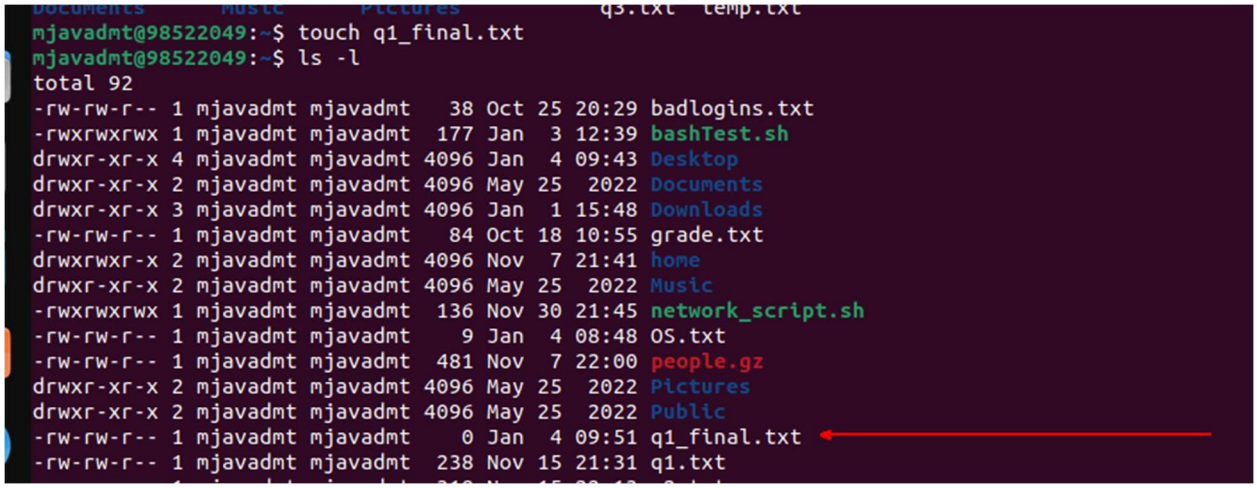
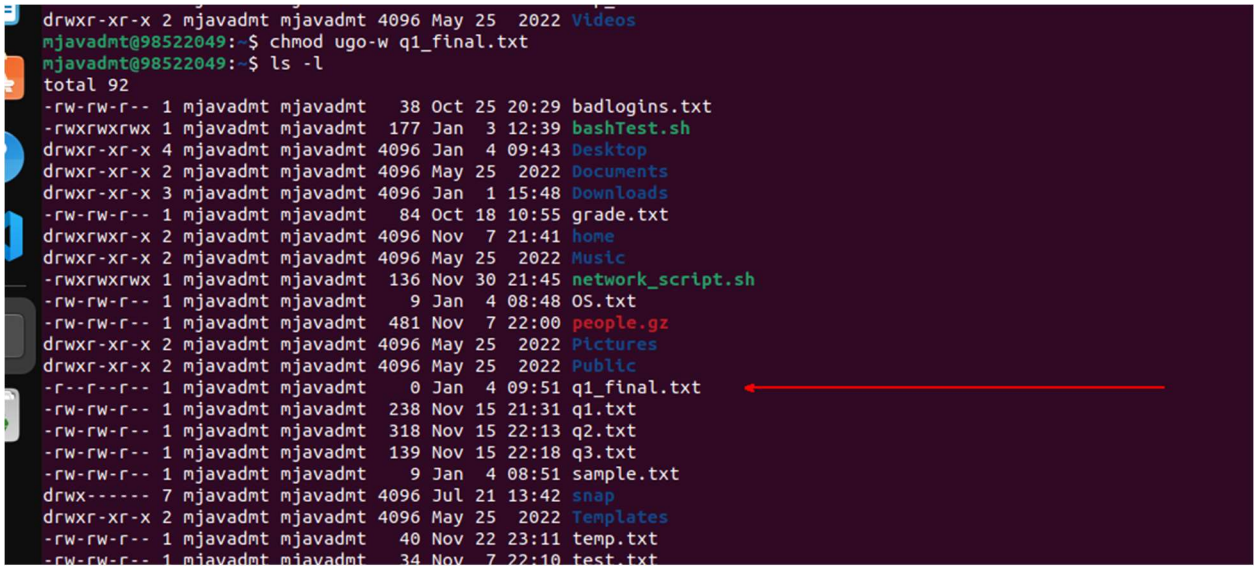
Q1.


