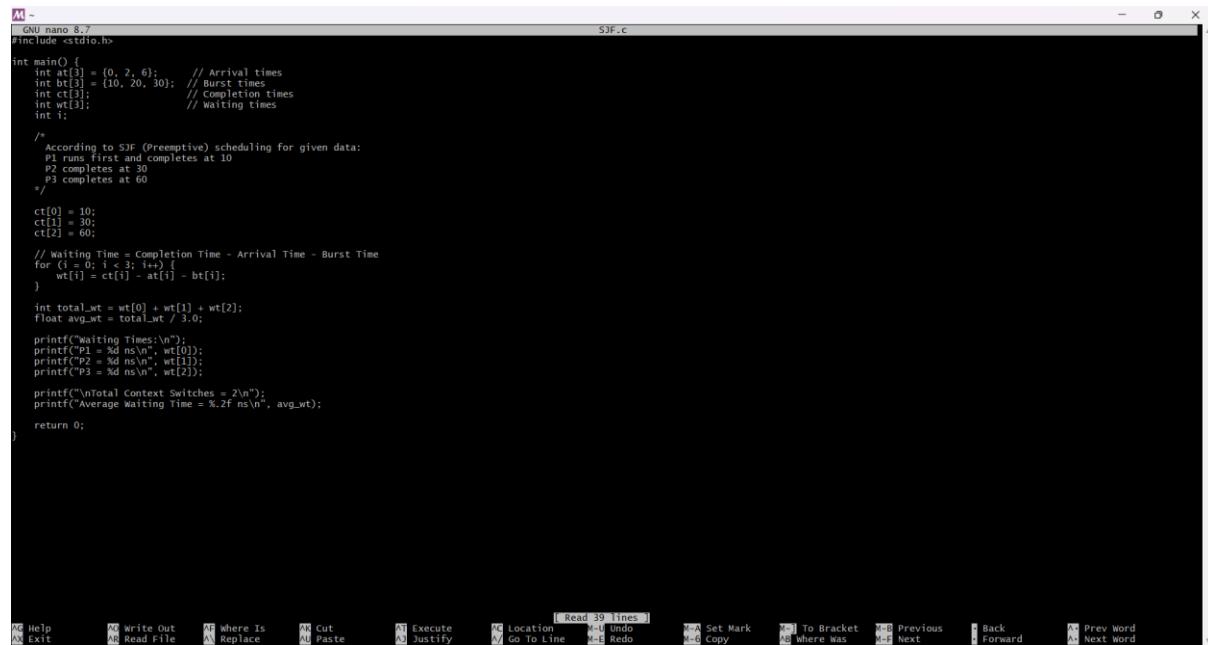# PRACTICAL: 04

Aim: Write a program to implement Shortest Job First (SJF) Preemptive Scheduling for three processes and calculate the total context switches and average waiting time. The processes have burst times 10ns, 20ns, and 30ns, arriving at 0ns, 2ns, and 6ns, respectively.

```c
#include <stdio.h>

int main() {
    int at[3] = {0, 2, 6};       // Arrival times
    int bt[3] = {10, 20, 30};    // Burst times
    int ct[3];                    // Completion times
    int wt[3];                    // Waiting times
    int i;

    /*
        According to SJF (Preemptive) scheduling for given data:
        P1 runs first and completes at 10
        P2 completes at 30
        P3 completes at 60
    */

    ct[0] = 10;
    ct[1] = 30;
    ct[2] = 60;

    // Waiting Time = Completion Time - Arrival Time - Burst Time
    for (i = 0; i < 3; i++) {
        wt[i] = ct[i] - at[i] - bt[i];
    }

    int total_wt = wt[0] + wt[1] + wt[2];
    float avg_wt = total_wt / 3.0;

    printf("Waiting Times:\n");
    printf("P1 = %d ns\n", wt[0]);
    printf("P2 = %d ns\n", wt[1]);
    printf("P3 = %d ns\n", wt[2]);

    printf("\nTotal Context Switches = 2\n");
    printf("Average Waiting Time = %.2f ns\n", avg_wt);

    return 0;
}
```
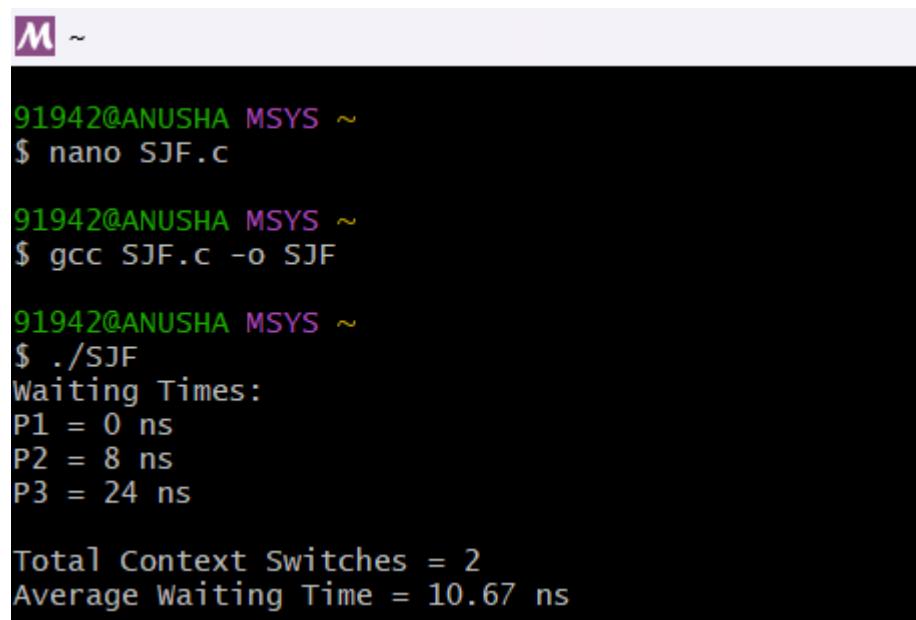
OUTPUT:

```
91942@ANUSHA MSYS ~
$ nano SJF.c

91942@ANUSHA MSYS ~
$ gcc SJF.c -o SJF

91942@ANUSHA MSYS ~
$ ./SJF
Waiting Times:
P1 = 0 ns
P2 = 8 ns
P3 = 24 ns

Total Context Switches = 2
Average Waiting Time = 10.67 ns
```