

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>
#include <limits.h>

int main() {
    int n = 3;
    int arrival[] = {0, 2, 6};
    int burst[] = {10, 20, 30};
    int remaining[] = {10, 20, 30};
    int waiting[3], completion[3];

    int time = 0, completed = 0;
    int min, shortest;
    int prev = -1, context_switch = 0;

    while (completed != n) {
        min = INT_MAX;
        shortest = -1;

        for (int i = 0; i < n; i++) {
            if (arrival[i] <= time && remaining[i] > 0 && remaining[i] < min) {
                min = remaining[i];
                shortest = i;
            }
        }

        if (shortest == -1) {
            time++;
            continue;
        }

        if (prev != shortest) {
            if (prev != -1)
                context_switch++;
            prev = shortest;
        }

        remaining[shortest]--;
        time++;

        if (remaining[shortest] == 0) {
            completed++;
            completion[shortest] = time;
            waiting[shortest] = completion[shortest] - burst[shortest] - arrival[shortest];
        }
    }
}
```

Output:-

```
himani@DELL:~$ nano sjf.c
himani@DELL:~$ gcc sjf.c -o sjf
himani@DELL:~$ gcc sjf.c -o sjf
himani@DELL:~$ ./sjf
Total Context Switches = 2
Average Waiting Time = 10.67
himani@DELL:~$
```