mjavadmt@98522049:~$ touch q1_final.txt
mjavadmt@98522049:~$ ls -l
total 92
-rw-rw-r-- 1 mjavadmt mjavadmt 38 Oct 25 20:29 badlogins.txt
-rwxrwxrwx 1 mjavadmt mjavadmt 177 Jan 3 12:39 bashTest.sh
drwxr-xr-x 4 mjavadmt mjavadmt 4096 Jan 4 09:43 Desktop
drwxr-xr-x 2 mjavadmt mjavadmt 4096 May 25 2022 Documents
drwxr-xr-x 3 mjavadmt mjavadmt 4096 Jan 1 15:48 Downloads
-rw-rw-r-- 1 mjavadmt mjavadmt 84 Oct 18 10:55 grade.txt
drwxrwxr-x 2 mjavadmt mjavadmt 4096 Nov 7 21:41 home
drwxr-xr-x 2 mjavadmt mjavadmt 4096 May 25 2022 Music
-rwxrwxrwx 1 mjavadmt mjavadmt 136 Nov 30 21:45 network_script.sh
-rw-rw-r-- 1 mjavadmt mjavadmt 9 Jan 4 08:48 OS.txt
-rw-rw-r-- 1 mjavadmt mjavadmt 481 Nov 7 22:00 people.gz
drwxr-xr-x 2 mjavadmt mjavadmt 4096 May 25 2022 Pictures
drwxr-xr-x 2 mjavadmt mjavadmt 4096 May 25 2022 Public
-rw-rw-r-- 1 mjavadmt mjavadmt 0 Jan 4 09:51 q1_final.txt
-rw-rw-r-- 1 mjavadmt mjavadmt 238 Nov 15 21:31 q1.txt


drwxr-xr-x 2 mjavadmt mjavadmt 4096 May 25 2022 Videos
mjavadmt@98522049:~$ chmod ugo-w q1_final.txt
mjavadmt@98522049:~$ ls -l
total 92
-rw-rw-r-- 1 mjavadmt mjavadmt 38 Oct 25 20:29 badlogins.txt
-rwxrwxrwx 1 mjavadmt mjavadmt 177 Jan 3 12:39 bashTest.sh
drwxr-xr-x 4 mjavadmt mjavadmt 4096 Jan 4 09:43 Desktop
drwxr-xr-x 2 mjavadmt mjavadmt 4096 May 25 2022 Documents
drwxr-xr-x 3 mjavadmt mjavadmt 4096 Jan 1 15:48 Downloads
-rw-rw-r-- 1 mjavadmt mjavadmt 84 Oct 18 10:55 grade.txt
drwxrwxr-x 2 mjavadmt mjavadmt 4096 Nov 7 21:41 home
drwxr-xr-x 2 mjavadmt mjavadmt 4096 May 25 2022 Music
-rwxrwxrwx 1 mjavadmt mjavadmt 136 Nov 30 21:45 network_script.sh
-rw-rw-r-- 1 mjavadmt mjavadmt 9 Jan 4 08:48 OS.txt
-rw-rw-r-- 1 mjavadmt mjavadmt 481 Nov 7 22:00 people.gz
drwxr-xr-x 2 mjavadmt mjavadmt 4096 May 25 2022 Pictures
drwxr-xr-x 2 mjavadmt mjavadmt 4096 May 25 2022 Public
-r--r--r-- 1 mjavadmt mjavadmt 0 Jan 4 09:51 q1_final.txt
-rw-rw-r-- 1 mjavadmt mjavadmt 238 Nov 15 21:31 q1.txt
-rw-rw-r-- 1 mjavadmt mjavadmt 318 Nov 15 22:13 q2.txt
-rw-rw-r-- 1 mjavadmt mjavadmt 139 Nov 15 22:18 q3.txt
-rw-rw-r-- 1 mjavadmt mjavadmt 9 Jan 4 08:51 sample.txt
drwx------ 7 mjavadmt mjavadmt 4096 Jul 21 13:42 snap
drwxr-xr-x 2 mjavadmt mjavadmt 4096 May 25 2022 Templates
-rw-rw-r-- 1 mjavadmt mjavadmt 40 Nov 22 23:11 temp.txt

