0 ]

do

fact=$((fact * $n))

n=$((n - 1))

done

echo "$fact"
```

Output:

```
aakash@aakash-VirtualBox:~$ bash factorial.sh
Enter the factorial of number you want->
5
120
```

4.Program Code WHILE LOOP:

```
i=1
while [ $i -lt 10 ]
do echo $i
i=$(($i+1))
done
```

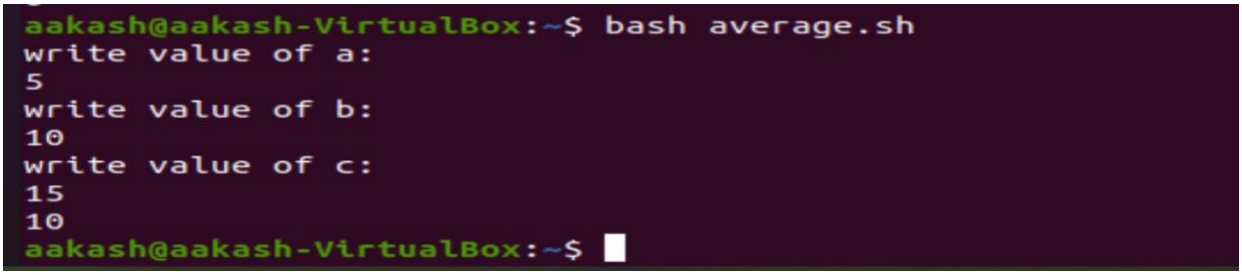
Output:

```
aakash@aakash-VirtualBox:~$ gedit while.sh
aakash@aakash-VirtualBox:~$ bash while.sh
1
2
3
4
5
6
7
8
9
10
```

5.Program code Average:

```
echo "write value of a:"
read a echo "write value of b:"
read b echo "write value of c:"
read c
sum=$(($a + $b + $c))
avg=$(($sum/3))
echo $avg
```

Output:


aakash@aakash-VirtualBox:~$ bash average.sh
write value of a:
5
write value of b:
10
write value of c:
15
10
aakash@aakash-VirtualBox:~$

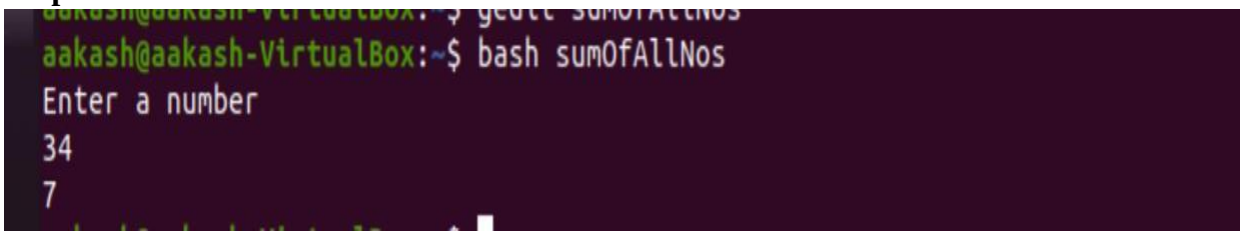
Experiment-3

AIM-: Write a Shell script to print given numbers sum of all digits.

Program Code:

```
echo "Enter a number"
read num sum=0

while [ $num -gt 0 ] do
   mod=$((num % 10))
sum=$((sum + mod))
num=$((num / 10))  done

echo $sum
```

Output:



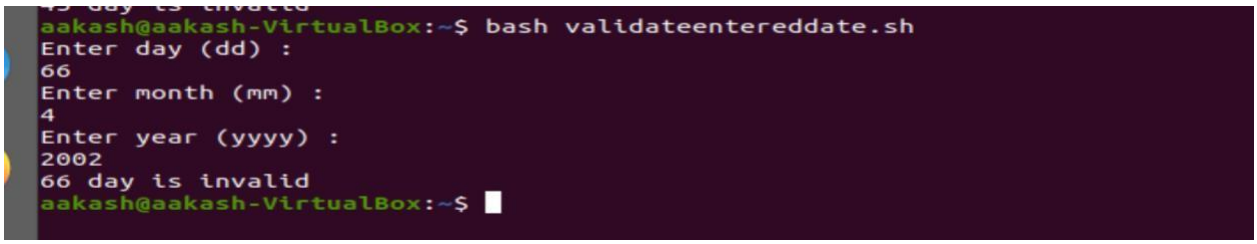
Experiment-4

AIM-: Write a shell script to validate the entered date. (eg. Date format is: dd-mm-yyyy).

Program Code:

