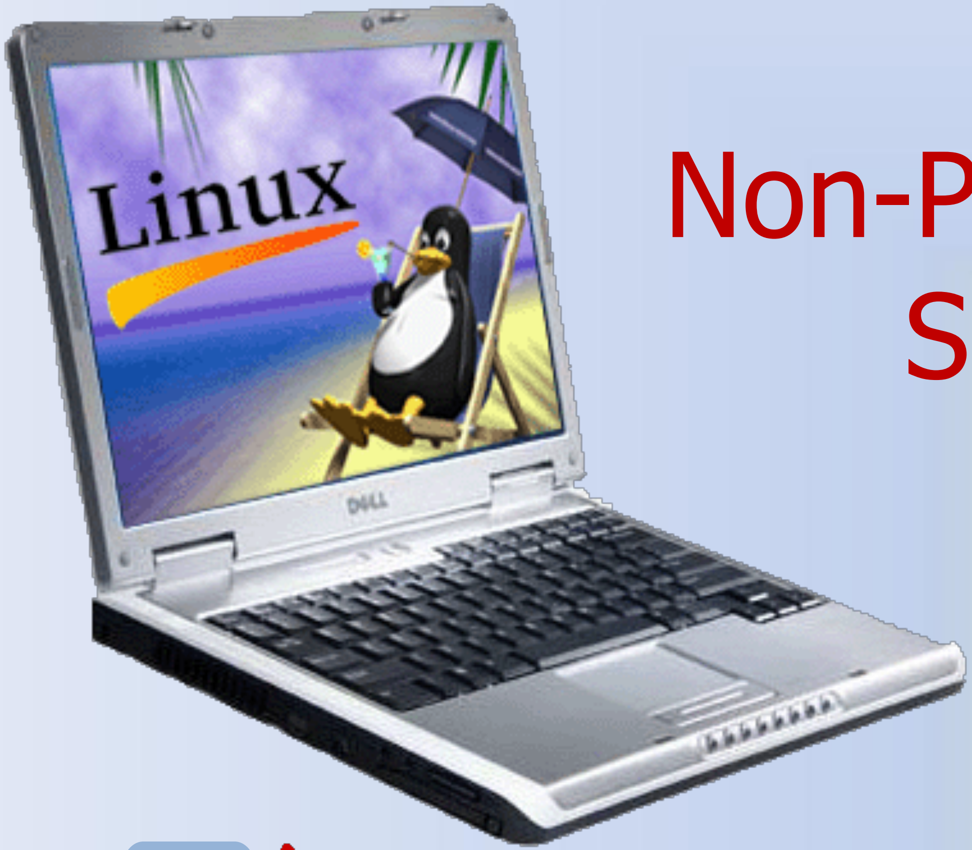

Non-Preemptive SJF Scheduling

Lab 09

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Lab Objective

- To practice the Non-Preemptive SJF scheduling.

