Assignment-1
Operating Systems Lab
190010045

1)

a)Processor:It is an electronic circuit that executes the instructions.
Core:Core is a processing unit.In general core operates two processes at once.

```
yyr@Yaswanth-Inspiron-5437:~$ lscpu
Architecture:                    x86_64
CPU op-mode(s):                  32-bit, 64-bit
Byte Order:                      Little Endian
Address sizes:                   39 bits physical, 48 bits virtual
CPU(s):                          4
On-line CPU(s) list:             0-3
Thread(s) per core:              2
Core(s) per socket:              2
Socket(s):                       1
NUMA node(s):                    1
Vendor ID:                       GenuineIntel
CPU family:                      6
Model:                           69
Model name:                      Intel(R) Core(TM) i5-4200U CPU @ 1.60GHz
Stepping:                        1
CPU MHz:                         1401.442
CPU max MHz:                     2600.0000
CPU min MHz:                     800.0000
BogoMIPS:                        3192.58
Virtualization:                  VT-x
L1d cache:                       64 KiB
L1i cache:                       64 KiB
L2 cache:                        512 KiB
L3 cache:                        3 MiB
NUMA node0 CPU(s):               0-3
Vulnerability Itlb multihit:     KVM: Mitigation: VMX disabled
Vulnerability L1tf:              Mitigation; PTE Inversion; VMX conditional cac
                                 he flushes, SMT vulnerable
Vulnerability Mds:               Mitigation; Clear CPU buffers; SMT vulnerable
Vulnerability Meltdown:          Mitigation; PTI
Vulnerability Spec store bypass: Mitigation; Speculative Store Bypass disabled
                                 via prctl and seccomp
Vulnerability Spectre v1:        Mitigation; usercopy/swapgs barriers and __use
                                 r pointer sanitization
Vulnerability Spectre v2:        Mitigation; Full generic retpoline, IBPB condi
                                 tional, IBRS_FW, STIBP conditional, RSB fillin
                                 g
Vulnerability Srbds:             Mitigation; Microcode
Vulnerability Tsx async abort:   Not affected
Flags:                           fpu vme de pse tsc msr pae mce cx8 apic sep mt
                                 rr pge mca cmov pat pse36 clflush dts acpi mmx
                                  fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb
                                  rdtscp lm constant_tsc arch_perfmon pebs bts
                                 rep_good nopl xtopology nonstop_tsc cpuid aper
                                 fmperf pni pclmulqdq dtes64 monitor ds_cpl vmx
                                  est tm2 ssse3 sdbg fma cx16 xtpr pdcm pcid ss
                                 e4_1 sse4_2 movbe popcnt tsc_deadline_timer ae
                                 s xsave avx f16c rdrand lahf_lm abm cpuid_faul
                                 t epb invpcid_single pti ssbd ibrs ibpb stibp
```

```
yyr@Yaswanth-Inspiron-5437:~$ more /proc/cpuinfo
processor       : 0
vendor_id       : GenuineIntel
cpu family      : 6
model           : 69
model name      : Intel(R) Core(TM) i5-4200U CPU @ 1.60GHz
stepping        : 1
microcode       : 0x26
cpu MHz         : 1100.000
cache size      : 3072 KB
physical id     : 0
siblings        : 4
core id         : 0
cpu cores       : 2
apicid          : 0
initial apicid  : 0
fpu             : yes
fpu_exception   : yes
cpuid level     : 13
wp              : yes
flags           : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb rdt
scp lm constant_tsc arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cp
uid aperfmperf pni pclmulqdq dtes64 monitor ds_cpl vmx est tm2 ssse3 sdbg fma cx
```

b)No. Of cores-2

c)No. Of processors-4

```
yyr@Yaswanth-Inspiron-5437:~$ nproc
4
```

d)Frequency of each processor(in MHz):

```
yyr@Yaswanth-Inspiron-5437:~$ cat /proc/cpuinfo | grep "MHz"
cpu MHz         : 1018.558
cpu MHz         : 1461.862
cpu MHz         : 1498.250
cpu MHz         : 1412.481
```