```
echo "Enter day (dd) : "
read d
echo "Enter month (mm) : "
read m
echo "Enter year (yyyy) : "
read y

if [ $m -le 0 -o $m -gt 12 ] then
   echo "$m is invalid month."
exit 1 fi

if [ $d -le 0 -o $d -gt 30 ] then
   echo "$d day is invalid"
exit 3 fi

echo "$d/$m/$y is a vaild date"
```

Output:



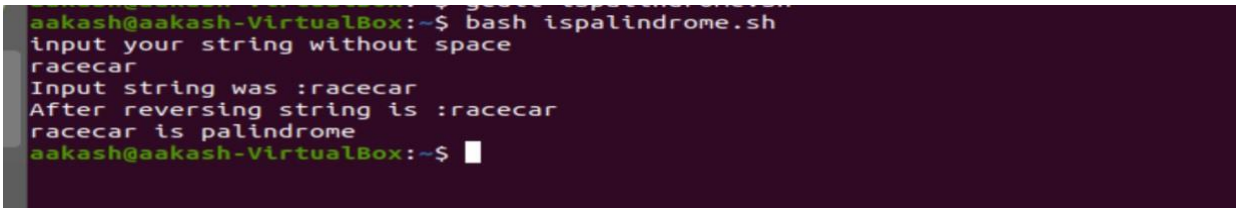
Experiment-5A

A)AIM-: Write a shell script to check entered string is palindrome or not.

Program Code:

```
echo "input your string without space" read
vstr
for i in $(seq 0 ${#vstr})
do
        rvstr=${vstr:$i:1}${rvstr}
done

echo "Input string was :"$vstr echo
"After reversing string is :"$vstr

if [ "$vstr" = "$rvstr" ]
then
        echo $vstr is palindrome
else
        echo $vstr is not plaindrome
fi
```

Output:



Experiment-5B

B)AIM-: Write a Shell script to say Good morning/Afternoon/Evening as you log in to system.

Program Code:

```
h=$(date +"%H")

if

[ $h -gt 6 -a $h -le 12 ]

then

echo good morning

elif

[ $h -gt 12 -a $h -le 16 ]

then

echo good afternoon

elif [ $h -gt 16 -a $h -le 20 ]

then

echo good evening

else

echo good night fi
```

Output:

```
aakash@aakash-VirtualBox:~$ date
Wednesday 16 February 2022 10:18:19 AM IST
aakash@aakash-VirtualBox:~$ bash greeting.sh
good morning
```

Practical-6

AIM: Write a C program to create a child process

Code:

```
#include<stdio.h>
#include<sys/wait.h>
#include<stdlib.h>
#include<sys/types.h>
#include<unistd.h>
int main(void)
{
int pid;
int status;
printf("hello World!!\n");
pid=fork();
if(pid == -1)
{
perror("bad fork!!");
exit(1);
}
if(pid == 0)
printf("I am the child process=%d\n",getpid());
else
{
printf("I am the parent process=%d\n",getppid());
}
```

```
}
```

Output:


ashok@kali: ~/Documents/oslab
File Actions Edit View Help
(ashok㉿kali)-[~/Documents/oslab]
$ gcc child.c -o child
(ashok㉿kali)-[~/Documents/oslab]
$ ./child
Hello World!
I am the child process.
I am the parent process.

Practical-7

AIM-:Finding out biggest number from given three numbers supplied as command line arguments

Code:

```
echo "Enter 3 numbers: "
read a read
b read c
if [ $a -gt $b ] && [ $a -gt $c ]
then echo " " echo "Greatest
num :$a" elif [ $b -gt $a ] && [
$b -gt $c ]
then echo
" "
echo "Greatest num :$b"
else echo
" "
echo "Greatest num :$c" fi
```

Output:

