PRACTICAL: 05

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
GNU nano 8.7
#include <stdio.h>

int main() {
    int n = 3; // Number of processes
    int arrival[] = {0, 2, 6};
    int burst[] = {10, 20, 30};
    int remaining[3];
    int completed = 0, time = 0, i;
    int context_switches = 0;
    int last_process = -1;
    float waiting_time = 0;

    // Initialize remaining times
    for(i = 0; i < n; i++)
        remaining[i] = burst[i];

    while(completed < n) {
        int idx = -1;
        int min_remaining = 1000000; // large number

        // Find the process with shortest remaining time
        for(i = 0; i < n; i++) {
            if(arrival[i] <= time && remaining[i] > 0 && remaining[i] < min_remaining) {
                min_remaining = remaining[i];
                idx = i;
            }
        }

        if(idx != -1) {
            // Context switch count
            if(last_process != idx) {
                if(last_process != -1)
                    context_switches++;
                last_process = idx;
            }

            remaining[idx]--;
            time++;

            if(remaining[idx] == 0) {
                completed++;
                waiting_time += time - burst[idx] - arrival[idx];
            }
        } else {
            time++; // CPU idle
        }
    }

    printf("Total Context Switches = %d\n", context_switches);
    printf("Average Waiting Time = %.2f ns\n", waiting_time/n);

    return 0;
}
```



```
HP@DESKTOP-IUUK17D MSYS ~
# gcc hello.c -o hello

HP@DESKTOP-IUUK17D MSYS ~
# ./hello
Total Context Switches = 2
Average Waiting Time = 10.67 ns

HP@DESKTOP-IUUK17D MSYS ~
#
```