OS Simulation Based Assignment Assessment Rubric

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GitHub Link: **https://github.com/impksingh/os-project.git**

Problem:12

ALGORITHM:-

Theoretical Explanation:-

1. LRTF is to be used. Student C has the longest remaining time. So the serving starts with C.
2. After C is served for 4 minutes, the remaining time of B and C are equal. B has the lowest ID number. So the serve moves onto B.
3. After B is served for 2 minutes, the reaming time of A and B are equal. But still, B has the lowest ID number. So B is served.

4. Since his “food taken time” is 4 minutes, he is done with the job.

5. Comparing the remaining students A and C, C has a longer waiting time i.e., 4 min (total time being 8 min after he was serving 4 minutes). So, C is continued with the service.

The remaining time of C and A are equal after serving him for 2 minutes. A has the lowest ID number. So, the serve moves onto A.

He is done with the job since his “food taken time” is 2 minutes, after serving A for 2 minutes

The remaining 2 min of his “food taken time” is serve moves onto C again to

process.

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14

c c c c c b b b b c c a a c c

Total Turn Around Time = Arrival Time - Completion Time

Wait Time + Burst Time = Turn Around Time

A completes the job in 12 min, arrival time of A is 0.

B completes the job in 8 min, arrival time of B is 0.

C completes the job in 14 min, arrival time of C is 0.

Total Turn Around Time = Arrival Time - Completion Time

Turn Around Time (A) = 12 - 0 = 12 min

Turn Around Time (B) = 8 - 0 = 8 min

Turn Around Time (C) = 14 - 0 = 14 min

Given;

min A’s Burst Time = 2

min B’s Burst Time= 4

min C’s Burst Time= 8

Here, Burst Time = Food Taken Time

Waiting Time = Turn-Around Time - Burst Time (BT)

Wait Time (A) = 12 - 2 = 10

Wait Time (B) = 8 - 4 = 4

Wait Time (C) = 14 - 8 = 6

CODE:-

```
#include <stdio.h>
struct student
{
   int STD_ID,Time_for_food,WT,TAT;


};

void get_data(struct student list[], int s);
void show(struct student list[], int s);
void scheduling(struct student list[], int
s); void WT(struct student list[], int n);
void TAT(struct student list[], int n);

int main()
{
   struct student data[20];
   int n,i;
   char c='n';
   do
         {
   printf(" TOTAL NUMBER OF STUDENT TO EAT IN MESS :- ");
   scanf("%d", &n);
   get_data(data, n);
   scheduling(data,
   n); WT(data,n);
   TAT(data,n);
   show(data, n);
   printf("======================================WANT TO TRY FOR
MORE VALUES=================================== ");
   scanf("%s",&c);
   }while(c=='y');
   return 0;
}

void get_data(struct student list[80], int s)
{
   int i;
   for (i = 0; i < s; i++)
   {

printf("\nEnter Student id %d\t", i + 1);
scanf("%d", &list[i].STD_ID);
  printf(" For Student Enter time taken for food (minuts) %d\t", i + 1);
```

```
    scanf("%d", &list[i].Time_for_food);
  }
}
void show(struct student list[80], int s)
{
  int i,AvgWT=0,AvgTAT=0;
      int TotalWatingTime=0,TotalTAT=0;
  printf("\n\nOutput according to LRTF\n");
  printf("\n|Student id\tTime_for_food\tWT\t\tTAT |");


  for (i = 0; i < s; i++)
  {
    printf("\n|%d\t\t%d\t\t%d\t\t%d\t\t|", list[i].STD_ID,
list[i].Time_for_food,list[i].WT,list[i].TAT);
            TotalWatingTime= TotalWatingTime+list[i].WT;
            TotalTAT= TotalTAT+list[i].TAT;
      }
      printf("\n\nTotal Waiting Time is: = %d",TotalWatingTime);
      printf("\nTotal Turn around Time is: = %d\n\n",TotalTAT);
      printf("\n\ntAverage Waiting Time is: = %d",TotalWatingTime/s);
      printf("\nAverage Turn around Time is: = %d\n\n",TotalTAT/s);
}
void scheduling(struct student list[80], int s)
{
  int i, j;
  struct student temp;

  for (i = 0;i < s -1; i++)
  {
    for (j = 0;j < (s -1-i); j++)
    {
      if (list[j].Time_for_food < list[j + 1].Time_for_food)
      {
        temp  =  list[j];
        list[j] =  list[j +
        1]; list[j + 1]   =
        temp;
      }
      else if(list[j].Time_for_food == list[j + 1].Time_for_food)
      {
            if(list[j].STD_ID > list[j + 1].STD_ID)
            {
            temp=list[j];
        list[j] =list[j+ 1];
        list[j+1]=temp;
        }
                  }
    }
}
```

```
}


void WT(struct student list[80], int n)
{
int j,total;
list[0].WT=0;
   for(j=1;j<n;j++)
   {
      list[j].WT=list[j-1].WT+list[j-1].Time_for_food;
   }
}


void TAT(struct student list[80], int n)
{
int j,total;

        for(j=0;j<n;j++)
       {
        list[j].TAT=list[j].WT+list[j].Time_for_food;
       }
}
```