e)Total Physical Memory(in my computer)-8047872 kB

```
MemTotal:        8047872 kB
MemFree:         3704972 kB
MemAvailable:    5212408 kB
Buffers:          136752 kB
Cached:          1901780 kB
SwapCached:            0 kB
Active:           809536 kB
Inactive:        2972140 kB
```

f)3704972 kB memory is free

g)Number of forks since the boot in the system-7961

```
yyr@Yaswanth-Inspiron-5437:~$ cat /proc/stat | grep processes
processes 7961
```

h)Number of context switches that system performed since bootup-11125843

```
yyr@Yaswanth-Inspiron-5437:~$ cat /proc/stat | grep ctxt
ctxt 11125843
```

2)

```
yyr@Yaswanth-Inspiron-5437:~/Courses/OS_Lab/Lab1/intro-code(1)/intro-code$ gcc c
pu.c
yyr@Yaswanth-Inspiron-5437:~/Courses/OS_Lab/Lab1/intro-code(1)/intro-code$ ./a.o
ut
```

```
top - 14:47:18 up 47 min,  1 user,  load average: 1.66, 0.85, 0.74
Tasks: 253 total,   3 running, 250 sleeping,   0 stopped,   0 zombie
%Cpu(s): 26.9 us,  1.0 sy,  0.0 ni, 71.5 id,  0.6 wa,  0.0 hi,  0.0 si,  0.0 st
MiB Mem :   7859.2 total,   3530.6 free,   2185.0 used,   2143.6 buff/cache
MiB Swap:   1186.5 total,   1186.5 free,      0.0 used.   5038.8 avail Mem

    PID USER      PR  NI    VIRT    RES    SHR S  %CPU  %MEM     TIME+ COMMAND
   8335 yyr       20   0    2364    584    516 R 100.0   0.0   0:17.22 a.out
```

a) PID is 8335
b) CPU used is 100.0% and memory used is 0.0%
c) State of process-running

3)

```
1642065760 sec, 419296 usec
1642065760 sec, 419299 usec
1642065760 sec, 419302 usec
1642065760 sec, 419305 usec
1642065760 sec, 419308 usec
1642065760 sec, 419311 usec
1642065760 sec, 419314 usec
1642065760 sec, 419317 usec
1642065760 sec, 419319 usec
1642065760 sec, 419322 usec
1642065760 sec, 419324 usec
1642065760 sec, 419326 usec
1642065760 sec, 419329 usec
1642065760 sec, 419331 usec
1642065760 sec, 419333 usec
1642065760 sec, 419335 usec
1642065760 sec, 419337 usec
1642065760 sec, 419340 usec
1642065760 sec, 419342 usec
1642065760 sec, 419345 usec
1642065760 sec, 419347 usec
1642065760 sec, 419349 usec
1642065760 sec, 419352 usec
```

```
yyr@Yaswanth-Inspiron-5437:~/Courses/OS_Lab/Lab1/intro-code(1)/intro-code$ ps axo ppid,pid,pcpu,comm
  PPID     PID %CPU COMMAND
     0       1  0.0 systemd
     0       2  0.0 kthreadd
     2       3  0.0 rcu_gp
     2       4  0.0 rcu_par_gp
     2       6  0.0 kworker/0:0H-events_highpri
     2       9  0.0 mm_percpu_wq
     2      10  0.0 rcu_tasks_rude_
     2      11  0.0 rcu_tasks_trace
     2      12  0.0 ksoftirqd/0
     2      13  0.0 rcu_sched
     2      14  0.0 migration/0
     2      15  0.0 idle_inject/0
     2      16  0.0 cpuhp/0
     2      17  0.0 cpuhp/1
     2      18  0.0 idle_inject/1
     2      19  0.0 migration/1
     2      20  0.0 ksoftirqd/1
     2      22  0.0 kworker/1:0H-events_highpri
     2      23  0.0 cpuhp/2
     2      24  0.0 idle_inject/2
     2      25  0.0 migration/2
     2      26  0.0 ksoftirqd/2
     2      28  0.0 kworker/2:0H-events_highpri
     2      29  0.0 cpuhp/3
     2      30  0.0 idle_inject/3
     2      31  0.0 migration/3
     2      32  0.0 ksoftirqd/3
     2      34  0.0 kworker/3:0H-events_highpri
     2      35  0.0 kdevtmpfs
     2      36  0.0 netns
     2      37  0.0 inet_frag_wq
     2      38  0.0 kauditd
     2      41  0.0 khungtaskd
     2      42  0.0 oom_reaper
     2      43  0.0 writeback
     2      44  0.0 kcompactd0
```

```
  2229    7251  0.2 chrome
  2229    7287  0.0 chrome
     2    7517  0.1 kworker/1:0-events
     2    7535  0.0 kworker/3:2-events
  2229    7619  0.1 chrome
     2    7732  0.0 kworker/0:1-cgroup_destroy
     2    8134  0.0 kworker/2:0-events
     2    8181  0.0 kworker/0:2-events
  6987    8221  0.0 bash
     2    8348  0.0 kworker/1:2-events
     2    8349  0.1 kworker/3:1-events
     2    8410  0.1 kworker/2:2-events
     2    8452  0.0 kworker/0:0-events
  2229    8468  0.0 chrome
  6987    8493  0.0 bash
     2    8513  1.1 kworker/u8:2-events_unbound
  6987    8563  0.0 bash
  8493    8573 48.0 cpu-print
  8563    8574  0.0 ps
```

