OPERATING SYSTEMS LAB

FACULTY: S.VENKATRAMAN

Lab 6

DATE: 22TH MAR2021

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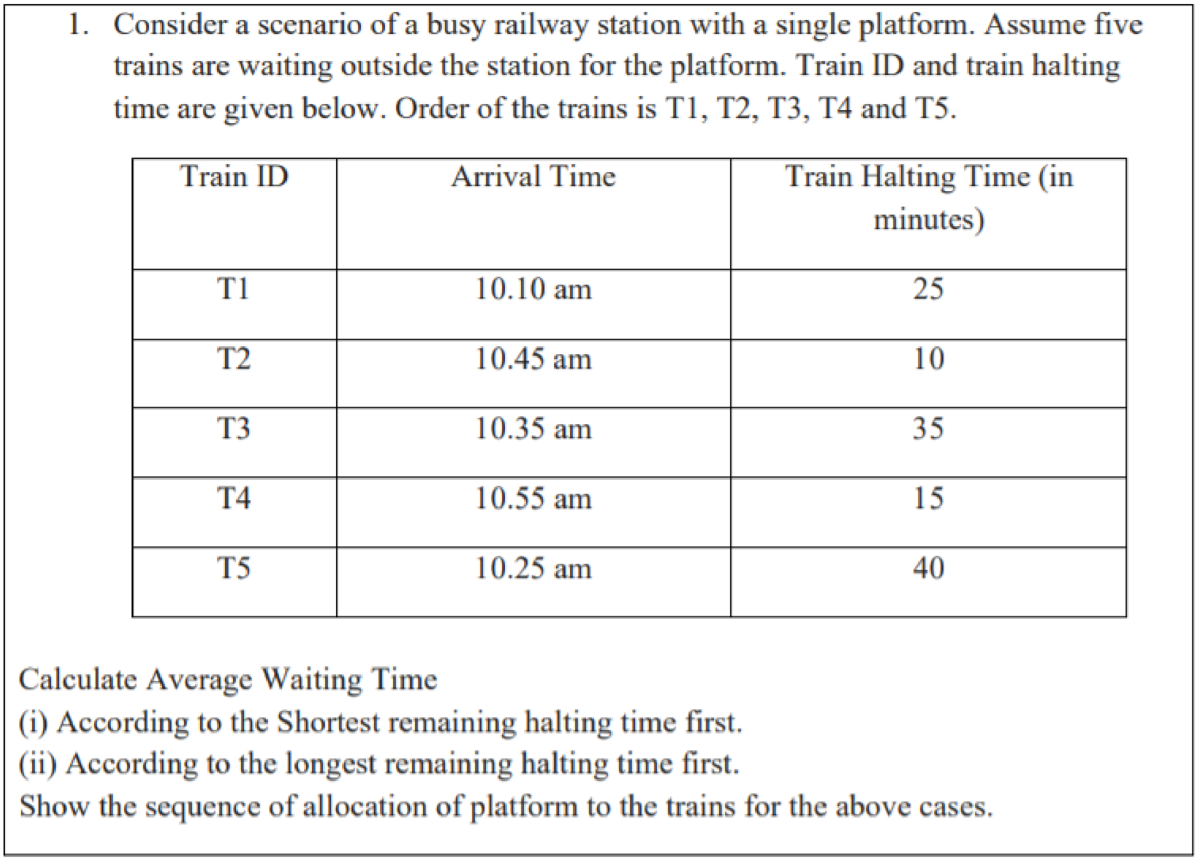
19BCE1446

Aim: To understand and implement preemptive scheduling algorithms



1. Consider a scenario of a busy railway station with a single platform. Assume five trains are waiting outside the station for the platform. Train ID and train halting time are given below. Order of the trains is T1, T2, T3, T4 and T5.