SJF Scheduling

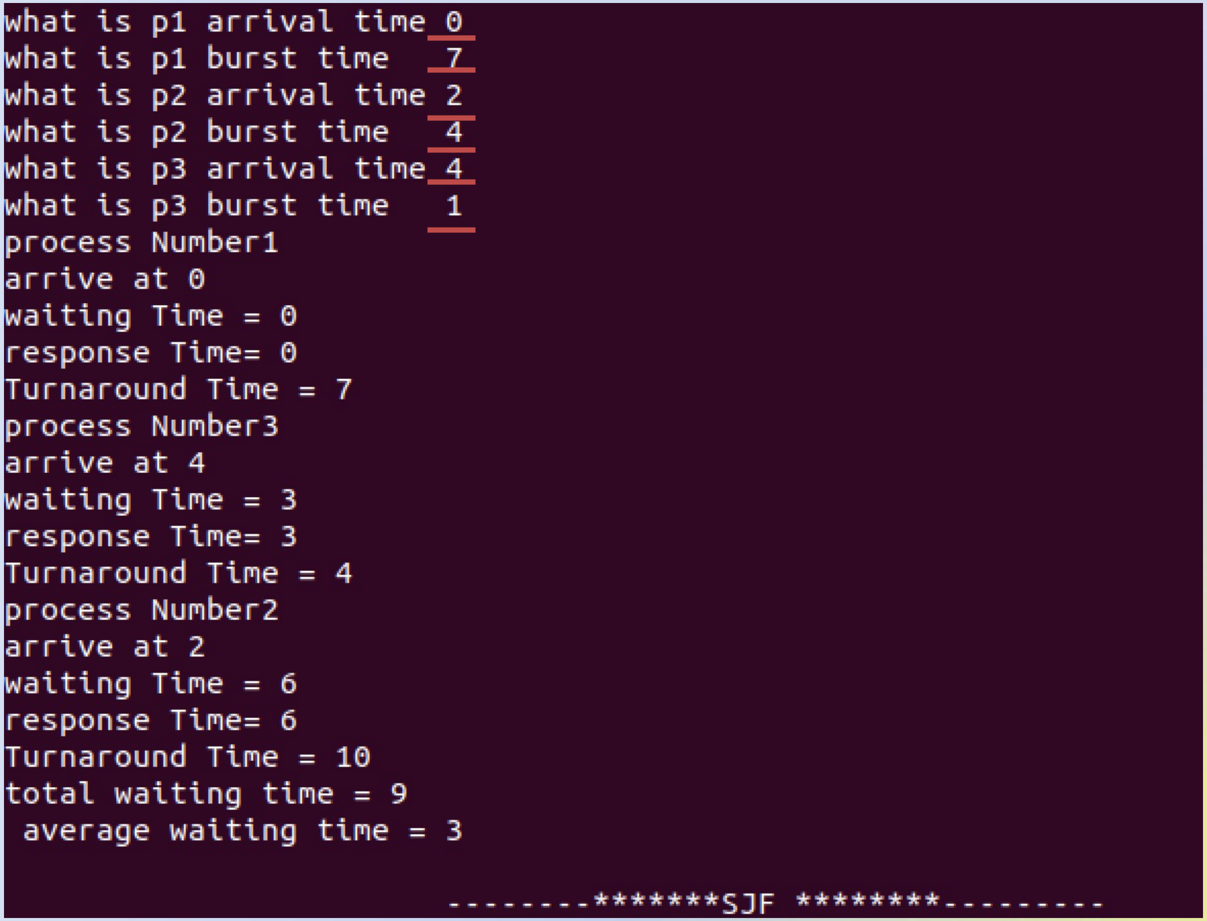
- Associate with each process the length of its next CPU burst. Use these length to schedule the process with the shortest time
- Two schemes:
  - *Non-preemptive*: once CPU given to the process it cannot be preempted until completes its CPU burst.
  - *preemptive*: if a new process arrives with CPU burst length less than remaining time of current executing process, preempt.
- SJF is optimal – gives minimum average waiting time for a given set of processes.

Procedure

- Write a C++ program that simulate the Non-Preemptive SJF CPU scheduling policy.
- Assume that you have only three processes.
- The inputs to the program are the arrival time and burst time of each process.
- The output of the program are the response time, waiting time, and turnaround time for each of the three process.

Procedure (Cont.)

