Lab report no : 08

Lab report name : Implementation of SJF scheduling algorithm.

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Objective:- Shortest Job First (SJF) scheduling algorithm technique in detail.

To understand the advantage and disadvantage of Shortest Job First (SJF) scheduling algorithm technique.

Shortest Job First:- Shortest job first can be either preemptive or non-preemptive. Owing to its simple nature, shortest job first is considered optimal. It also reduces the average waiting time for other processes awaiting execution.

Algorithm:

1. Sort all the process according to the arrival time.

2. Then select that process which has minimum arrival time and minimum Burst time.

3. After completion of process make a pool of process which after till the completion of previous process and select that process among the pool which is having minimum Burst time.

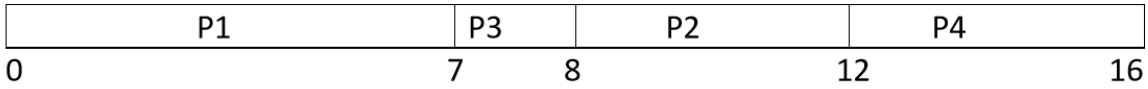
1. Completion Time: Time at which process completes its execution.

2. Turn Around Time: Time Difference between completion time and arrival time. Turn Around Time = Completion Time – Arrival Time

3. Waiting Time (W.T): Time Difference between turn-around time and burst time.

Waiting Time = Turn Around Time – Burst Time In this post, we have assumed arrival times as 0, so turn around and completion times are same.

Gantt chart:-



process	Arrival time	Burst time	Completion time	Turn-around time	Waiting time
P1	0	7	7	7	0
P2	2	4	12	10	10
P3	4	1	8	4	3
P4	5	4	16	11	7

Average waiting time = (0+6+3+7)/4

=4ms

Average turn-around time = (7+10+8+11)/4

=8ms

Code:-

```
// C++ program to implement Shortest Job first with Arrival Time

#include<iostream>

using namespace std;

int mat[10][6];


void swap(int *a, int *b)

{

 int temp = *a;

 *a = *b;
```

```
 *b = temp;
}

void arrangeArrival(int num, int mat[][6])
{
 for(int i=0; i<num; i++)
 {
  for(int j=0; j<num-i-1; j++)
  {
   if(mat[j][1] > mat[j+1][1])
   {
    for(int k=0; k<5; k++)
    {
     swap(mat[j][k], mat[j+1][k]);
    }
   }
  }
 }
}

void completionTime(int num, int mat[][6])
{
```

```
int temp, val;
mat[0][3] = mat[0][1] + mat[0][2];
mat[0][5] = mat[0][3] - mat[0][1];
mat[0][4] = mat[0][5] - mat[0][2];

for(int i=1; i<num; i++)
{
 temp = mat[i-1][3];
 int low = mat[i][2];
 for(int j=i; j<num; j++)
 {
  if(temp >= mat[j][1] && low >= mat[j][2])
  {
   low = mat[j][2];
   val = j;
  }
 }
 mat[val][3] = temp + mat[val][2];
 mat[val][5] = mat[val][3] - mat[val][1];
 mat[val][4] = mat[val][5] - mat[val][2];
 for(int k=0; k<6; k++)
 {
```

```
   swap(mat[val][k], mat[i][k]);
  }
 }
}

int main()
{
 int num, temp;

 cout<<"Enter number of Process: ";
 cin>>num;

 cout<<"...Enter the process ID...\n";
 for(int i=0; i<num; i++)
 {
  cout<<"...Process "<<i+1<<"...\n";
  cout<<"Enter Process Id: ";
  cin>>mat[i][0];
  cout<<"Enter Arrival Time: ";
  cin>>mat[i][1];
  cout<<"Enter Burst Time: ";
  cin>>mat[i][2];
```

```
}


arrangeArrival(num, mat);
completionTime(num, mat);
cout<<"Process ID\tArrival Time\tBurst Time\tWaiting Time\tTurnaround Time\n";
for(int i=0; i<num; i++)
{
cout<<mat[i][0]<<"\t\t"<<mat[i][1]<<"\t\t"<<mat[i][2]<<"\t\t"<<mat[i][4]<<
"\t\t"<<mat[i][5]<<"\n";
}
}
```

Output:

```
Enter number of Process: 4
...Enter the process ID...
...Process 1...
Enter Process Id: 4
Enter Arrival Time: 5
Enter Burst Time: 4
...Process 2...
Enter Process Id: 3
Enter Arrival Time: 4
Enter Burst Time: 1
...Process 3...
Enter Process Id: 2
Enter Arrival Time: 2
Enter Burst Time: 4
...Process 4...
Enter Process Id: 1
Enter Arrival Time: 0
Enter Burst Time: 7
Process ID      Arrival Time    Burst Time      Waiting Time    Turnaround Time
1               0               7               0               7
3               4               1               3               4
4               5               4               3               7
2               2               4               10              14

Process returned 0 (0x0)   execution time : 47.147 s
Press any key to continue.
```

Conclusion:- Regarding the average and waiting time is pretty advantage then FCFS .This because the execution of small processes in start brings a little time waiting for long processes. One of the major disadvantage of this algorithm is: a process must wait in the queue if he has a large time of execution although he may be in the queue for a long time if on the queue come processes with short execution time .