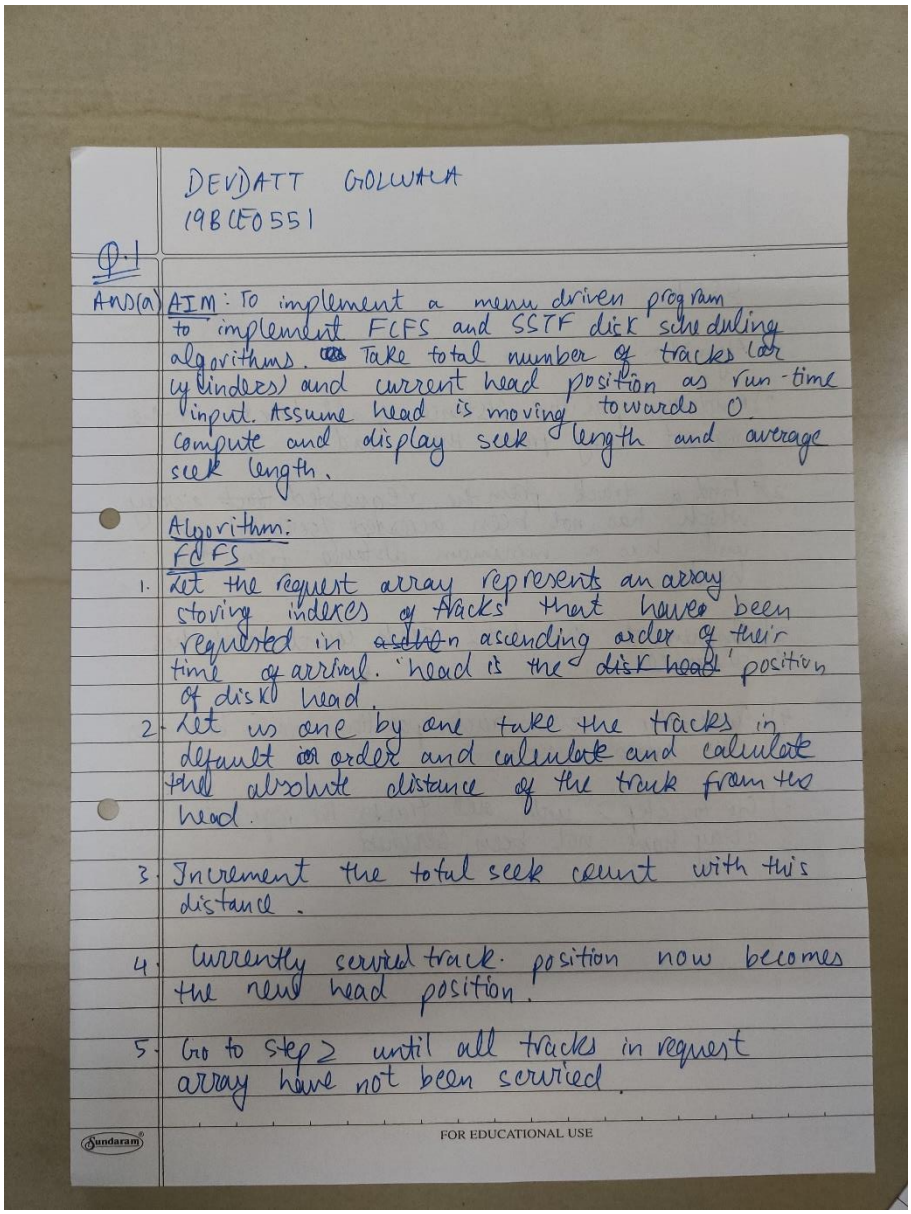
OS LAB FAT

3rd NOVEMBER 2020

QUESTION 1

AIM AND ALGORITHM



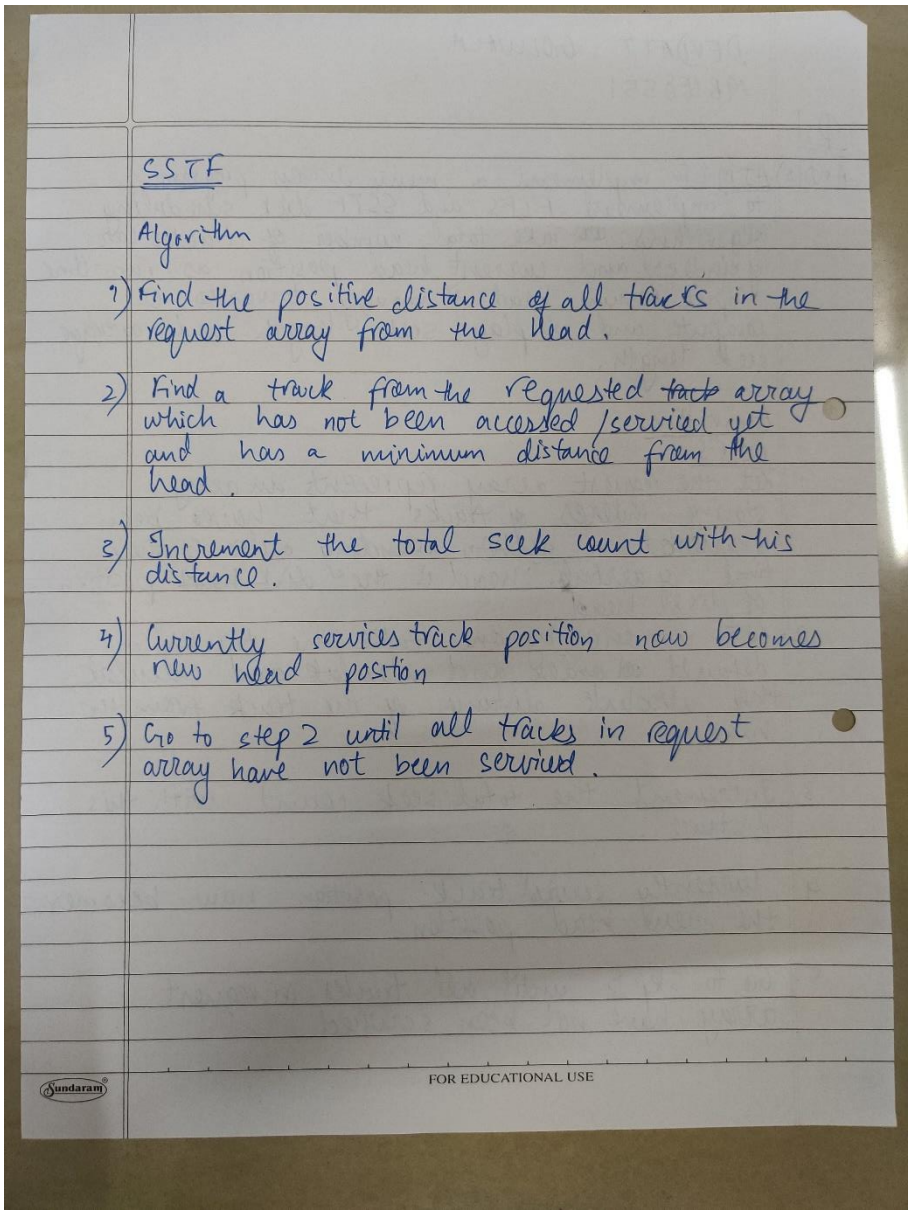
DEVDATT GOLWALA
19BCE0551

Q.1

Ans(a) AIM: To implement a menu driven program to implement FCFS and SSTF disk scheduling algorithms. Take total number of tracks (or cylinders) and current head position as run-time input. Assume head is moving towards 0. Compute and display seek length and average seek length.

Algorithm:
FCFS

1. Let the request array represents an array storing indexes of tracks that have been requested in ascending order of their time of arrival. 'head' is the position of disk head.
2. Let us one by one take the tracks in default order and calculate the absolute distance of the track from the head.
3. Increment the total seek count with this distance.
4. Currently serviced track position now becomes the new head position.
5. Go to step 2 until all tracks in request array have not been serviced.



SSTF

Algorithm

1) Find the positive distance of all tracks in the request array from the head.

2) Find a track from the requested ~~track~~ array which has not been accessed / serviced yet and has a minimum distance from the head.

3) Increment the total seek count with this distance.

4) Currently services track position now becomes new head position

5) Go to step 2 until all tracks in request array have not been serviced.

