EXPERIMENT 7:

TITLE: Write a CPU bound C program and a I/O bound C program and observe the effect of their CPU share using the top command and its variants.

- **I/O bound C program**

```
#include<stdio.h>
#include<time.h>
int main(){
int j,k,n;
while(1){
printf("\nEnter any number: ");
scanf("%d",&k);
printf("Enter any number: ");
scanf("%d",&j);
n = k%j;
printf("%d",n);
}
}
```

```
suraj@surajpandit:~$ cat io.c
#include<stdio.h>
#include<time.h>

int main(){
int j,k,n;
while(1){
printf("\nEnter any number: ");
scanf("%d",&k);
printf("Enter any number: ");
scanf("%d",&j);
n = k%j;
printf("%d",n);
}
}
```

```
    PID USER      PR  NI    VIRT    RES    SHR S  %CPU  %MEM     TIME+ COMMAND
  11525 root      20   0       0      0      0 I   0.0   0.0   0:00.10 kworker/u8:0-events_unbound
  11541 root      20   0       0      0      0 I   0.0   0.0   0:00.02 kworker/u8:2-events_unbound
  11543 suraj     20   0 2933944  63668  47832 S   0.0   3.1   0:00.34 gjs
  11588 root      20   0       0      0      0 I   0.0   0.0   0:00.00 kworker/1:1-events
  11603 suraj     20   0    2772    936    848 S   0.0   0.0   0:00.00 a.out
  11611 root      20   0       0      0      0 I   0.0   0.0   0:00.00 kworker/0:1
  11620 suraj     20   0   44488  19452  11744 S   0.0   1.0   0:00.05 gnome-terminal
  11623 suraj     20   0  391784  27696  20184 S   0.0   1.4   0:00.08 gnome-terminal.
  11628 suraj     20   0   19788   5024   3560 S   0.0   0.2   0:00.00 bash
```

➢ CPU bound program

```
#include<stdio.h>
#include<time.h>
void main(){
   clock_t start,end;
   double runtime;
   start = clock();
   int i,num = 1,primes = 0;
   while(num <= 10000000000000){
     i=2;
     while (i<= num){
       if(num % i ==0)
       break;
       i++;
     }
    if (i == num)
        primes++;
    printf("%d prime numbers calculated\n",primes);
    num++;
    }
    end = clock();
    runtime = (end - start) / (double) CLOCKS_PER_SEC;
    printf("This machine calculated all %d prime numbers in %g seconds\n" , primes ,runtime);
}
```

CODE:

```
suraj@surajpandit:~$ cat cpubound.c
#include<stdio.h>
#include<time.h>

void main(){
   clock_t start,end;
   double runtime;
   start = clock();
   int i,num = 1,primes = 0;

   while(num <= 10000000000000){
      i=2;
      while (i<= num){
         if(num % i ==0)
         break;
         i++;
      }
     if (i == num)
           primes++;


     printf("%d prime numbers calculated\n",primes);
     num++;
     }

     end = clock();
     runtime = (end - start) / (double) CLOCKS_PER_SEC;
     printf("This machine calculated all %d prime numbers in %g seconds\n" , primes ,runtime);
}
```

OUTPUT:

```
    PID USER      PR  NI    VIRT    RES    SHR S  %CPU  %MEM     TIME+ COMMAND
  11665 suraj     20   0    2772    936    844 R  99.3   0.0   0:16.67 a.out
   2482 suraj     20   0  578648  63384  48644 D   7.6   3.1   0:32.86 gnome-terminal-
   1719 suraj     20   0 5276984 426356 123060 S   2.0  21.1   2:35.99 gnome-shell
  11525 root      20   0       0      0      0 R   1.0   0.0   0:00.30 kworker/u8:0-events_unbound
    444 systemd+  20   0   14824   6168   5384 S   0.3   0.3   0:02.84 systemd-oomd
   2106 suraj     20   0  162220   1724   1484 S   0.3   0.1   0:04.99 VBoxClient
  11541 root      20   0       0      0      0 I   0.3   0.0   0:00.17 kworker/u8:2-events_unbound
      1 root      20   0  241668  13248   8224 S   0.0   0.7   0:01.62 systemd
      2 root      20   0       0      0      0 S   0.0   0.0   0:00.00 kthreadd
```