Q2.

```
mjavadmt@98522049:/etc$ ls | grep "t$"
apport
apt
bindresvport.blacklist
default
environment
ghostscript
init
issue.net
newt
opt
PackageKit
rmt
wpa_supplicant
mjavadmt@98522049:/etc$ ls | grep "t$" | wc -c
120
mjavadmt@98522049:/etc$
```

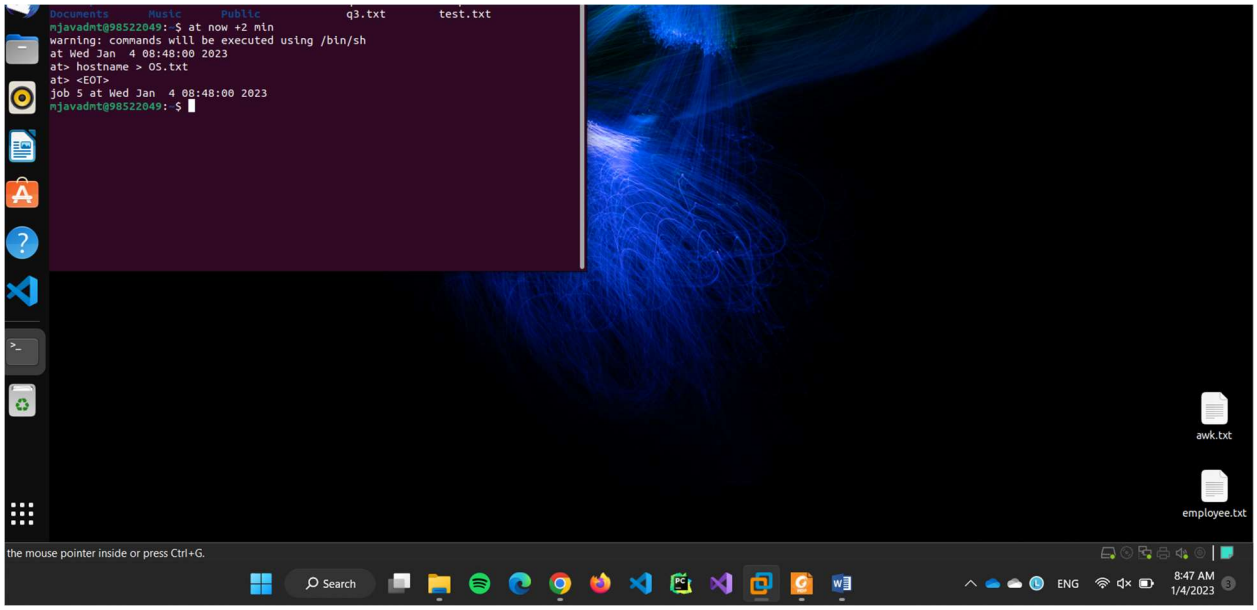
Q3.

```
wtmp begins Wed May 25 21:16:28 2022
mjavadmt@98522049:/etc$ last -1
mjavadmt tty2         tty2             Wed Jan  4 08:21   still logged in

wtmp begins Wed May 25 21:16:28 2022
mjavadmt@98522049:/etc$ last -num 1
last: failed to parse number: 'um'
mjavadmt@98522049:/etc$ last -n 1
mjavadmt tty2         tty2             Wed Jan  4 08:21   still logged in

wtmp begins Wed May 25 21:16:28 2022
mjavadmt@98522049:/etc$ last -n 1 | head 1
head: cannot open '1' for reading: No such file or directory
mjavadmt@98522049:/etc$ last -n 1 | head -1
mjavadmt tty2         tty2             Wed Jan  4 08:21   still logged in
mjavadmt@98522049:/etc$ last -n 1 | head -1 | cut -f 1
mjavadmt tty2         tty2             Wed Jan  4 08:21   still logged in
mjavadmt@98522049:/etc$ last -n 1 | head -1 | cut -f 1 -d " "
mjavadmt
mjavadmt@98522049:/etc$ last -n 1 | head -1 | cut -f 1 -d " " | groups
mjavadmt adm cdrom sudo dip plugdev lpadmin lxd sambashare wireshark
mjavadmt@98522049:/etc$
```

