Bansilal Ramnath Agarwal Charitable Trust's

Vishwakarma Institute of Technology, Pune-37

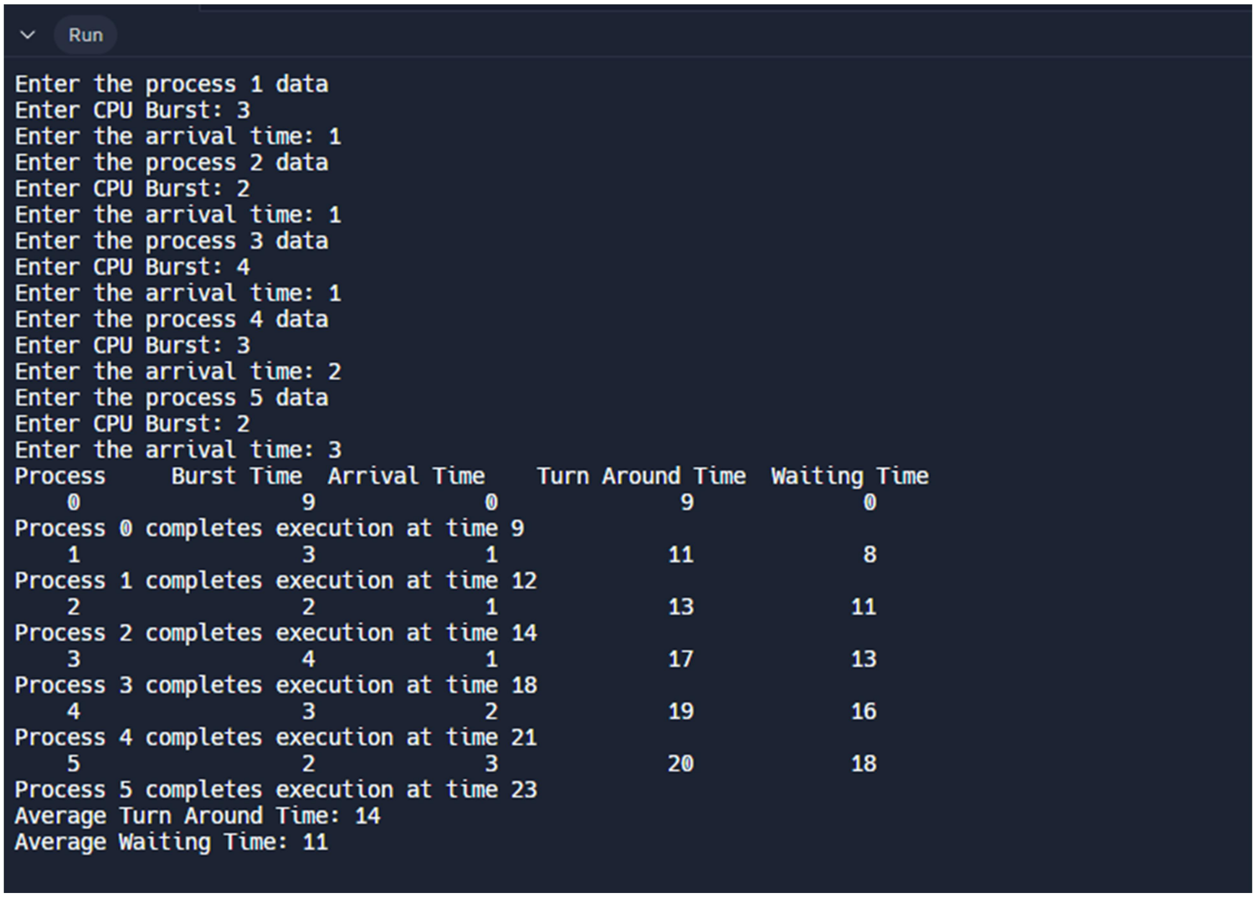
(Anautonomous Institute of Savitribai Phule Pune University)

Department of Multidisciplinary Engineering

Division	**CS-A**
Batch	**B1**
Roll no.	**90**
Name	**Aditya Shrinivas Kurapati**
Subject	**OS**