a) PID of cpu-print is 8573

b) PPID of cpu-print is 8493

Ancestors of cpu-print:

PID 0(init)→PID 1(systemd) →PID 1461(systemd) →PID 6987(gnome-terminal)→PID 8493(bash)

c)

```
yyr@Yaswanth-Inspiron-5437:~/Courses/OS_Lab/Lab1/intro-code(1)/intro-code$ ./cpu-print > /tmp/tmp.txt
^C
```

```
yyr@Yaswanth-Inspiron-5437:~/Courses/OS_Lab/Lab1/intro-code(1)/intro-code$ ps -aux
USER         PID %CPU %MEM    VSZ   RSS TTY      STAT START   TIME COMMAND
root           1  0.0  0.1 167724 11652 ?        Ss   14:00   0:01 /sbin/init
root           2  0.0  0.0      0     0 ?        S    14:00   0:00 [kthreadd]
root           3  0.0  0.0      0     0 ?        I<   14:00   0:00 [rcu_gp]
root           4  0.0  0.0      0     0 ?        I<   14:00   0:00 [rcu_par_gp
root           6  0.0  0.0      0     0 ?        I<   14:00   0:00 [kworker/0:
root           9  0.0  0.0      0     0 ?        I<   14:00   0:00 [mm_percpu_
root          10  0.0  0.0      0     0 ?        S    14:00   0:00 [rcu_tasks_
root          11  0.0  0.0      0     0 ?        S    14:00   0:00 [rcu_tasks_
root          12  0.0  0.0      0     0 ?        S    14:00   0:00 [ksoftirqd/
root          13  0.0  0.0      0     0 ?        I    14:00   0:03 [rcu_sched]
root          14  0.0  0.0      0     0 ?        S    14:00   0:00 [migration/
root          15  0.0  0.0      0     0 ?        S    14:00   0:00 [idle_injec
root          16  0.0  0.0      0     0 ?        S    14:00   0:00 [cpuhp/0]
root          17  0.0  0.0      0     0 ?        S    14:00   0:00 [cpuhp/1]
root          18  0.0  0.0      0     0 ?        S    14:00   0:00 [idle_injec
root          19  0.0  0.0      0     0 ?        S    14:00   0:00 [migration/
root          20  0.0  0.0      0     0 ?        S    14:00   0:00 [ksoftirqd/
root          22  0.0  0.0      0     0 ?        I<   14:00   0:00 [kworker/1:
root          23  0.0  0.0      0     0 ?        S    14:00   0:00 [cpuhp/2]
root          24  0.0  0.0      0     0 ?        S    14:00   0:00 [idle_injec
root          25  0.0  0.0      0     0 ?        S    14:00   0:00 [migration/
root          26  0.0  0.0      0     0 ?        S    14:00   0:00 [ksoftirqd/
root          28  0.0  0.0      0     0 ?        I<   14:00   0:00 [kworker/2:
root          29  0.0  0.0      0     0 ?        S    14:00   0:00 [cpuhp/3]
root          30  0.0  0.0      0     0 ?        S    14:00   0:00 [idle_injec
root          31  0.0  0.0      0     0 ?        S    14:00   0:00 [migration/