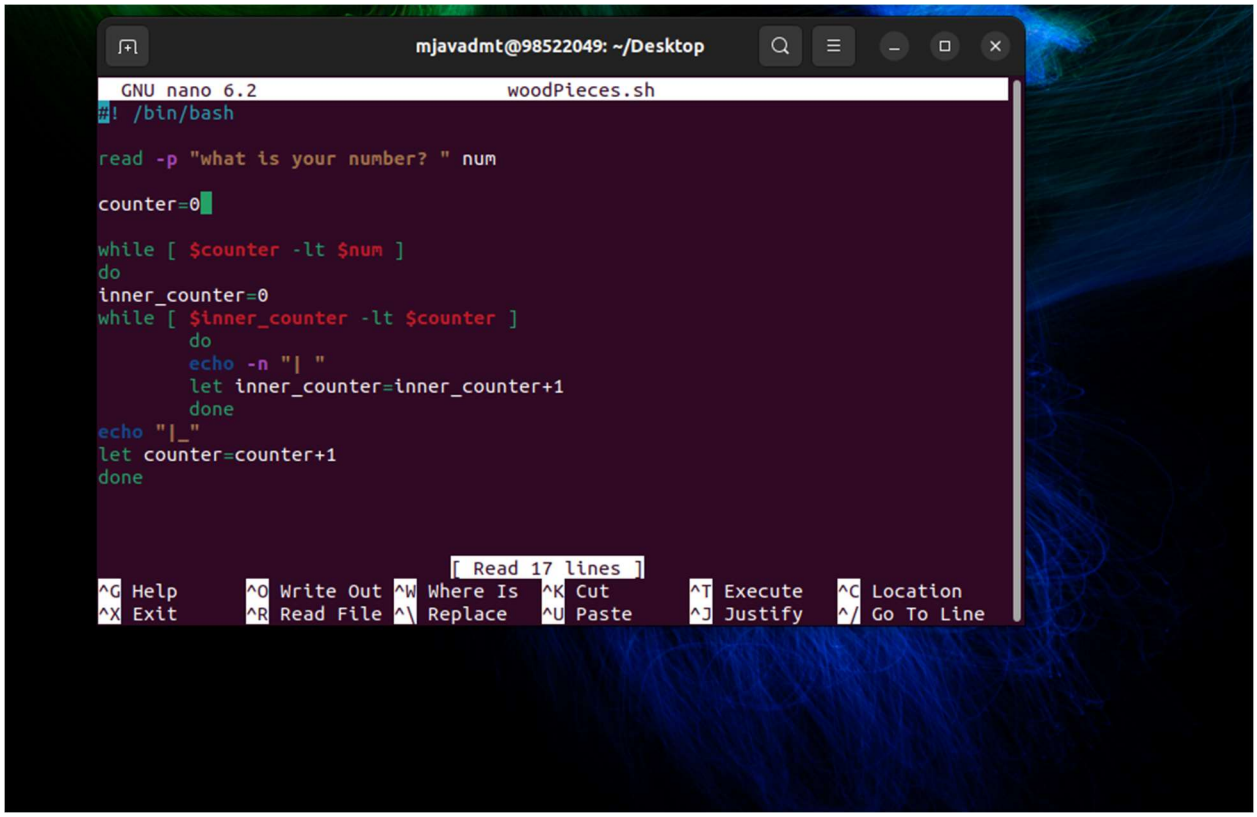
Q4.

```
systemd-oom
mjavadmt@98522049:/etc$ cat passwd | grep "nologin" | cut -d ":" -f 1 | head -10
daemon
bin
sys
games
man
lp
mail
news
uucp
proxy
mjavadmt@98522049:/etc$
```

Q5.