Advantages:-

SRTF algorithm makes the processing of the jobs faster than SJN algorithm, given it's overhead charges are not counted.

Disadvantages:-

The context switch is done a lot more times in SRTF than in SJN, and consumes CPU's valuable time for processing. This adds up to it's processing time and diminishes it's advantage of fast processing.

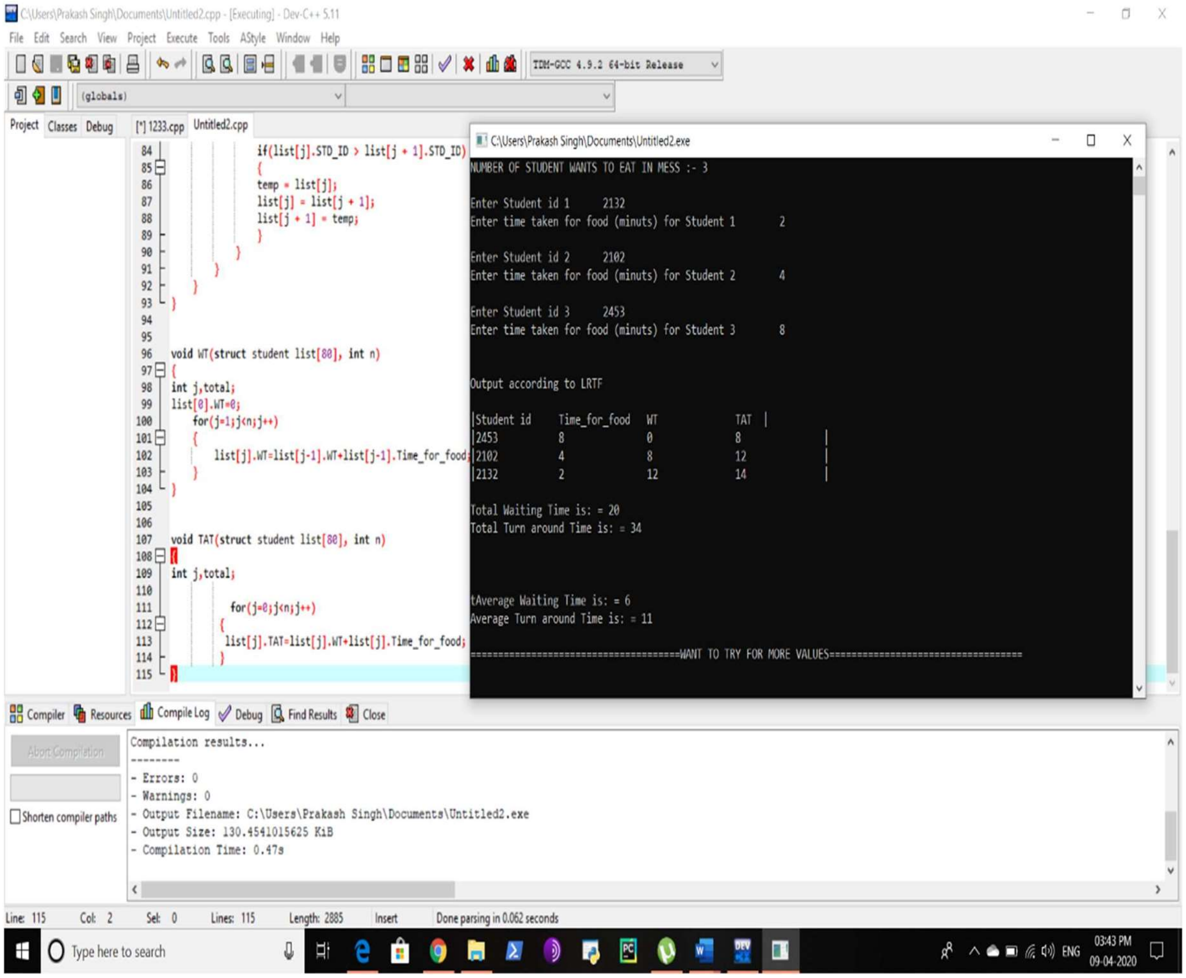
CONSTRAINTS:-

Like shortest job next scheduling, shortest remaining time scheduling is rarely used outside of specialized environments because it requires accurate estimates of the runtime of each process.

TEST RESULTS:-

Output is obtained as-

- **The required Average Turn Around Time** = (12+8+14)/3 = 11.33 minutes
- **The required Average Wait Time** = (10+4+6)/3   = 6.67 minutes



C:\Users\Prakash Singh\Documents\Untitled2.cpp - [Executing] - Dev-C++ 5.11
File Edit Search View Project Execute Tools AStyle Window Help
TDM-GCC 4.9.2 64-bit Release
(globals)
Project Classes Debug
[*] 1233.cpp
Untitled2.cpp
C:\Users\Prakash Singh\Documents\Untitled2.exe
Compiler
Resources
Compile Log
Debug
Find Results
Close
Abort Compilation
□ Shorten compiler paths
Line: 115 Col: 2 Sel: 0 Lines: 115 Length: 2885 Insert Done parsing in 0.062 seconds
Type here to search
03:43 PM
09-04-2020
ENG

```
                if(list[j].STD_ID > list[j + 1].STD_ID)
                {
                temp = list[j];
                list[j] = list[j + 1];