root          32  0.0  0.0      0     0 ?        S    14:00   0:00 [ksoftirqd/
root          34  0.0  0.0      0     0 ?        I<   14:00   0:00 [kworker/3:
root          35  0.0  0.0      0     0 ?        S    14:00   0:00 [kdevtmpfs]
root          36  0.0  0.0      0     0 ?        I<   14:00   0:00 [netns]
root          37  0.0  0.0      0     0 ?        I<   14:00   0:00 [inet_frag_
root          38  0.0  0.0      0     0 ?        S    14:00   0:00 [kauditd]
root          41  0.0  0.0      0     0 ?        S    14:00   0:00 [khungtaskd
root          42  0.0  0.0      0     0 ?        S    14:00   0:00 [oom_reaper
yyr         6923  0.0  0.0 156056  5380 ?        Sl   14:13   0:00 /usr/libexe
yyr         6987  1.2  0.7 907104 59316 ?        Ssl  14:14   0:42 /usr/libexe
yyr         7251  0.1  1.8 25562912 148876 ?     Sl   14:19   0:04 /opt/google
yyr         7287  0.0  1.1 25540960 95572 ?      Sl   14:20   0:00 /opt/google
yyr         7619  0.0  1.7 29747280 139688 ?     Sl   14:28   0:02 /opt/google
root        8134  0.0  0.0      0     0 ?        I    14:41   0:00 [kworker/2:
root        8349  0.0  0.0      0     0 ?        I    14:47   0:01 [kworker/3:
root        8410  0.1  0.0      0     0 ?        I    14:48   0:01 [kworker/2:
yyr         8468  0.0  0.7 25532368 61932 ?      Sl   14:50   0:00 /opt/google
yyr         8493  0.0  0.0  19512  4960 pts/2    Ss   14:51   0:00 bash
yyr         8563  0.0  0.0  19512  4972 pts/3    Ss   14:53   0:00 bash
root        8624  0.0  0.0      0     0 ?        I    14:55   0:00 [kworker/0:
root        8664  0.0  0.0      0     0 ?        I    14:55   0:00 [kworker/1:
root        8702  0.1  0.0      0     0 ?        I    14:56   0:01 [kworker/0:
root        8796  0.2  0.0      0     0 ?        I    15:00   0:01 [kworker/1:
root        8869  0.0  0.0      0     0 ?        R    15:04   0:00 [kworker/u8
root        8872  0.1  0.0      0     0 ?        I    15:04   0:00 [kworker/3:
yyr         8983  101  0.0   2496   712 pts/2    R+   15:12   0:03 ./cpu-print
yyr         8985  0.0  0.0  20320  3588 pts/3    R+   15:12   0:00 ps -aux
```

PID of the process is 8983.Folder proc/8983 is created when the process is ready.Inside /proc/8983/fd we find three files(0,1,2) that are only present while the process is running.

File 0(Standard Input):

This file is input file.By default, shell is used to accept input,But we use the '>' operator to redirect input from a file.