- The following is a sample run of the program (the underlined numbers are entered by the user who runs the program):



```
what is p1 arrival time 0
what is p1 burst time   7
what is p2 arrival time 2
what is p2 burst time   4
what is p3 arrival time 4
what is p3 burst time   1
process Number1
arrive at 0
waiting Time = 0
response Time= 0
Turnaround Time = 7
process Number3
arrive at 4
waiting Time = 3
response Time= 3
Turnaround Time = 4
process Number2
arrive at 2
waiting Time = 6
response Time= 6
Turnaround Time = 10
total waiting time = 9
 average waiting time = 3

                        --------*******SJF ********---------
```

```
#include <iostream>
using namespace std;

float n, tempb, tempa, tempp, tw, average, gap,a rrive[3], burst[3],
process[3],start[3],finish[3],waiting[3],response[3], turnaround[3];

///////////////////start finish function///////////
void start_finish()
{
   start[0]=arrive[0];
   finish[0]=arrive[0]+burst[0];
   for(int i=1;i<3;i++)
   {
     gap=0;
     if(arrive[i]>finish[i-1])
     {
       gap=arrive[i]-finish[i-1];
       start[i]=finish[i-1]+gap;
     }//end if
     else
       start[i]=finish[i-1];

     finish[i]=start[i]+burst[i];
 }//end for
} //end start_finish function
```

```
int main()
{
   int i,j;

/////////////// Get values from User///////////
   for(i=0;i<3;i++)
   { n=i+1;
     process[i]=n;
     cout<<"what is p"<<n<<" arrival time\t";
     cin>>arrive[i];
     cout<<" what is p"<<n<<" burst time\t";
     cin>>burst[i];
   }//end for
```

```
//////////Sort process based on arrival time//////////////

  for(i=0;i<2;i++)
     for( j=i+1;j<3;j++)
     {
       if(arrive[j]<arrive[i])
       {
          tempa=arrive[i];
          arrive[i]=arrive[j];
          arrive[j]=tempa;

          tempb=burst[i];
          burst[i]=burst[j];
          burst[j]=tempb;

          tempp=process[i];
          process[i]=process[j];
          process[j]=tempp;
       }//end if
      }//end for

////////////calculate start and finish times /////////////
   start_finish();
```

```
//////////Resort//////////////

  for(i=0;i<2;i++)
     for( j=i+1;j<3;j++)
     {
       if(arrive[j]<=start[i] && burst[j]<burst[i])
       {
          tempa=arrive[i];
          arrive[i]=arrive[j];
          arrive[j]=tempa;

          tempb=burst[i];
          burst[i]=burst[j];
          burst[j]=tempb;

          tempp=process[i];
          process[i]=process[j];
          process[j]=tempp;
       }//end if
      }//end for

/////////////calculate start and finish times /////////////
   start_finish();
```

```
///calculate response, waiting, turnaround times for each process///
    tw=0;
    for(i=0;i<3;i++)
    { response[i]= start[i]-arrive[i];
      waiting[i]= start[i]-arrive[i];
      turnaround[i]= finish[i]-arrive[i];
      tw+=waiting[i];
    }//end for
///calculate average waiting time///
    average= tw/3;

//////////////////Display results///////////////////
    for(i=0;i<3;i++)
    {
      cout<<"process Number"<<process[i]<<'\n'<<"arrive at 
"<<arrive[i]<<'\n'<<"waiting Time = "<<waiting[i]<<'\n'<<"response 
Time= "<<response[i]<<'\n'<<"Turnaround Time = 
"<<turnaround[i]<<'\n’;
    }
    cout<<"Total waiting time = "<<tw;
    cout<<"\n \n Average waiting time = "<<average;
    cout<<"\n\n\t\t\t--------*******SJF *******---------\n";
    return(0);
}//end main
```

Practice

- Write, compile and run a C++ program that simulates the non-preemptive SJF
- The main process creates two threads to perform the task of the function `start_finish`

Check Cases

	Input		Output		
	Arrival	Burst	Response	Waiting	Turnaround
P1	4	2	2	2	4
P2	1	5	0	0	5
P3	3	6	5	5	11
P1	2	4	6	6	10
P2	0	5	0	0	5
P3	5	3	0	0	3
P1	1	3	3	3	6
P2	1	2	0	0	2
P3	2	1	1	1	2
P1	6	3	3	3	6
P2	0	2	0	0	2
P3	3	6	0	0	6

Question ?