SHORTEST JOB FIRST

1. Shortest job first (SJF) or shortest job next, is a scheduling policy that selects the waiting process with the smallest execution time to execute next. SJN is a non-preemptive algorithm.
2. Shortest Job first has the advantage of having a minimum average waiting time among all scheduling algorithms.
3. It is a Greedy Algorithm.
4. It may cause starvation if shorter processes keep coming. This problem can be solved using the concept of ageing.
5. It is practically infeasible as Operating System may not know burst time and therefore may not sort them. While it is not possible to predict execution time, several methods can be used to estimate the execution time for a job, such as a weighted average of previous execution times. SJF can be used in specialized environments where accurate estimates of running time are available.

Approach:

The following is the approach used for the implementation of the shortest job first:

As the name suggests, the shortest job first algorithm is an algorithm which executes the process whose burst time is least and has arrived before the current time.

Therefore, in order to find the process which needs to be executed, sort all the processes from the given set of processes according to their arrival time.

This ensures that the process with the shortest burst time which has arrived first is executed first.

Instead of finding the minimum burst time process among all the arrived processes by iterating the whole struct array, the range minimum of the burst time of all the arrived processes up to the current time is calculated using segment tree.

After selecting a process which needs to be executed, the completion time, turn around time and waiting time is calculated by using arrival time and burst time of the process.

The formulae to calculate the respective times are:

Completion Time: Time at which process completes its execution.

Completion Time = Start Time + Burst Time

Turn Around Time: Time Difference between completion time and arrival time.

Turn Around Time = Completion Time – Arrival Time

Waiting Time(W.T): Time Difference between turnaround time and burst time.

Waiting Time = Turn Around Time – Burst Time

After calculating, the respective times are updated in the array and the burst time of the executed process is set to infinity in the segment tree base array so that it is not considered as the minimum burst time in the further queries.