

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.

```
1 // SJF Preemptive Scheduling
2 #include <iostream>
3 using namespace std;
4
5 int main() {
6     // Arrival times
7     int at[3] = {0, 2, 6};
8     // Burst times
9     int bt[3] = {10, 20, 30};
10    // Completion times
11    int ct[3];
12    // Waiting times
13    int wt[3];
14
15    // Execution order (SJF Preemptive but no preemption here)
16    int i = 0; // P1 completes at 10
17    int j = 1; // P2 completes at 20
18    int k = 2; // P3 completes at 30
19
20    // Waiting time = ct - bt - at
21    for (i = 0; i < 3; i++) {
22        wt[i] = ct[i] - bt[i] - at[i];
23    }
24
25    int total_at = at[0] + at[1] + at[2];
26    float avg_at = total_at / 3.0;
27
28    printf("Waiting Times:\n");
29    for (i = 0; i < 3; i++) {
30        printf("P%d = %d ns\n", i + 1, wt[i]);
31    }
32
33    printf("Total Context Switches = %d\n", 2);
34    printf("Average Waiting Time = %f ns\n", avg_at);
35
36    return 0;
37 }
```

OUTPUT:

```
user@AnushkaGudadhe MSYS ~
$ nano SJF.c

user@AnushkaGudadhe MSYS ~
$ gcc SJF.c -o SJF

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

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