                list[j + 1] = temp;
                }
            }
        }
    }
}


void WT(struct student list[80], int n)
{
int j,total;
list[0].WT=0;
    for(j=1;j<n;j++)
    {
        list[j].WT=list[j-1].WT+list[j-1].Time_for_food;
    }
}


void TAT(struct student list[80], int n)
{
int j,total;

          for(j=0;j<n;j++)
         {
          list[j].TAT=list[j].WT+list[j].Time_for_food;
         }
}
```

```
NUMBER OF STUDENT WANTS TO EAT IN MESS :- 3

Enter Student id 1     2132
Enter time taken for food (minuts) for Student 1       2

Enter Student id 2     2102
Enter time taken for food (minuts) for Student 2       4

Enter Student id 3     2453
Enter time taken for food (minuts) for Student 3       8


Output according to LRTF

|Student id    Time_for_food  WT           TAT  |
|2453          8              0            8             |
|2102          4              8            12            |
|2132          2              12           14            |

Total Waiting Time is: = 20
Total Turn around Time is: = 34



tAverage Waiting Time is: = 6
Average Turn around Time is: = 11

====================================WANT TO TRY FOR MORE VALUES==================================
```

```
Compilation results...
--------
- Errors: 0
- Warnings: 0
- Output Filename: C:\Users\Prakash Singh\Documents\Untitled2.exe
- Output Size: 130.4541015625 KiB
- Compilation Time: 0.47s
```

GITHUB LINK-https://github.com/impksingh/os-project.git