Documents Music Public q3.txt test.txt
mjavadmt@98522049:~$ at now +2 min
warning: commands will be executed using /bin/sh
at Wed Jan 4 08:48:00 2023
at> hostname > OS.txt
at> <EOT>
job 5 at Wed Jan 4 08:48:00 2023
mjavadmt@98522049:~$
awk.txt
employee.txt
the mouse pointer inside or press Ctrl+G.
Search
ENG
8:47 AM
1/4/2023

Q6.


mjavadmt@98522049: ~/Desktop
GNU nano 6.2 woodPieces.sh
#! /bin/bash
read -p "what is your number? " num
counter=0
while [$counter -lt $num]
do
inner_counter=0
while [$inner_counter -lt $counter]
do
echo -n "| "
let inner_counter=inner_counter+1
done
echo "|_"
let counter=counter+1
done
[Read 17 lines]
^G Help ^O Write Out ^W Where Is ^K Cut ^T Execute ^C Location
^X Exit ^R Read File ^\ Replace ^U Paste ^J Justify ^/ Go To Line

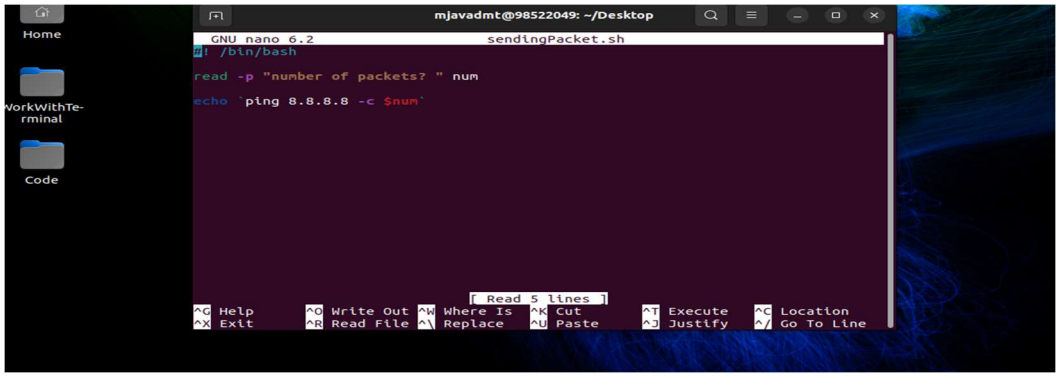
```
mjavadmt@98522049:~/Desktop$ ./woodPieces.sh
what is your number? 5
|_
| |_
| | |_
| | | |_
| | | | |_
mjavadmt@98522049:~/Desktop$ nano woodPieces.sh
```

Q7.

```
./Videos:
mjavadmt@98522049:~$ ls -R | awk '/sh$/ {print $0}'
bashTest.sh
network_script.sh
woodPieces.sh
mjavadmt@98522049:~$ ls -R | awk '/sh$/ && /[^[a-k]/ {print $0}'
bashTest.sh
network_script.sh
woodPieces.sh
mjavadmt@98522049:~$ ls -R | awk '/sh$/ && /^[a-k]/ {print $0}'
bashTest.sh
mjavadmt@98522049:~$
```