```
aakash@aakash-VirtualBox:~$ bash greatestnobetnthreeno.sh
type a value
3
type b  value
8
type c value
9
c is greater than a,b
```

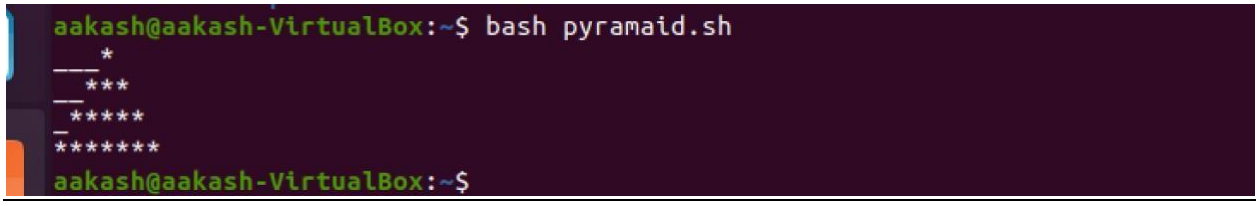
Practical-8

AIM-:Printing the patterns using for loop

Code:

```
n=4
for((i=1;i<=$n;i++)) do
for((j=1;j<=$n-$i;j++))
do  echo -n "_" done
for((j=1;j<=2*$i-1;j++)) do
echo -n "*"

done echo
done
```

output:



Experiment-9

AIM-: Shell script to determine whether given file exist or not.

Program Code:

```
echo Enter file name ?
read a
if [ -f $a ]
then
        echo $a exists
else
        echo $a doesnt exists
fi
```

Output:

```
aakash@aakash-VirtualBox:~$ gedit isfileexit.sh
aakash@aakash-VirtualBox:~$ bash isfileexit.sh
Enter file name ?
aaku.txt
aaku.txt doesnt exists
aakash@aakash-VirtualBox:~$
```

Experiment-10

AIM-: Write a program for process creation using C. (Use of gcc compiler).

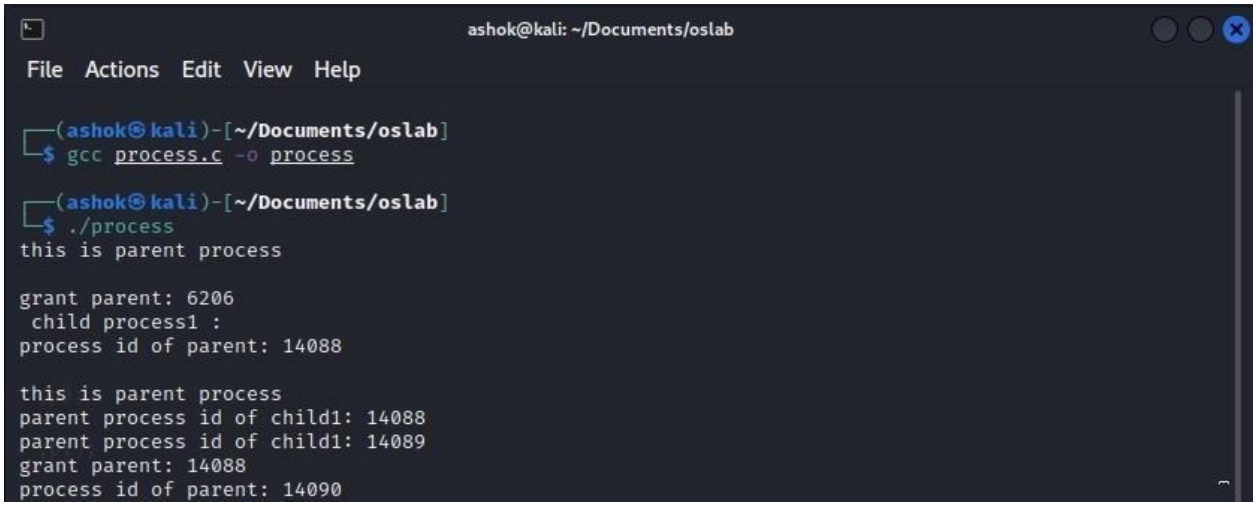
Program:

```
#include<sys/types.h >
#include<stdio.h>
#include<unistd.h>
int main()
{
int pid_t,pid,pid1,p,p1;
pid=fork();
if(pid==-1)
{
printf("enter in connection: ");
}
elseif(pid == 0)
```