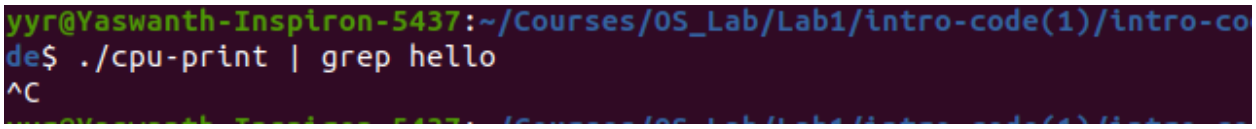
File 1(Standard output)

In this file the output is printed.By default,it is displayed on the shell,but can be redirected using '>'

File 2(Standard error)

If any error occurs,it is stored in this file.By default error messages are displayed on the shell,but can be redirected using '>'.

d)



```
yyr@Yaswanth-Inspiron-5437:~/Courses/OS_Lab/Lab1/intro-code(1)/intro-code$ ps a
USER         PID %CPU %MEM    VSZ   RSS TTY      STAT START   TIME COMMAND
root           1  0.0  0.1 167724 11652 ?        Ss   14:00   0:02 /sbin/
root           2  0.0  0.0      0     0 ?        S    14:00   0:00 [kthre
root           3  0.0  0.0      0     0 ?        I<   14:00   0:00 [rcu_g
root           4  0.0  0.0      0     0 ?        I<   14:00   0:00 [rcu_p
root           6  0.0  0.0      0     0 ?        I<   14:00   0:00 [kwork
root           9  0.0  0.0      0     0 ?        I<   14:00   0:00 [mm_pe
root          10  0.0  0.0      0     0 ?        S    14:00   0:00 [rcu_t
root          11  0.0  0.0      0     0 ?        S    14:00   0:00 [rcu_t
root          12  0.0  0.0      0     0 ?        S    14:00   0:00 [ksoft
root          13  0.0  0.0      0     0 ?        I    14:00   0:05 [rcu_s
root          14  0.0  0.0      0     0 ?        S    14:00   0:00 [migra
root          15  0.0  0.0      0     0 ?        S    14:00   0:00 [idle_
root          16  0.0  0.0      0     0 ?        S    14:00   0:00 [cpuhp
root          17  0.0  0.0      0     0 ?        S    14:00   0:00 [cpuhp
root          18  0.0  0.0      0     0 ?        S    14:00   0:00 [idle_
root          19  0.0  0.0      0     0 ?        S    14:00   0:00 [migra
root          20  0.0  0.0      0     0 ?        S    14:00   0:00 [ksoft
root          22  0.0  0.0      0     0 ?        I<   14:00   0:00 [kwork
root          23  0.0  0.0      0     0 ?        S    14:00   0:00 [cpuhp
root          24  0.0  0.0      0     0 ?        S    14:00   0:00 [idle_
root          25  0.0  0.0      0     0 ?        S    14:00   0:00 [migra
root          26  0.0  0.0      0     0 ?        S    14:00   0:00 [ksoft
root          28  0.0  0.0      0     0 ?        I<   14:00   0:00 [kwork
root          29  0.0  0.0      0     0 ?        S    14:00   0:00 [cpuhp
root          30  0.0  0.0      0     0 ?        S    14:00   0:00 [idle_
root          31  0.0  0.0      0     0 ?        S    14:00   0:00 [migra
root          32  0.0  0.0      0     0 ?        S    14:00   0:00 [ksoft
root          34  0.0  0.0      0     0 ?        I<   14:00   0:00 [kwork