Q8.

```
mjavadmt@98522049:~/Desktop$ nano sendingPacket.sh
mjavadmt@98522049:~/Desktop$ chmod 777 sendingPacket.sh
mjavadmt@98522049:~/Desktop$ ./sendingPacket.sh
number of packets? 3
PING 8.8.8.8 (8.8.8.8) 56(84) bytes of data. 64 bytes from 8.8.8.8: icmp_seq=1 t
tl=128 time=115 ms 64 bytes from 8.8.8.8: icmp_seq=2 ttl=128 time=102 ms 64 byte
s from 8.8.8.8: icmp_seq=3 ttl=128 time=156 ms --- 8.8.8.8 ping statistics --- 3
 packets transmitted, 3 received, 0% packet loss, time 2003ms rtt min/avg/max/md
ev = 101.665/123.978/155.541/22.946 ms
mjavadmt@98522049:~/Desktop$
```

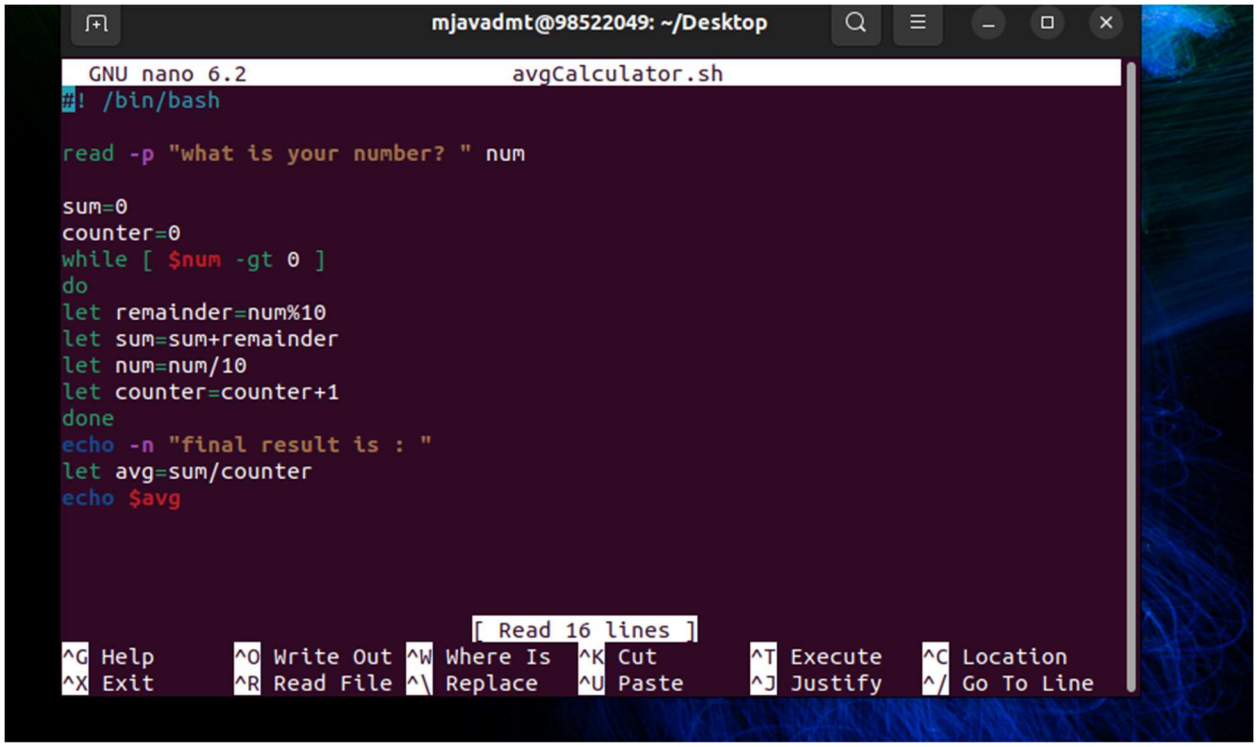


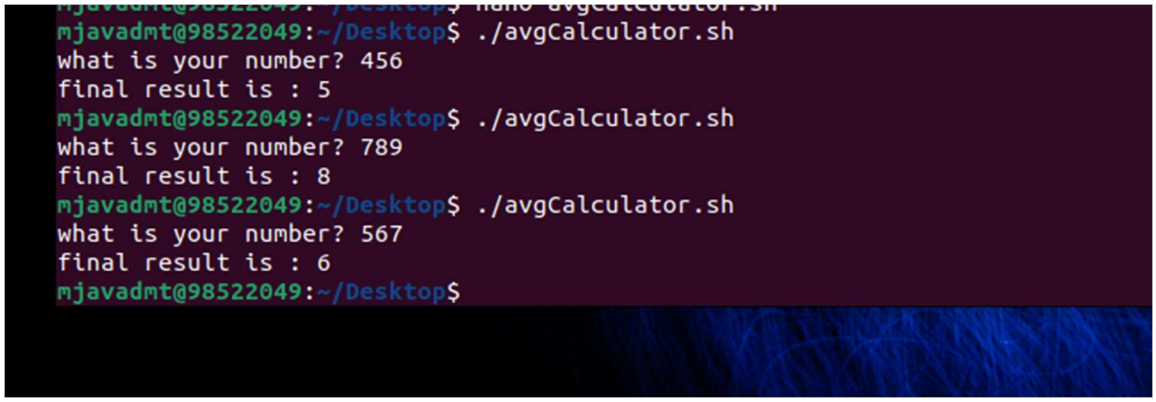
Q9.

```c
#include <stdio.h>
struct process
{
    int pid, st, wt, tt, priority;
};
int main()
{
    int processes_num;
    printf("what is number of processes? \n");
    scanf("%d", &processes_num);

    struct process processes[processes_num];

    for (int i = 0; i < processes_num; i++)
    {
        // assign service time
        int service_time;
        printf("what is service time of process with pid = %d\n", i + 1);
        scanf("%d", &service_time);
        processes[i].st = service_time;

        // assign priority
        int priority;
        printf("what is priority of process with pid %d\n", i+1);
        scanf("%d",&priority);
        processes[i].priority=priority;

        // assign id
        processes[i].pid = i + 1;
    }
    int i, j;
    struct process swap_temp;
    // bubble sort
    for (i = 0; i < processes_num - 1; i++)
    {
        for (j = 0; j < processes_num - i - 1; j++)
        {