Train ID	Arrival Time	Train Halting Time (in minutes)
T1	10.10 am	25
T2	10.45 am	10
T3	10.35 am	35
T4	10.55 am	15
T5	10.25 am	40

Calculate Average Waiting Time
(i) According to the Shortest remaining halting time first.
(ii) According to the longest remaining halting time first.
Show the sequence of allocation of platform to the trains for the above cases.

SRTF:

Cpu will execute the process with lower burst time

LRTF:

Cpu will execute the process with higher burst time

SRTF:

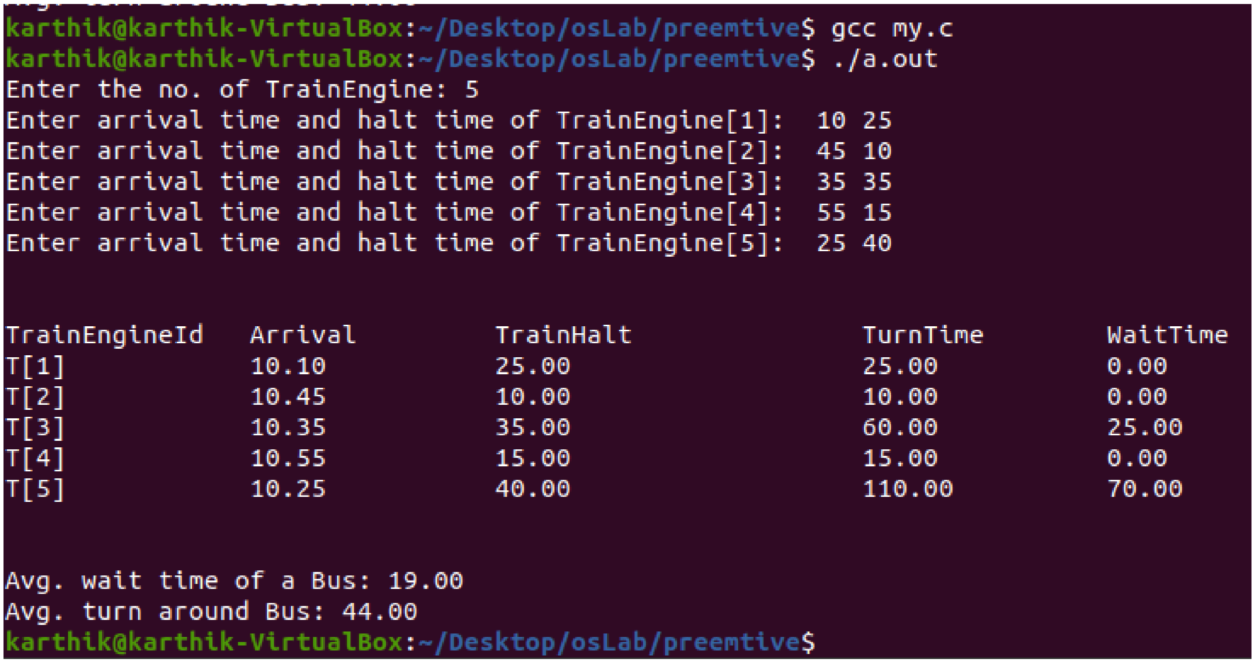
Code:

```
#include<stdio.h>
int main(){
    float arrivalTime[10], burstTime[10],remTime[10];
    float waitTime[10],turnTime[10],complete[10],sumTurn=0,sumWait=0;
    int process[10],remain,endTime;
    int noOfProcess;
    printf("Enter the no. of TrainEngine: ");
    scanf("%d",&noOfProcess);
    for(int i=0;i<noOfProcess;i++){
        printf("Enter arrival time and halt time of TrainEngine[%d]:  ",i+1);
        scanf("%f %f",&arrivalTime[i],&burstTime[i]);
        process[i]=i+1;
        remTime[i]=burstTime[i];
    }
    remTime[9]=9999;
    for(int time=0;remain!=noOfProcess;time++){
        int smallest=9;
        for(int i=0;i<noOfProcess;i++){
            if(arrivalTime[i]<=time &&remTime[i]<remTime[smallest] &&
remTime[i]>0){
                smallest=i;
            }
        }
        remTime[smallest]--;
        if(remTime[smallest]==0){
            remain++;
            endTime=time+1;
            turnTime[smallest]=endTime-arrivalTime[smallest];
            waitTime[smallest]=turnTime[smallest]- burstTime[smallest];
```

```
                        sumWait+=waitTime[smallest];
                    sumTurn+=turnTime[smallest];
                    printf("%f",turnTime[smallest]);
                    }
        }
        printf("\n\nTrainEngineId\tArrival\t\tTrainHalt\t\tTurnTime\tWaitTime\n");
        for(int i=0;i<noOfProcess;i++){

printf("T[%d]\t\t10.%.0f\t\t%.2f\t\t\t%.2f\t\t%.2f\n",i+1,arrivalTime[i],burstTime[i],turnTi
me[i],waitTime[i]);
        }
        printf("\n\nAvg. wait time of a Bus: %.2f",sumWait/noOfProcess);
        printf("\nAvg. turn around Bus: %.2f\n",sumTurn/noOfProcess);
}
```

OutPut:



```
karthik@karthik-VirtualBox:~/Desktop/osLab/preemtive$ gcc my.c
karthik@karthik-VirtualBox:~/Desktop/osLab/preemtive$ ./a.out
Enter the no. of TrainEngine: 5
Enter arrival time and halt time of TrainEngine[1]:  10 25
Enter arrival time and halt time of TrainEngine[2]:  45 10
Enter arrival time and halt time of TrainEngine[3]:  35 35
Enter arrival time and halt time of TrainEngine[4]:  55 15
Enter arrival time and halt time of TrainEngine[5]:  25 40


TrainEngineId   Arrival         TrainHalt               TurnTime        WaitTime
T[1]            10.10           25.00                   25.00           0.00
T[2]            10.45           10.00                   10.00           0.00
T[3]            10.35           35.00                   60.00           25.00
T[4]            10.55           15.00                   15.00           0.00
T[5]            10.25           40.00                   110.00          70.00


Avg. wait time of a Bus: 19.00
Avg. turn around Bus: 44.00
karthik@karthik-VirtualBox:~/Desktop/osLab/preemtive$
```

Lrtf:

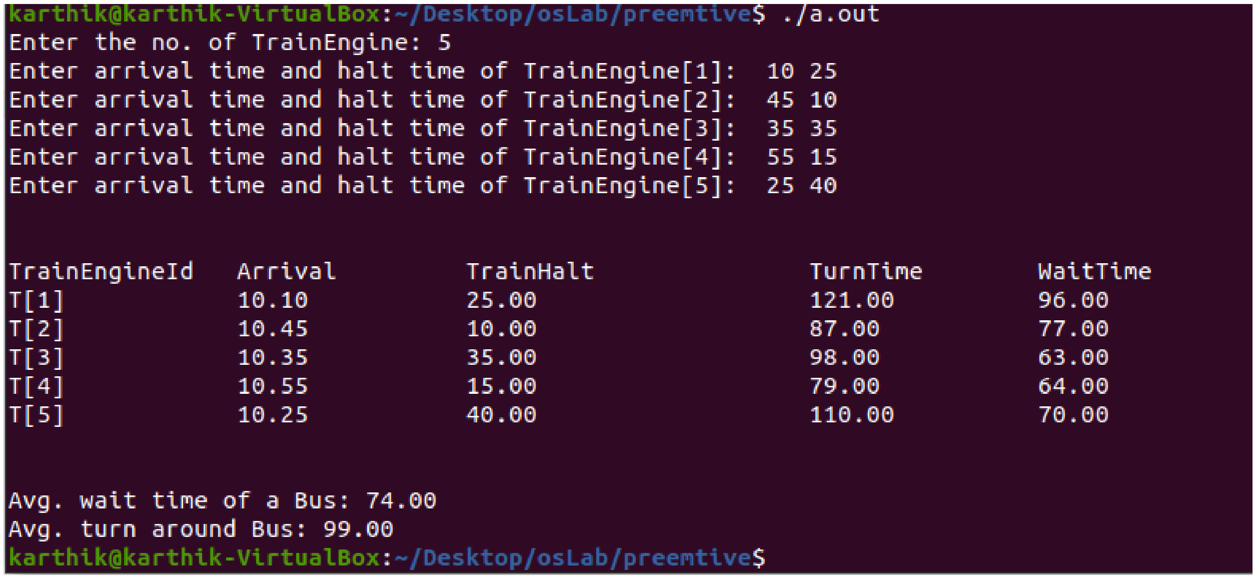
Code:

```
#include<stdio.h>
int main(){
    float arrivalTime[10], burstTime[10],remTime[10];
    float waitTime[10],turnTime[10],complete[10],sumTurn=0,sumWait=0;
    int process[10],remain,endTime;
    int noOfProcess;
    printf("Enter the no. of TrainEngine: ");
    scanf("%d",&noOfProcess);
    for(int i=0;i<noOfProcess;i++){
        printf("Enter arrival time and halt time of TrainEngine[%d]:  ",i+1);
        scanf("%f %f",&arrivalTime[i],&burstTime[i]);
        process[i]=i+1;
        remTime[i]=burstTime[i];
    }
    remTime[9]=-1;
    for(int time=0;remain!=noOfProcess;time++){
        int largest=9;
        for(int i=0;i<noOfProcess;i++){
            if(arrivalTime[i]<=time &&remTime[i]>remTime[largest] &&
remTime[i]>0){
                largest=i;
            }
        }
        remTime[largest]--;
        if(remTime[largest]==0){
            remain++;
            endTime=time+1;
            turnTime[largest]=endTime-arrivalTime[largest];
            waitTime[largest]=turnTime[largest]- burstTime[largest];
            sumWait+=waitTime[largest];
        sumTurn+=turnTime[largest];
```

```
                    }
            }
            printf("\n\nTrainEngineId\tArrival\t\tTrainHalt\t\tTurnTime\tWaitTime\n");
            for(int i=0;i<noOfProcess;i++){

printf("T[%d]\t\t10.%.0f\t\t%.2f\t\t\t%.2f\t\t%.2f\n",i+1,arrivalTime[i],burstTime[i],turnTime[i],waitTime[i]);
            }
            printf("\n\nAvg. wait time of a Bus: %.2f",sumWait/noOfProcess);
            printf("\nAvg. turn around Bus: %.2f\n",sumTurn/noOfProcess);
}
```

OutPut:



```
karthik@karthik-VirtualBox:~/Desktop/osLab/preemtive$ ./a.out
Enter the no. of TrainEngine: 5
Enter arrival time and halt time of TrainEngine[1]:  10 25
Enter arrival time and halt time of TrainEngine[2]:  45 10
Enter arrival time and halt time of TrainEngine[3]:  35 35
Enter arrival time and halt time of TrainEngine[4]:  55 15
Enter arrival time and halt time of TrainEngine[5]:  25 40


TrainEngineId   Arrival         TrainHalt               TurnTime        WaitTime
T[1]            10.10           25.00                   121.00          96.00
T[2]            10.45           10.00                   87.00           77.00
T[3]            10.35           35.00                   98.00           63.00
T[4]            10.55           15.00                   79.00           64.00
T[5]            10.25           40.00                   110.00          70.00


Avg. wait time of a Bus: 74.00
Avg. turn around Bus: 99.00
karthik@karthik-VirtualBox:~/Desktop/osLab/preemtive$
```