root          35  0.0  0.0      0     0 ?        S    14:00   0:00 [kdevt
root          36  0.0  0.0      0     0 ?        I<   14:00   0:00 [netns
root          37  0.0  0.0      0     0 ?        I<   14:00   0:00 [inet_
root          38  0.0  0.0      0     0 ?        S    14:00   0:00 [kaudi
root          41  0.0  0.0      0     0 ?        S    14:00   0:00 [khung
root          42  0.0  0.0      0     0 ?        S    14:00   0:00 [oom_r
root          43  0.0  0.0      0     0 ?        I<   14:00   0:00 [write
```

```
yyr          6916  0.0  0.9 1093424 77992 ?        Sl   14:13   0:04 evince
yyr          6923  0.0  0.0 156056  5380 ?         Sl   14:13   0:00 /usr/l
yyr          6987  0.7  0.7 907656 60564 ?         Ssl  14:14   0:53 /usr/l
yyr          7251  0.0  1.9 29757216 154444 ?      Sl   14:19   0:05 /opt/g
yyr          7287  0.0  1.1 25540960 95544 ?       Sl   14:20   0:00 /opt/g
yyr          7619  0.0  1.6 25552976 135748 ?      Sl   14:28   0:02 /opt/g
yyr          8468  0.0  0.7 25532368 61932 ?       Sl   14:50   0:00 /opt/g
yyr          8493  0.0  0.0  19512  4960 pts/2     Ss   14:51   0:00 bash
yyr          8563  0.0  0.0  19512  4972 pts/3     Ss   14:53   0:00 bash
root         9114  0.1  0.0      0     0 ?         I    15:15   0:06 [kwork
root         9259  0.1  0.0      0     0 ?         I    15:21   0:03 [kwork
root         9356  0.0  0.0      0     0 ?         I    15:27   0:02 [kwork
root         9389  0.0  0.0      0     0 ?         I    15:31   0:02 [kwork
root         9393  0.0  0.0      0     0 ?         I    15:31   0:00 [kwork
root         9495  0.0  0.0      0     0 ?         I    15:47   0:00 [kwork
root         9587  0.0  0.0      0     0 ?         I    15:58   0:00 [kwork
root         9641  0.0  0.0      0     0 ?         I    16:04   0:00 [kwork
root         9699  0.0  0.0      0     0 ?         I    16:06   0:00 [kwork
root         9702  0.0  0.0      0     0 ?         I    16:06   0:00 [kwork
root         9742  0.1  0.0      0     0 ?         I    16:08   0:00 [kwork
root         9903  0.0  0.0      0     0 ?         I    16:12   0:00 [kwork
yyr          9908 95.6  0.0   2496   648 pts/2     R+   16:12   0:02 ./cpu-
yyr          9909 17.3  0.0  17540  2556 pts/2     S+   16:12   0:00 grep -
yyr          9910  0.0  0.0  20132  3260 pts/3     R+   16:12   0:00 ps aux
yyr@Yaswanth-Inspiron-5437:~/Courses/OS_Lab/Lab1/intro-code(1)/intro-code$ cd /proc/9908/fd
yyr@Yaswanth-Inspiron-5437:/proc/9908/fd$ ls
0  1  2
```