            if (processes[j].priority < processes[j + 1].priority)
            {
                // swapping
                swap_temp = processes[j];
                processes[j] = processes[j + 1];
                processes[j + 1] = swap_temp;
```

```
            }
        }
    }

    int total_waiting = 0;
    for (int i = 0; i < processes_num; i++)
    {
        if (i == 0)
        {
            processes[i].wt = 0;
        }
        else
        {
            processes[i].wt = processes[i - 1].tt;
        }
        total_waiting += processes[i].wt;
        processes[i].tt = processes[i].wt + processes[i].st;
        printf("process with pid = %d, wait time = %d , service time = %d, total
time= %d\n", i, processes[i].wt, processes[i].st, processes[i].tt);
    }
    double avg_wtime = total_waiting / processes_num;
    printf("avg wtime = %f\n", avg_wtime);

    return 0;
}
```

Q10.


mjavadmt@98522049: ~/Desktop
GNU nano 6.2 avgCalculator.sh
#! /bin/bash
read -p "what is your number? " num
sum=0
counter=0
while [$num -gt 0]
do
let remainder=num%10
let sum=sum+remainder
let num=num/10
let counter=counter+1
done
echo -n "final result is : "
let avg=sum/counter
echo $avg
[Read 16 lines]
^G Help ^O Write Out ^W Where Is ^K Cut ^T Execute ^C Location
^X Exit ^R Read File ^\ Replace ^U Paste ^J Justify ^/ Go To Line


mjavadmt@98522049:~/Desktop$ ./avgCalculator.sh
what is your number? 456
final result is : 5
mjavadmt@98522049:~/Desktop$ ./avgCalculator.sh
what is your number? 789
final result is : 8
mjavadmt@98522049:~/Desktop$ ./avgCalculator.sh
what is your number? 567
final result is : 6
mjavadmt@98522049:~/Desktop$