1. FCFS SEHEDULING Algorithm Using C.

```
#include <stdio.h>

typedef struct fcfs {
  int process; // Process Number
  int burst;   // Burst Time
  int arrival; // Arrival Time
  int tat;     // Turn Around Time
  int wt;      // Waiting Time
} fcfs;

int sort(fcfs[], int);

int main() {
  int n, i, temp = 0, AvTat = 0, AvWt = 0;

  printf("Enter the number of processes: ");
  scanf("%d", &n);
  fcfs arr[n]; // Array of type fcfs
  int tct[n];

  for (i = 0; i < n; i++) {
    arr[i].process = i;
    printf("Enter the process %d data\n", arr[i].process);
    printf("Enter CPU Burst: ");
    scanf("%d", &(arr[i].burst));
    printf("Enter the arrival time: ");
    scanf("%d", &(arr[i].arrival));
  }

  // Sorting the processes according to their arrival time
  sort(arr, n);

  printf(
      "Process\t\tBurst Time\tArrival Time\tTurn Around Time\tWaiting Time\n");
  for (i = 0; i < n; i++) {
    tct[i] = temp + arr[i].burst;
    temp = tct[i];
    arr[i].tat = tct[i] - arr[i].arrival;
    arr[i].wt = arr[i].tat - arr[i].burst;
    AvTat = AvTat + arr[i].tat;
    AvWt = AvWt + arr[i].wt;
    printf("%5d\t%15d\t\t%9d\t%12d\t%12d\n", arr[i].process, arr[i].burst,
           arr[i].arrival, arr[i].tat, arr[i].wt);

    // Print when process completes its execution
    printf("Process %d completes execution at time %d\n", arr[i].process,
           tct[i]);
  }

  printf("Average Turn Around Time: %d\nAverage Waiting Time: %d\n", AvTat / n,
         AvWt / n);

  return 0;
}

// Bubble Sort
