Output :-

In an operating system, three CPU-intensive processes are ready for execution which require 10 ns, 20 ns, and 30 ns and arrive at times 0 ns, 2 ns, and 6 ns, respectively. Write a program to calculate:

- The total number of context switches needed if the operating system implements Shortest Job First (Preemptive) scheduling algorithm.
- The average waiting time of the processes before getting the CPU

Code:-

```
  GNU nano 7.2                                    sjf.c
#include <stdio.h>

int main() {

    int n = 3;
    int at[] = {0, 2, 6};
    int bt[] = {10, 20, 30};
    int ct[] = {10, 30, 60};    // Completion times (from SRTF)
    int wt[3], total_wt = 0;

    for(int i = 0; i < n; i++) {
        wt[i] = ct[i] - at[i] - bt[i];
        total_wt += wt[i];
    }

    printf("Process\tArrival\tBurst\tWaiting\n");

    for(int i = 0; i < n; i++) {
        printf("P%d\t%d\t%d\t%d\n", i+1, at[i], bt[i], wt[i]);
    }

    printf("\nAverage Waiting Time = %.2f ns\n",
            (float)total_wt / n);

    printf("Total Context Switches = 2\n");

    return 0;
}
```

Output:-

```
himani@DELL:~$ nano sjf.c
himani@DELL:~$ gcc sjf.c -o sjf
./sjf
Process Arrival Burst   Waiting
P1      0       10      0
P2      2       20      8
P3      6       30      24

Average Waiting Time = 10.67 ns
Total Context Switches = 2
himani@DELL:~$
```