Write a C program to simulate the following non-pre-emptive CPU scheduling algorithm to find turnaround time and waiting time.

FCFS

SJF (pre-emptive & Non-pre-emptive)

```
#include <stdio.h> int at[10],
pt[10], ia, ip, n; int tat[10],
wt[10], it, iw, pos, j, i; float atat
= 0, awt = 0; void fcfs()
{ int t;
    printf("Enter number of processes: ");
    scanf("%d", &n);

    printf("Enter arrival times:\n");
    for (ia = 0; ia < n; ia++)
        scanf("%d", &at[ia]);

    printf("Enter process times:\n");
    for (ip = 0; ip < n; ip++)
        scanf("%d", &pt[ip]);

    if (at[0] == at[1])
    {
        t = pt[1];
        pt[1] = pt[0];
        pt[0] = t;
    }

    if (at[0] != 0)
        tat[0] = at[0];

    for (it = 0; it < n; it++)
        tat[it] = 0;

    int i = 0;
    for (it = 0; it < n; it++)
    {
        while (i <= it)
            tat[it] += pt[i++];
        i = 0;
    }
```

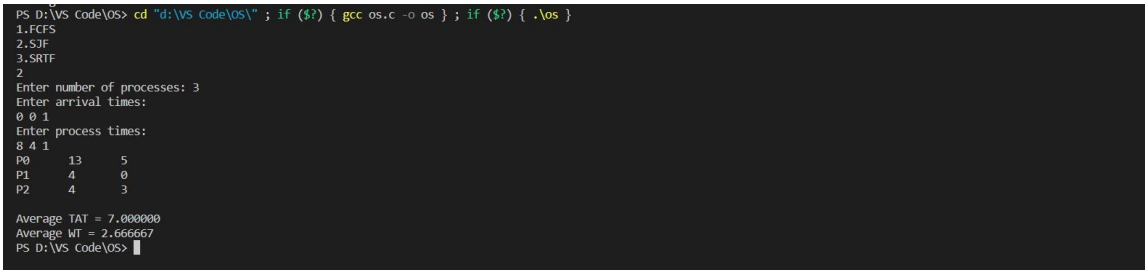
```
    for (it = 0; it < n; it++)
        tat[it] = tat[it] - at[it];

    for (ia = 0; ia < n; ia++)
        wt[ia] = tat[ia] - pt[ia];

    for (i = 0; i < n; i++)
    {
        atat += tat[i];
        awt += wt[i];
    }

    atat = atat / n;
    awt = awt / n;

    for (i = 0; i < n; i++)
    { printf("P%d\t%d\t%d\n", i, tat[i], wt[i]);
    }

    printf("Average TAT=%.2f\nAverage WT=%.2f\n", atat, awt);
}

void srtf()
{
    int rt[10], endTime, i, smallest; int remain = 0, time,
    sum_wait = 0, sum_turnaround = 0; printf("Enter no of
    Processes : "); scanf("%d", &n); printf("Enter arrival
    times\n"); for (i = 0; i < n; i++)
    {
        scanf("%d", &at[i]);
    }
    printf("Enter Process times \n");
    for (i = 0; i < n; i++)
    {
        scanf("%d", &pt[i]);
        rt[i] = pt[i];
    }
    rt[9] = 9999; for (time = 0; remain
    != n; time++) {
        smallest = 9; for (i
        = 0; i < n; i++)
        {
            if (at[i] <= time && rt[i] < rt[smallest] && rt[i] > 0)
            {
```

