Experiment-7:Construct a C program to implement a non-preemptive SJF algorithm.

Aim:

The aim of this program is to implement the Non-Preemptive Shortest Job First (SJF) Scheduling Algorithm in C. In the non-preemptive SJF algorithm, the process with the shortest burst time is selected for execution first, and once a process starts executing, it runs to completion without being interrupted.

Procedure:

1. Input:
   - Number of processes.
   - Burst time for each process.
2. Sorting:
   - Sort processes in ascending order of burst time. In case two processes have the same burst time, they are processed based on their arrival order.
3. Execution:
   - Select the process with the shortest burst time from the ready queue and execute it.
4. Waiting Time Calculation:
   - Calculate the waiting time for each process. Waiting time is the total time a process spends waiting in the ready queue before it gets executed.
5. Turnaround Time Calculation:
   - Calculate the turnaround time for each process. Turnaround time is the total time taken from the arrival of the process to its completion.
6. Output:
   - Output the process ID, burst time, waiting time, and turnaround time for each process, as well as the average waiting time and average turnaround time.

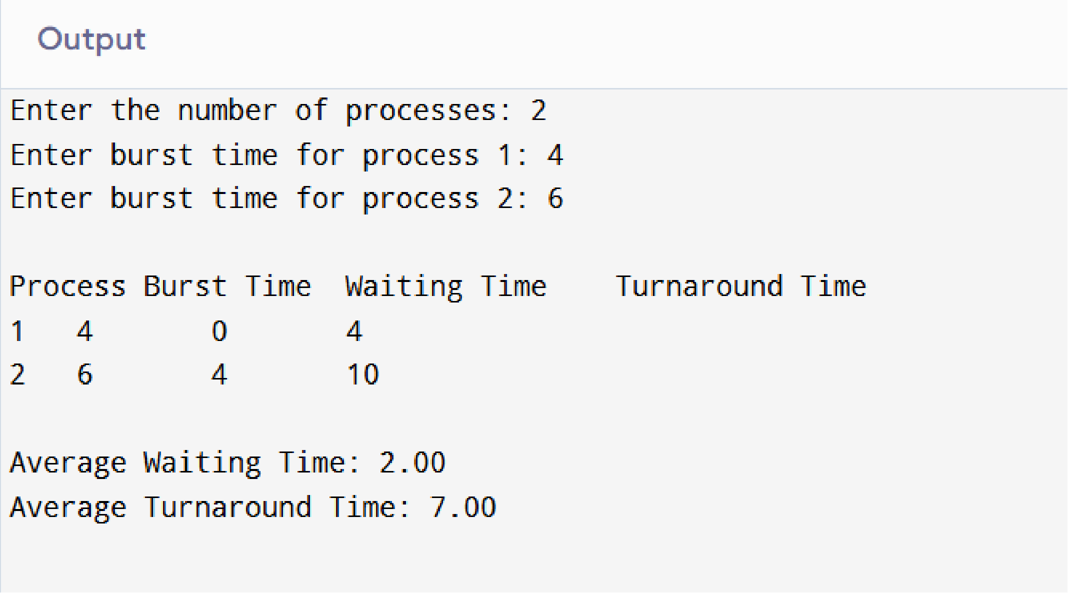
Non-Preemptive Shortest Job First (SJF) Scheduling Algorithm:

- Non-preemptive SJF means that once a process starts executing, it runs to completion.
- Shortest Job First selects the process with the shortest burst time to execute next.

C Program Implementation:

```
#include <stdio.h>


struct Process {
    int id;
    int burst_time;
    int waiting_time;
    int turnaround_time;
};


// Function to sort processes by burst time
void sortByBurstTime(struct Process processes[], int n) {
    struct Process temp;
    for (int i = 0; i < n - 1; i++) {
        for (int j = i + 1; j < n; j++) {
            if (processes[i].burst_time > processes[j].burst_time) {
                // Swap processes[i] and processes[j]
                temp = processes[i];
                processes[i] = processes[j];
                processes[j] = temp;
            }
        }
    }
}
int main() {
    int n;
    printf("Enter the number of processes: ");
    scanf("%d", &n);

    struct Process processes[n];

    int total_waiting_time = 0, total_turnaround_time = 0;

    for (int i = 0; i < n; i++) {

        processes[i].id = i + 1;  // Assign process ID

        printf("Enter burst time for process %d: ", i + 1);

        scanf("%d", &processes[i].burst_time);

    }

    sortByBurstTime(processes,

    processes[0].waiting_time = 0;  // The first process has no waiting time

    for (int i = 1; i < n; i++) {

        processes[i].waiting_time = processes[i - 1].waiting_time + processes[i - 1].burst_time;

    }

    for (int i = 0; i < n; i++) {

        processes[i].turnaround_time = processes[i].waiting_time + processes[i].burst_time;

        total_waiting_time += processes[i].waiting_time;

        total_turnaround_time += processes[i].turnaround_time;

    }

    printf("\nProcess\tBurst Time\tWaiting Time\tTurnaround Time\n");

    for (int i = 0; i < n; i++) {

        printf("%d\t%d\t\t%d\t\t%d\n", processes[i].id, processes[i].burst_time,
processes[i].waiting_time,

                processes[i].turnaround_time);

    }

    printf("\nAverage Waiting Time: %.2f\n", (float)total_waiting_time / n);

    printf("Average Turnaround Time: %.2f\n", (float)total_turnaround_time / n);

    return 0;

}
```

Output:



```
Enter the number of processes: 2
Enter burst time for process 1: 4
Enter burst time for process 2: 6

Process Burst Time  Waiting Time    Turnaround Time
1   4       0       4
2   6       4       10

Average Waiting Time: 2.00
Average Turnaround Time: 7.00
```