int sort(fcfs arr[], int n) {
  int i, j;
  fcfs k;


  for (i = 0; i < n - 1; i++) {
    for (j = i + 1; j < n; j++) {
      // Sorting the processes according to their arrival time
      if (arr[i].arrival > arr[j].arrival) {
        k = arr[i];
        arr[i] = arr[j];
        arr[j] = k;
      }
    }
  }
  return 0;
}
```

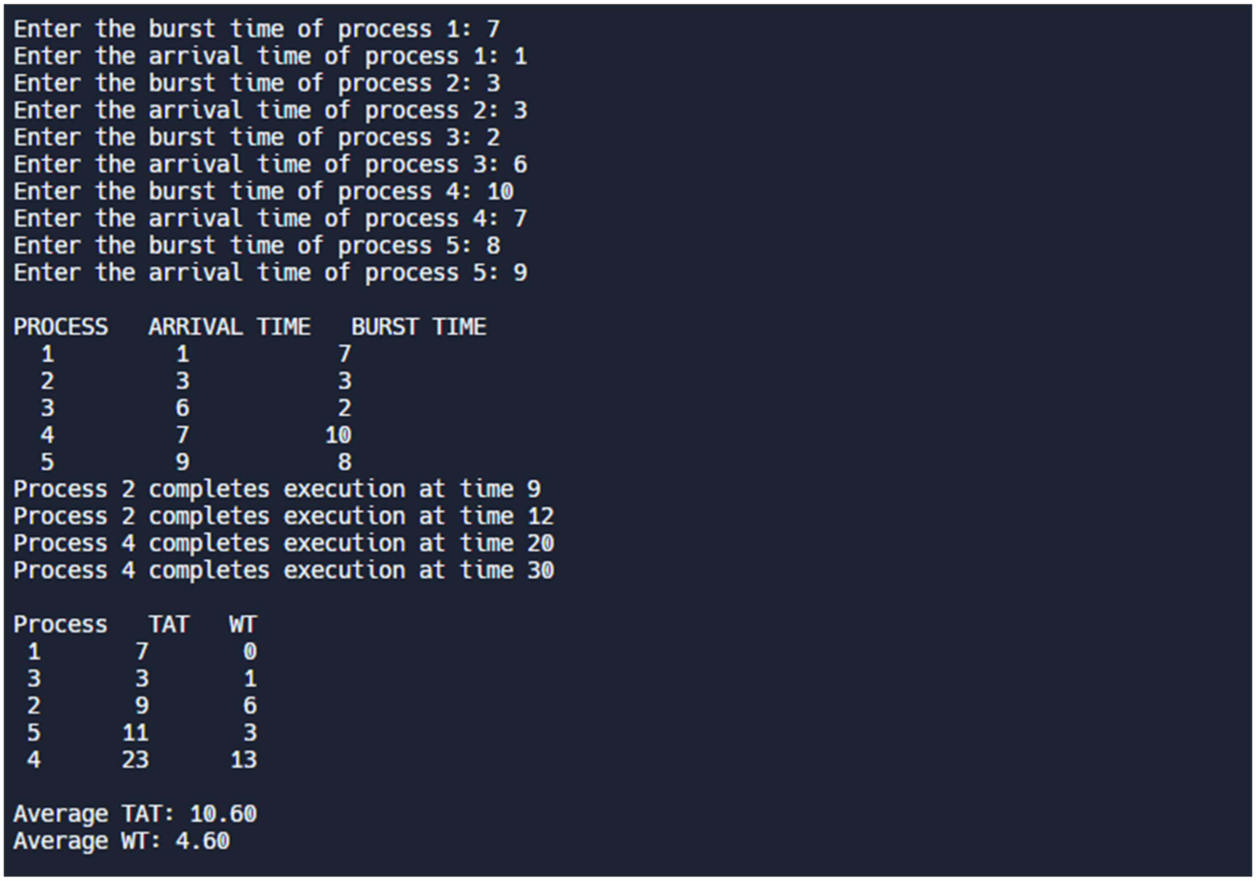


```
Enter the process 1 data
Enter CPU Burst: 3
Enter the arrival time: 1
Enter the process 2 data
Enter CPU Burst: 2
Enter the arrival time: 1
Enter the process 3 data
Enter CPU Burst: 4
Enter the arrival time: 1
Enter the process 4 data
Enter CPU Burst: 3
Enter the arrival time: 2
Enter the process 5 data
Enter CPU Burst: 2
Enter the arrival time: 3
Process     Burst Time  Arrival Time    Turn Around Time  Waiting Time
    0                 9             0              9             0
Process 0 completes execution at time 9
    1                 3             1             11             8
Process 1 completes execution at time 12
    2                 2             1             13            11
Process 2 completes execution at time 14
    3                 4             1             17            13
Process 3 completes execution at time 18
    4                 3             2             19            16
Process 4 completes execution at time 21
    5                 2             3             20            18
Process 5 completes execution at time 23
Average Turn Around Time: 14
Average Waiting Time: 11
```