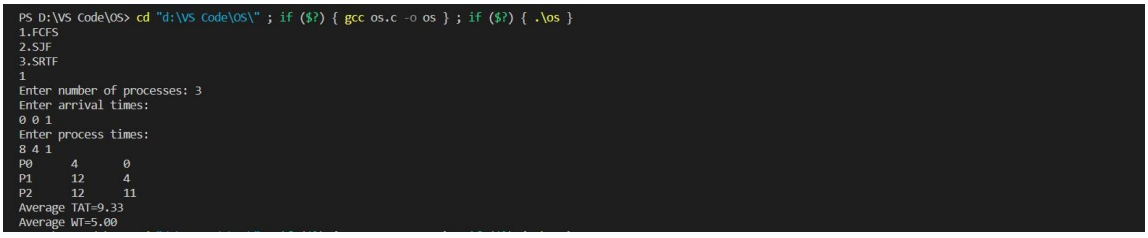
```
            smallest = i;
        } } rt[smallest]--;
      if (rt[smallest] ==
      0)
      {
        remain++; endTime = time + 1; printf("\nP%d %d %d", smallest + 1, endTime -
        at[smallest], endTime - pt[smallest] -
at[smallest]); sum_wait += endTime - pt[smallest] -
        at[smallest]; sum_turnaround += endTime -
        at[smallest];
      }
   }
   printf("\n\nAverage waiting time = %f\n", sum_wait * 1.0 / n);
   printf("Average Turnaround time = %f", sum_turnaround * 1.0 / n);
}

void sjf()
{
   int completed = 0; int
   currentTime = 0; int
   complete[n], ct[n];

   printf("Enter number of processes: ");
   scanf("%d", &n);

   printf("Enter arrival times:\n");
   for (int ia = 0; ia < n; ia++)
   scanf("%d", &at[ia]);

   printf("Enter process times:\n");
   for (int ip = 0; ip < n; ip++)
   scanf("%d", &pt[ip]);

   for (int i = 0; i < n; i++)
   {
      complete[i] = 0;
      ct[i] = 0;
   }
   while (completed != n)
   {
      int shortest = -1;
      int min_bt = 9999;

      for (int i = 0; i < n; i++)
```

```
    {
        if (at[i] <= currentTime && complete[i] == 0)
        {
            if (pt[i] < min_bt)
            {
                min_bt = pt[i];
                shortest = i;
            }
            if (pt[i] == min_bt)
            { if (at[i] < at[shortest])
                {
                    shortest = i;
                }
            }
        }
    }

    if (shortest == -1)
    {
        currentTime++;
    }
    else
    {
        ct[shortest] = currentTime +
        pt[shortest]; tat[shortest] = ct[shortest] -
        at[shortest]; wt[shortest] = tat[shortest] -
        pt[shortest]; complete[shortest] = 1;
        completed++; currentTime =
        ct[shortest];
    }
}

for (int i = 0; i < n; i++)
{
    atat += tat[i];
    awt += wt[i];
}
atat = atat / n;
awt = awt / n;

for (int i = 0; i < n; i++)
{ printf("P%d\t%d\t%d\n", i, tat[i], wt[i]);
}
```

```
    printf("\nAverage TAT = %f\nAverage WT = %f\n", atat, awt);
}

void main()
{
    int op = 1, x; printf("1.FCFS \n2.SJF
    \n3.SRTF\n"); scanf("%d", &x);
    switch (x)
    {
    case 1:
        fcfs();
        break;
    case 2:
        sjf();
        break;

    case 3:
        srtf();
        break;

    default:
        printf("Invalid option \n");
    }
}
```

OUTPUT:





```
PS D:\VS Code\OS> cd "d:\VS Code\OS\" ; if ($?) { gcc os.c -o os } ; if ($?) { .\os }
1.FCFS
2.SJF
3.SRTF
2
Enter number of processes: 3
Enter arrival times:
0 0 1
Enter process times:
8 4 1
P0      13      5
P1      4       0
P2      4       3

Average TAT = 7.000000
Average WT = 2.666667
PS D:\VS Code\OS>
```

```
PS D:\VS Code\OS> cd "d:\VS Code\OS\" ; if ($?) { gcc os.c -o os } ; if ($?) { .\os }
1.FCFS
2.SJF
3.SRTF
3
Enter no of Processes : 3
Enter arrival times
0 0 1
Enter Process times
8 4 1

P3  1  0
P2  5  1
P1  13  5

Average waiting time = 2.000000
Average Turnaround time = 6.333333
PS D:\VS Code\OS>
```