```
{
printf("\nchild process1 :\n\n");
p=getppid();
printf("parent process id of child1:%d\n",p);
p1=getpid();
printf("parent process id of child1: %d\n",p1);
}
else
{
pid1= fork();
if(pid ==0)
{
printf("\nchild process 2: \n\n");
p=getppid();
printf("parent process id of child2: %d\n",p);
p1=getpid();
printf("parent process id of child2: %d\n",p1);
}
else
{
printf("this is parent process \n");
p=getppid();
printf("grant parent: %d \n",p);
```

```
p1=getpid();

printf("process id of parent: %d \n",p1);

}

}

return 0;

}
```

Output:



Experiment-11

AIM-:Implementation of FCFS & Round Robin Algorithm.

Code:

```
print("FIRST COME FIRST SERVE SCHEDULLING")

n= int(input("Enter number of processes : "))

d = dict()

for i in range(n):

   key = "P"+str(i+1)

a = int(input("Enter arrival time of process"+str(i+1)+":

"))

b = int(input("Enter burst time of process"+str(i+1)+":

"))

l = []

   l.append(a)

   l.append(b)
```

```
d[key] = l

d = sorted(d.items(), key=lambda item:

item[1][0])

  ET = []

for i in range(len(d)):

# first process

if(i==0):

       ET.append(d[i][1][1])

    # get prevET + newBT

    else:

       ET.append(ET[i-1] + d[i][1][1])

  TAT = []

for i in range(len(d)):

    TAT.append(ET[i] - d[i][1][0])

  WT = []

for i in range(len(d)):

    WT.append(TAT[i] - d[i][1][1])

  avg_WT = 0

for i in WT:

    avg_WT +=i avg_WT = (avg_WT/n)

  print("Process | Arrival | Burst | Exit | Turn Around |

Wait |")

for i in range(n):
```

```
    print("   ",d[i][0]," | ",d[i][1][0]," | ",d[i][1][1]," |
",ET[i]," | ",TAT[i]," | ",WT[i]," | ")
print("Average Waiting Time: ",avg_WT)
```

Output:

```
aakash@aakash-VirtualBox:~/Desktop$ ls
FCFS.py
aakash@aakash-VirtualBox:~/Desktop$ python FCFS.py
FIRST COME FIRST SERVE SCHEDULLING
Enter number of processes : 4
Enter arrival time of process1: 1
Enter burst time of process1: 5
Enter arrival time of process2: 0
Enter burst time of process2: 4
Enter arrival time of process3: 3
Enter burst time of process3: 3
Enter arrival time of process4: 2
Enter burst time of process4: 5
Process | Arrival | Burst | Exit | Turn Around | Wait |
('    ', 'P2', '    |    ', 0, ' |    ', 4, ' |    ', 4, '  |    ', 4, '  |   ',
 0, '    |   ')
('    ', 'P1', '    |    ', 1, ' |    ', 5, ' |    ', 9, '  |    ', 8, '  |   ',
 3, '    |   ')
('    ', 'P4', '    |    ', 2, ' |    ', 5, ' |    ', 14, '  |    ', 12, '  |
', 7, '    |   ')
('    ', 'P3', '    |    ', 3, ' |    ', 3, ' |    ', 17, '  |    ', 14, '  |
', 11, '    |   ')
('Average Waiting Time: ', 5)
aakash@aakash-VirtualBox:~/Desktop$
```

Program Code (ROUND ROBIN):

```
  def findWaitingTime(processes,
                      n, bt, wt, quantum):
   rem_bt = [0] * n
   # Copy the burst time into
rt[]
for i in range(n):
rem_bt[i] = bt[i] t = 0
# Current time
# Keep traversing processes in round
```

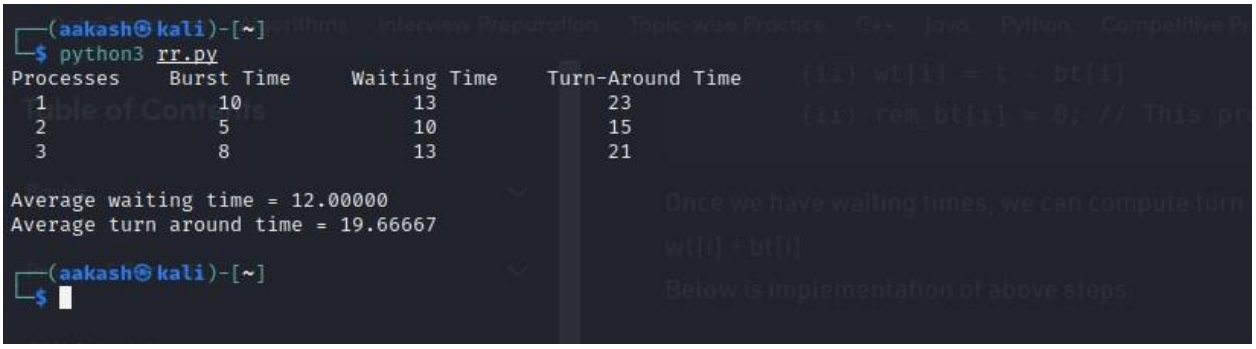
```
# robin manner until all of them
are
# not done.
 while(1):
done = True