Sundaram

FOR EDUCATIONAL USE

CODE:

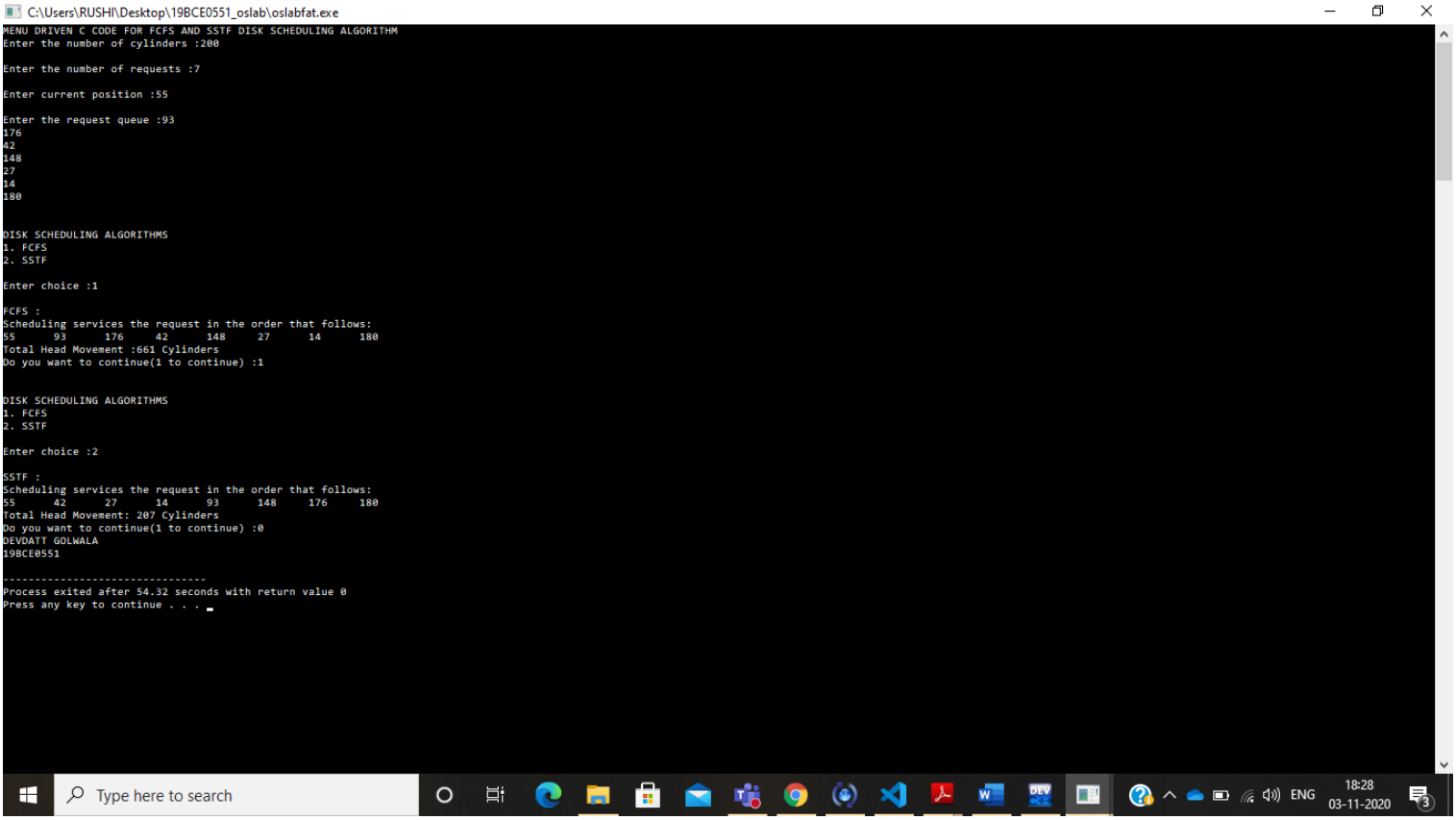
```
#include<stdio.h>
int absolute(int a,int b)
   {int c;
    c=a-b;
    if(c<0)
         return -c;
    else
       return c;
```

```
    }
int main()
  {
   printf("MENU DRIVEN C CODE FOR FCFS AND SSTF DISK SCHEDULING ALGORITHM");
   int choice,m,n,x,start,i,j,pos,min,a[15],count;
   count=0;
   printf("\nEnter the number of cylinders :");
   scanf("%d",&m);
   printf("\nEnter the number of requests :");
   scanf("%d",&n);
   printf("\nEnter current position :");
   scanf("%d",&start);
   printf("\nEnter the request queue :");
   for(i=0;i<n;i++)
              {scanf("%d",&a[i]);
               if(a[i]>=m)
                        {printf("\ninvalid input");
                         scanf("%d",&a[i]);
                         }
               }
   do
    {printf("\n\nDISK SCHEDULING ALGORITHMS\n1. FCFS\n2. SSTF\n");
     printf("\nEnter choice :");
     scanf("%d",&choice);
     count=0;
     x=start;
     switch(choice)
               {case 1:printf("\nFCFS :\n");
                    printf("Scheduling services the request in the order that follows:\n%d\t",start);
                    for(i=0;i<n;i++)
                              {x-=a[i];
```

```
                    if(x<0)
                        x=-x;
                    count+=x;
                    x=a[i];
                    printf("%d\t",x);
                    }
            printf("\nTotal Head Movement :%d Cylinders",count);
            break;
        case 2:printf("\nSSTF :\n");
            printf("Scheduling services the request in the order that follows:\n%d\t",start);
            for(i=0;i<n;i++)
                    {min=absolute(a[i],x);
                    pos=i;
                    for(j=i;j<n;j++)
                            if(min>absolute(x,a[j]))
                                    {pos=j;
                                    min=absolute(x,a[j]);
                                    }
                    count+=absolute(x,a[pos]);
                    x=a[pos];
                    a[pos]=a[i];
                    a[i]=x;
                    printf("%d\t",x);
                    }
            printf("\nTotal Head Movement: %d Cylinders",count);
            break;
        }
        printf("\nDo you want to continue(1 to continue) :");
scanf("%d",&choice);
}while(choice==1);
printf("DEVDATT GOLWALA\n");
```

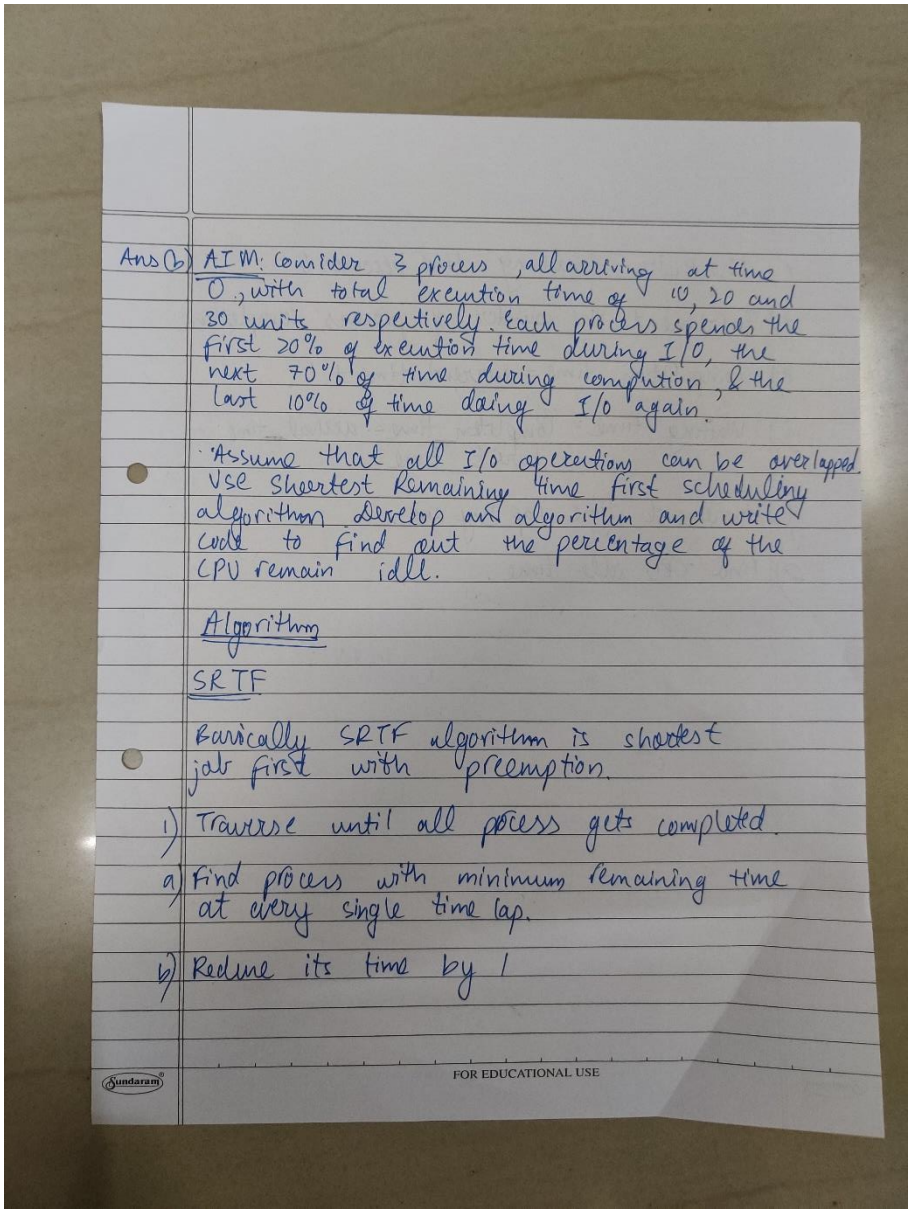
```
    printf("19BCE0551\n");
}
```

Screenshot (OUTPUT)



QUESTION 2

AIM AND ALGORITHM



Ans (b) AIM: Consider 3 process, all arriving at time 0, with total execution time of 10, 20 and 30 units respectively. Each process spends the first 20% of execution time during I/O, the next 70% of time during computation, & the last 10% of time doing I/O again.

· Assume that all I/O operations can be overlapped. Use Shortest Remaining time first scheduling algorithm. Develop an algorithm and write code to find out the percentage of the CPU remain idll.

Algorithm

SRTF

Basically SRTF algorithm is shortest job first with preemption.

1) Traverse until all process gets completed.

a) Find process with minimum remaining time at every single time lap.

b) Reduce its time by 1

c) Check if its remaining time becomes 0.

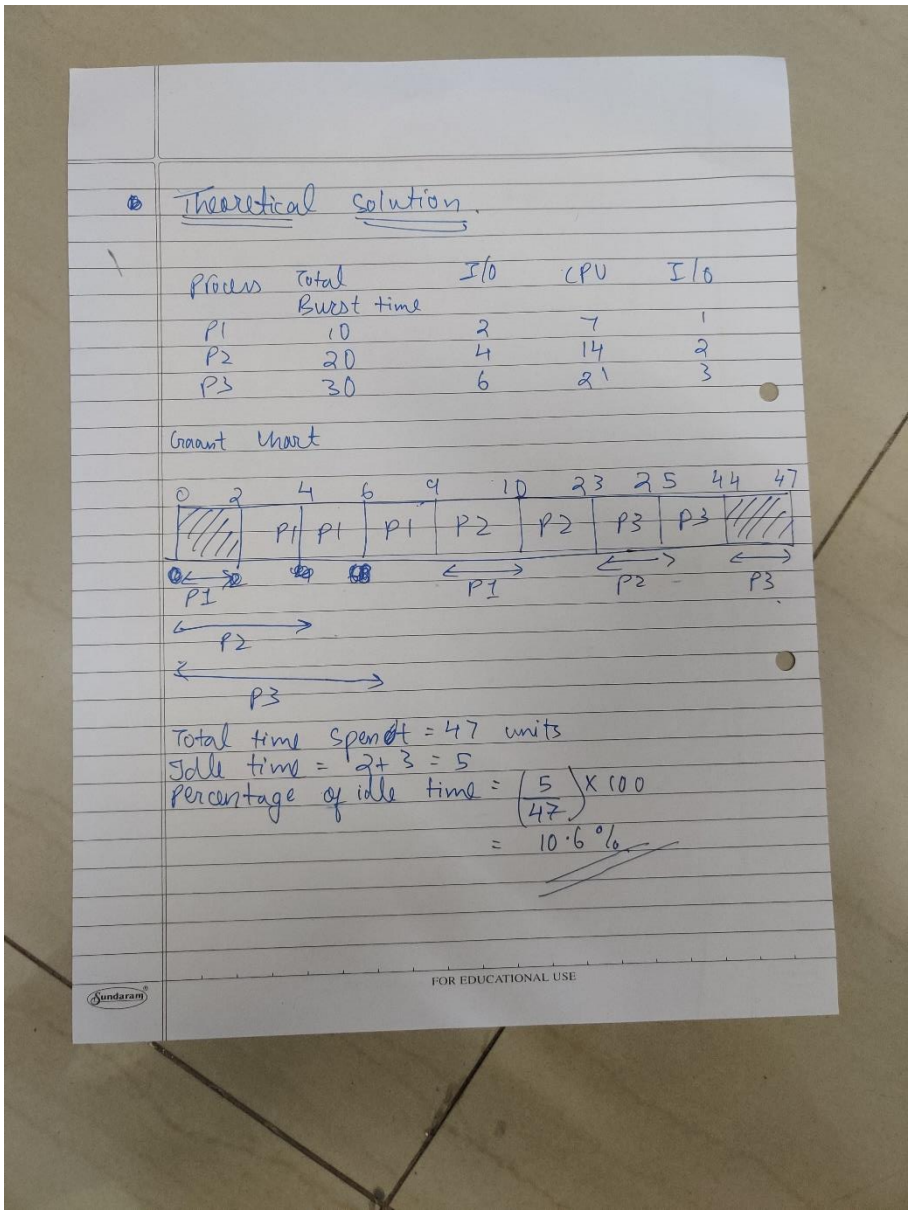
d) Increment the counter of process completion.

e) Completion time = current time + 1

f) Waiting time = Completion_time − arrival_time − burst_time.

g) Increment time lap by one.

2) Find CPU idle time.
→ Calculate total time spent
→ Calculate idle time
→ Percentage idle time = $\left(\frac{\text{Idle time}}{\text{Total time spent}}\right) \times 100$




CODE:

```
// C++ program to implement Shortest Remaining Time First
// Shortest Remaining Time First (SRTF)

#include <bits/stdc++.h>
using namespace std;

struct Process {
        int pid; // Process ID
        int bt; // Burst Time
```

```
        int art; // Arrival Time
};

// Function to find the waiting time for all
// processes
void findWaitingTime(Process proc[], int n,
                                                        int wt[])
{
        int rt[n];

        // Copy the burst time into rt[]
        for (int i = 0; i < n; i++)
                rt[i] = proc[i].bt;

        int complete = 0, t = 0, minm = INT_MAX;
        int shortest = 0, finish_time;
        bool check = false;

        // Process until all processes gets
        // completed
        while (complete != n) {

                // Find process with minimum
                // remaining time among the
                // processes that arrives till the
                // current time`
                for (int j = 0; j < n; j++) {
                        if ((proc[j].art <= t) &&
                        (rt[j] < minm) && rt[j] > 0) {
                                minm = rt[j];
                                shortest = j;
```

```
                check = true;
        }
}

if (check == false) {
        t++;
        continue;
}

// Reduce remaining time by one
rt[shortest]--;

// Update minimum
minm = rt[shortest];
if (minm == 0)
        minm = INT_MAX;

// If a process gets completely
// executed
if (rt[shortest] == 0) {

        // Increment complete
        complete++;
        check = false;

        // Find finish time of current
        // process
        finish_time = t + 1;

        // Calculate waiting time
        wt[shortest] = finish_time -
```

```
                                                    proc[shortest].bt -
                                                    proc[shortest].art;

                        if (wt[shortest] < 0)
                                wt[shortest] = 0;
                }
                // Increment time
                t++;
        }
}

// Function to calculate turn around time
void findTurnAroundTime(Process proc[], int n,
                                                    int wt[], int tat[])
{
        // calculating turnaround time by adding
        // bt[i] + wt[i]
        for (int i = 0; i < n; i++)
                tat[i] = proc[i].bt + wt[i];
}

// Function to calculate average time
void findavgTime(Process proc[], int n)
{
        int wt[n], tat[n], total_wt = 0,
                                        total_tat = 0;

        // Function to find waiting time of all
        // processes
        findWaitingTime(proc, n, wt);
```

```
	// Function to find turn around time for
	// all processes
	findTurnAroundTime(proc, n, wt, tat);

	// Display processes along with all
	// details
	cout << "Processes "
		<< " Burst time "
		<< " Waiting time "
		<< " Turn around time\n";

	// Calculate total waiting time and
	// total turnaround time
	for (int i = 0; i < n; i++) {
		total_wt = total_wt + wt[i];
		total_tat = total_tat + tat[i];
		cout << " " << proc[i].pid << "\t\t"
			<< proc[i].bt << "\t\t " << wt[i]
			<< "\t\t " << tat[i] << endl;
	}

	cout << "\nAverage waiting time = "
		<< (float)total_wt / (float)n;
	cout << "\nAverage turn around time = "
		<< (float)total_tat / (float)n;
}

// Driver code
int main()
{
	Process proc[] = { { 1, 7, 0 }, { 2, 14, 0 },
```

```
                                        { 3, 21, 0 } };
    int n = sizeof(proc) / sizeof(proc[0]);


    findavgTime(proc, n);

    return 0;
}
```

Screenshot (OUTPUT)