Pipes works as an inter-process communication channel process.They only have one direction to travel.Between the two instructions one end of the pipe is used to read and the other end of the pipe is used to write.Here output of ‘cpu-print’ is piped as input to grep command.

e)

```
yyr@Yaswanth-Inspiron-5437:~$ cd /usr/bin/
yyr@Yaswanth-Inspiron-5437:/usr/bin$ ls | grep -w cd
cd-create-profile
cd-fix-profile
cd-iccdump
cd-it8
yyr@Yaswanth-Inspiron-5437:/usr/bin$ ls |grep -w ls
gvfs-ls
ls
yyr@Yaswanth-Inspiron-5437:/usr/bin$ ls | grep -w history
yyr@Yaswanth-Inspiron-5437:/usr/bin$ ls | grep -w ps
ps
yyr@Yaswanth-Inspiron-5437:/usr/bin$
```

In /usr/bin we can see codes for ls and ps.So both ls and ps are programs executed by bash,whereas cd and history are commands executed by shell.

4)memory1.c

```
yyr@Yaswanth-Inspiron-5437:~/Courses/OS_Lab/Lab1/intro-code(1)/intro-code$ gcc memory1.c -o memory1
yyr@Yaswanth-Inspiron-5437:~/Courses/OS_Lab/Lab1/intro-code(1)/intro-code$ ./memory1


Program : 'memory_1'
--------------------


PID : 10337
Size of int : 4

Press Enter Key to exit.
```

```
yyr@Yaswanth-Inspiron-5437:~$ ps ef -o command,rss
COMMAND                      RSS
bash SSH_AUTH_SOCK=/run/use  5008
 \_ ps ef -o command,rss SH  3092
bash SSH_AUTH_SOCK=/run/use  5272
 \_ ./memory1 SHELL=/bin/ba  4932
bash SSH_AUTH_SOCK=/run/use  5056
/usr/lib/gdm3/gdm-x-session  6472
 \_ /usr/lib/xorg/Xorg vt2  62688
 \_ /usr/libexec/gnome-sess 13740
yyr@Yaswanth-Inspiron-5437:~$
```

Memory2.c

```
yyr@Yaswanth-Inspiron-5437:~/Courses/OS_Lab/Lab1/intro-code(1)/intro-code$ gcc memory2.c -o memory2
yyr@Yaswanth-Inspiron-5437:~/Courses/OS_Lab/Lab1/intro-code(1)/intro-code$ ./memory2


Program : 'memory_2'
--------------------


PID : 10510
Size of int : 4

Press Enter Key to exit.
```

```
yyr@Yaswanth-Inspiron-5437:~$ ps -ef -o command,rss
COMMAND                      RSS
bash SSH_AUTH_SOCK=/run/use  5288
 \_ ps -ef -o command,rss S  3164
bash SSH_AUTH_SOCK=/run/use  5480
 \_ ./memory2 SHELL=/bin/ba  4904
/usr/lib/gdm3/gdm-x-session  6472
 \_ /usr/lib/xorg/Xorg vt2  62684
 \_ /usr/libexec/gnome-sess 13740
yyr@Yaswanth-Inspiron-5437:~$
```

RSS for memory1.c is more compared to memory1.c.

5)Before:

```
yyr@Yaswanth-Inspiron-5437:~/Courses/OS_Lab/Lab1/intro-code(1)/intro-code$ iostat
Linux 5.11.0-44-generic (Yaswanth-Inspiron-5437)        13/01/22        _x86_64_        (4 CPU)

avg-cpu:  %user   %nice %system %iowait  %steal   %idle
           2.89    0.10    1.08    3.34    0.00   92.60

Device             tps    kB_read/s    kB_wrtn/s    kB_dscd/s    kB_read    kB_wrtn    kB_dscd
loop0             0.01         0.20         0.00         0.00       1072          0          0
loop1             0.00         0.00         0.00         0.00         17          0          0
loop10            0.01         0.20         0.00         0.00       1073          0          0
loop11            0.31         0.96         0.00         0.00       5178          0          0
loop12            0.01         0.06         0.00         0.00        350          0          0
loop13            0.01         0.06         0.00         0.00        347          0          0
loop14            0.14         1.53         0.00         0.00       8278          0          0
loop15            0.01         0.20         0.00         0.00       1065          0          0
loop16            0.25         8.84         0.00         0.00      47904          0          0
loop17            0.21         2.34         0.00         0.00      12678          0          0
loop18            0.00         0.00         0.00         0.00         22          0          0
loop2             0.01         0.20         0.00         0.00       1087          0          0
loop3             0.01         0.20         0.00         0.00       1098          0          0
loop4             0.01         0.20         0.00         0.00       1110          0          0
loop5             0.01         0.06         0.00         0.00        347          0          0
loop6             0.01         0.07         0.00         0.00        358          0          0
loop7             0.07         1.03         0.00         0.00       5605          0          0
loop8             0.01         0.20         0.00         0.00       1083          0          0
loop9             0.01         0.20         0.00         0.00       1082          0          0
sda              26.12       336.37      2362.36         0.00    1822989   12802901          0
scd0              0.00         0.00         0.00         0.00          2          0          0
```