    # Traverse all processes one by
    # one repeatedly
    for i in range(n):

 # If burst time of a process is greater
# than 0 then only need to process further
if (rem_bt[i] > 0) :
        done = False # There is a pending process
        if (rem_bt[i] > quantum) :

 # Increase the value of t i.e. shows
# how much time a process has been processed
t += quantum

 # Decrease the burst_time of current
# process by quantum
 rem_bt[i] -= quantum

 # If burst time is smaller than or equal
# to quantum. Last cycle for this process
else:

  # Increase the value of t i.e. shows
```

```
 # how much time a process has been processed
t = t + rem_bt[i]

# Waiting time is current time minus
 # time used by this process
wt[i] = t - bt[i]

 # As the process gets fully executed
 # make its remaining burst time = 0
rem_bt[i] = 0
# If all processes are done
if (done == True):
break

# Function to calculate turn around time
def findTurnAroundTime(processes, n, bt,
wt, tat):

   # Calculating turnaround
time     for i in range(n):
tat[i] = bt[i] + wt[i]



# Function to calculate average
waiting # and turn-around times. def
findavgTime(processes, n, bt,
quantum):
   wt = [0] * n
tat = [0] * n
```

```
    # Function to find waiting
time
# of all processes
findWaitingTime(processes, n,
bt, wt, quantum)

    # Function to find turn around
time
# for all processes
findTurnAroundTime(processes,n,b
t, wt, tat)
    # Display processes along with all details
print("Processes    Burst Time     Waiting",
"Time    Turn-Around Time")     total_wt = 0
total_tat = 0     for i in range(n):
          total_wt = total_wt + wt[i]
total_tat = total_tat + tat[i]
print(" ", i + 1, "\t\t", bt[i],
"\t\t", wt[i], "\t\t", tat[i])

    print("\nAverage waiting time = %.5f "%(total_wt /n)
)     print("Average turn around time = %.5f "% (total_tat
/ n))
# Driver code
if __name__
=="__main__":
 # Process id's
proc = [1, 2, 3]
n = 3
```

```
    # Burst time of all processes
burst_time = [10, 5, 8]
    # Time quantum
quantum = 2;
    findavgTime(proc, n, burst_time, quantum)
```

Output:



Experiment-12

AIM-: Implementation of Banker's Algorithm.

Code:

```
def main():
processes = int(input("number of processes : "))
resources = int(input("number of resources : "))
 max_resources = [int(i) for i in input("maximum resources : ").split()]
   print("\n-- allocated resources for each process --")
currently_allocated = [[int(i) for i in input(f"process {j + 1} : ").split()]
for j in range(processes)]
   print("\n-- maximum resources for each process --")
max_need = [[int(i)
for i in input(f"process {j + 1} : ").split()]
for j in range(processes)]
   allocated = [0] * resources
for i in range(processes):
for j in range(resources):
allocated[j] += currently_allocated[i][j]
 print(f"\ntotal allocated resources : {allocated}")
   available = [max_resources[i] - allocated[i]
for i in range(resources)]
print(f"total available resources : {available}\n")
```

```
 running = [True] * processes

count = processes

   while count != 0:

safe = False

 for i in range(processes):

if running[i]:

            executing = True

for j in range(resources):

if max_need[i][j] - currently_allocated[i][j] > available[j]:

 executing = False

break

if executing:

  print(f"process {i + 1} is executing")

running[i] = False

count -= 1

safe = True

for j in range(resources):

  available[j] += currently_allocated[i][j]

break

if not safe:

print("the processes are in an unsafe state.")

break
```

```
print(f"the process is in a safe state.\navailable resources : {available}\n")

if __name__ == '__main__': main()
```

Output: