Experiment No. 3.1
Write a Program to find out the average waiting time and Turn around Time.

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Subject Name: OPERATING SYSTEM LAB **Subject Code:** 210-20CSP-232_20BIT-1_A

1. ## Aim/Overview of the practical: Write a Program to find out the average waiting time and Turnaround Time.

2. ## Task to be done:

   Apply the best CPU scheduling algorithm for a given problem instance.

3. ## Apparatus:

   - Laptop/PC
   - Good internet connection
   - C language IDE
   - UNIX system

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4. Algorithm-

Step 1 : Input the number of processes required to be scheduled using FCFS, burst time for each process and its arrival time.

Step 2 : Using the enhanced bubble sort technique, sort is all given processes in ascending order according to arrival time in a ready queue.

Step 3 : Calculate the Finish Time, Turn Around Time and Waiting Time for each process which in turn help to calculate the Average Waiting Time and Average Turn Around Time required by CPU to schedule a given set of processes using FCFS.

Step 3.1 : for i = 0, Finish Time T 0 = Arrival Time T 0 + Burst Time T 0

Step 3.2 : for i >= 1, Finish Time T i = Burst Time T i + Finish Time T i - 1

Step 3.3 : for i = 0, Turn Around Time T 0 = Finish Time T 0 - Arrival Time T 0

Step 3.4 : for i >= 1, Turn Around Time T i = Finish Time T i - Arrival Time T i

Step 3.5 : for i = 0, Waiting Time T 0 = Turn Around Time T 0 - Burst Time T 0

Step 3.6 : for i >= 1, Waiting Time T i = Turn Around Time T i - Burst Time T i - 1

Step 4 : Process with less arrival time comes first and gets scheduled first by the CPU.

Step 5 : Calculate the Average Waiting Time and Average Turn Around Time.

Step 6 : Stop.

5. Code-

```cpp
#include <iostream>
using namespace std;
int main()
{
    cout<<"**********PROGRAM FOR VARIOUS CALCULATION OF 4
    PROCESSES************\n";
    int n=4;
    int b[4],w[4],tat[4],s=0,k=0;
    w[0]=0;
    for(int i=0;i<n;i++){
        cout<<"Enter burst time for process"<<i+1<<": ";
        cin>>b[i];
    }
    for(int i=1;i<n;i++){
        w[i]=b[i-1]+w[i-1];
    }
    for(int i=0;i<n;i++){
        tat[i]=b[i]+w[i];
```

```
}
for(int i=0;i<n;i++){
    s+=w[i];
    k+=tat[i];
}
cout<<"\n********Waiting Time***********\n";
for(int i=0;i<n;i++){
    cout<<"for process"<<i+1<<"= "<<w[i]<<"\n";
}
cout<<"Average= "<<s/(double)n;
cout<<"\n********Turn around Time***********\n";
for(int i=0;i<n;i++){
    cout<<"for process"<<i+1<<"= "<<tat[i]<<"\n";
}
cout<<"Average= "<<k/(double)n;




return 0;
}
```
Output-

input

```
**********PROGRAM FOR VARIOUS CALCULATION OF 4 PROCESSES************
Enter burst time for process1: 1
Enter burst time for process2: 2
Enter burst time for process3: 3
Enter burst time for process4: 4

********Waiting Time***********
for process1= 0
for process2= 1
for process3= 3
for process4= 6
Average= 2.5
********Turn around Time***********
for process1= 1
for process2= 3
for process3= 6
for process4= 10
Average= 5


...Program finished with exit code 0
Press ENTER to exit console.
```

Learning outcomes (What I have learnt):

1. Learn how to use different Linux commands like chmod ,echo, read command

2. Understood and execute basic commands of shell script

3. Applied the basic operations in shell script which are required for different

applications.

Evaluation Grid (To be created as per the SOP and Assessment guidelines by the faculty):

Sr. No.	Parameters	Marks Obtained	Maximum Marks
1.			
2.			
3.			