After running disk.c:

```
yyr@Yaswanth-Inspiron-5437:~/Courses/OS_Lab/Lab1/intro-code(1)/intro-code$ iostat
Linux 5.11.0-44-generic (Yaswanth-Inspiron-5437)        13/01/22        _x86_64_(4 CPU)

avg-cpu:  %user   %nice %system %iowait  %steal   %idle
           3.14    0.09    1.18    3.50    0.00   92.08

Device             tps    kB_read/s    kB_wrtn/s    kB_dscd/s    kB_read    kB_wrtn    kB_dscd
loop0             0.01         0.18         0.00         0.00       1072          0          0
loop1             0.00         0.00         0.00         0.00         17          0          0
loop10            0.01         0.18         0.00         0.00       1073          0          0
loop11            0.28         0.88         0.00         0.00       5178          0          0
loop12            0.01         0.06         0.00         0.00        350          0          0
loop13            0.01         0.06         0.00         0.00        347          0          0
loop14            0.13         1.40         0.00         0.00       8278          0          0
loop15            0.01         0.18         0.00         0.00       1065          0          0
loop16            0.26         9.12         0.00         0.00      53968          0          0
loop17            0.19         2.14         0.00         0.00      12678          0          0
loop18            0.00         0.00         0.00         0.00         22          0          0
loop2             0.01         0.18         0.00         0.00       1087          0          0
loop3             0.01         0.19         0.00         0.00       1098          0          0
loop4             0.01         0.19         0.00         0.00       1110          0          0
loop5             0.01         0.06         0.00         0.00        347          0          0
loop6             0.01         0.06         0.00         0.00        358          0          0
loop7             0.07         0.95         0.00         0.00       5605          0          0
loop8             0.01         0.18         0.00         0.00       1083          0          0
loop9             0.01         0.18         0.00         0.00       1082          0          0
sda              28.90       627.41      2179.44         0.00    3712771   12897077          0
scd0              0.00         0.00         0.00         0.00          2          0          0
```

After running disk1.c:

```
yyr@Yaswanth-Inspiron-5437:~/Courses/OS_Lab/Lab1/intro-code(1)/intro-code$yyr@Yyyr@Yaswanth-Inspi
de$ iostat
Linux 5.11.0-44-generic (Yaswanth-Inspiron-5437)        13/01/22        _x86_64_        (4 CPU)

avg-cpu:  %user   %nice %system %iowait  %steal   %idle
           3.15    0.09    1.19    3.55    0.00   92.01

Device             tps    kB_read/s    kB_wrtn/s    kB_dscd/s    kB_read    kB_wrtn    kB_dscd
loop0             0.01         0.18         0.00         0.00       1072          0          0
loop1             0.00         0.00         0.00         0.00         17          0          0
loop10            0.01         0.18         0.00         0.00       1073          0          0
loop11            0.28         0.87         0.00         0.00       5178          0          0
loop12            0.01         0.06         0.00         0.00        350          0          0
loop13            0.01         0.06         0.00         0.00        347          0          0
loop14            0.13         1.39         0.00         0.00       8278          0          0
loop15            0.01         0.18         0.00         0.00       1065          0          0
loop16            0.26         9.07         0.00         0.00      53968          0          0
loop17            0.19         2.13         0.00         0.00      12678          0          0
loop18            0.00         0.00         0.00         0.00         22          0          0
loop2             0.01         0.18         0.00         0.00       1087          0          0
loop3             0.01         0.18         0.00         0.00       1098          0          0
loop4             0.01         0.19         0.00         0.00       1110          0          0
loop5             0.01         0.06         0.00         0.00        347          0          0
loop6             0.01         0.06         0.00         0.00        358          0          0
loop7             0.07         0.94         0.00         0.00       5605          0          0
loop8             0.01         0.18         0.00         0.00       1083          0          0
loop9             0.01         0.18         0.00         0.00       1082          0          0
sda              29.60       693.51      2169.85         0.00    4124675   12905197          0
scd0              0.00         0.00         0.00         0.00          2          0          0
```