2.SJF Seheduling Using C.

```
#include <stdio.h>


typedef struct sjf {
  int process;
  int burst;
  int arrival;
  int tat;
  int wt;
} sjf;


void sort(sjf[], int);


int main() {
  int n, i, j, TCT, count_process = 0, count = 0, minBurst, pos;
  float AvTAT = 0.0, AvWT = 0.0;


  printf("Enter the number of processes: ");
  scanf("%d", &n);
  sjf arr[n];


  printf("Enter the data of processes\n");
  for (i = 0; i < n; i++) {
    arr[i].process = i + 1;
    printf("Enter the burst time of process %d: ", arr[i].process);
    scanf("%d", &(arr[i].burst));
    printf("Enter the arrival time of process %d: ", arr[i].process);
    scanf("%d", &(arr[i].arrival));
  }
```

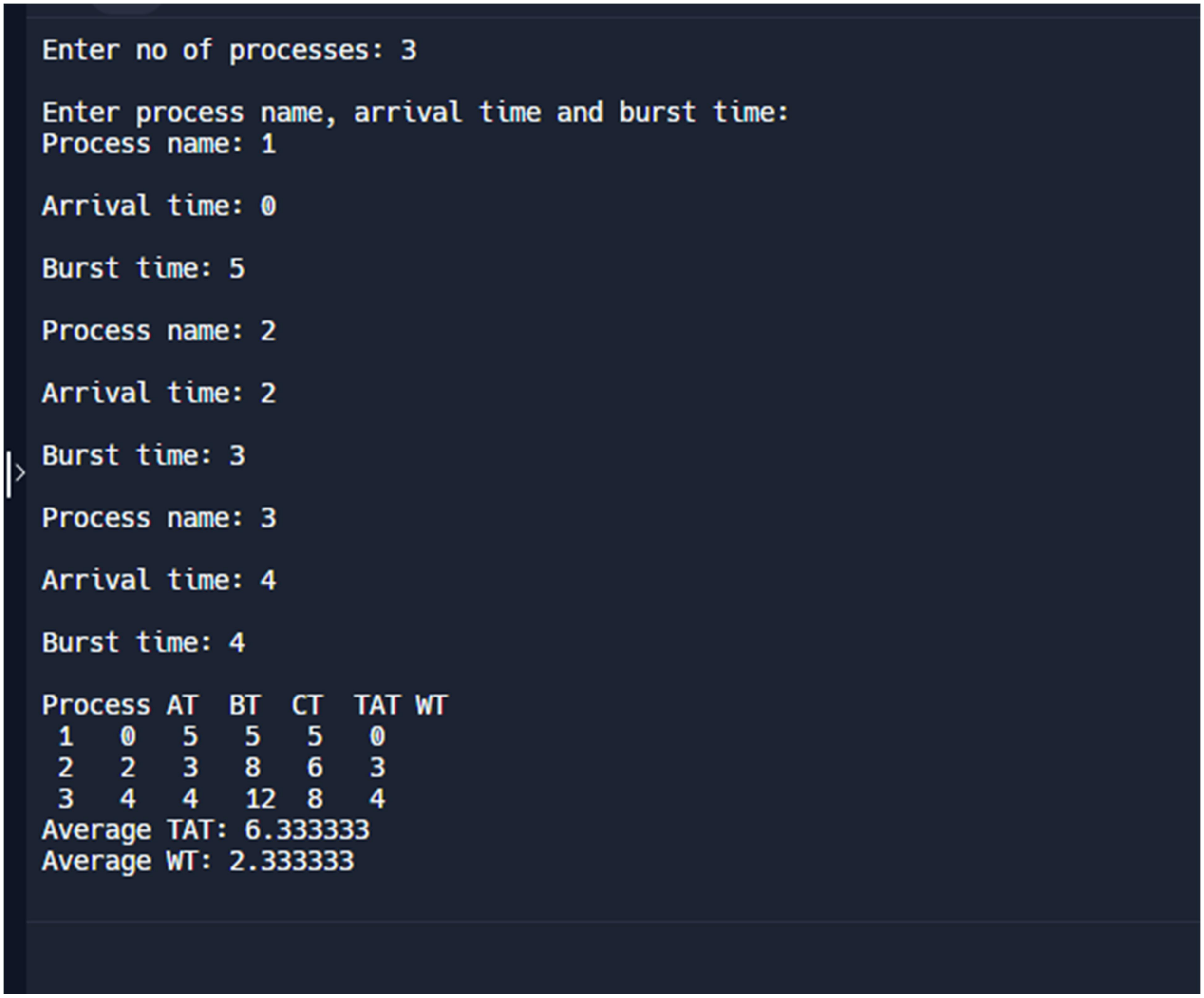
```
sort(arr, n);
printf("\nPROCESS   ARRIVAL TIME   BURST TIME\n");
for (i = 0; i < n; i++)
  printf("%3d\t\t%5d\t\t%5d\n", arr[i].process, arr[i].arrival, arr[i].burst);

TCT = arr[0].tat = arr[0].burst;
arr[0].wt = arr[0].tat - arr[0].burst;
arr[0].arrival = -1;
sort(arr, n);
count_process = 1;

while (count_process < n) {
  minBurst = 999;
  count = 0;
  i = count_process;

  while (TCT >= arr[i].arrival && i < n) {
    count++;
    i++;
  }

  if (count == 0) {
    TCT = arr[i].arrival; // Adjust TCT if no process arrives at this time
    continue;
  }

  for (j = i - count; count != 0 && j < n; j++, count--) {
    if (arr[j].burst < minBurst) {
      minBurst = arr[j].burst;
      pos = j;
      }
    }
    TCT = TCT + arr[pos].burst;
    arr[pos].tat = TCT - arr[pos].arrival;
    arr[pos].wt = arr[pos].tat - arr[pos].burst;
    arr[pos].arrival = -1;
    sort(arr, n);
    count_process++;

    // Display when each process completes its execution
    printf("Process %d completes execution at time %d\n", arr[pos].process,
           TCT);
  }
  printf("\nProcess   TAT   WT\n");
  for (i = 0; i < n; i++)
    printf("%2d\t\t%2d\t\t%2d\n", arr[i].process, arr[i].tat, arr[i].wt);

  for (i = 0; i < n; i++) {
    AvTAT = AvTAT + arr[i].tat;
    AvWT = AvWT + arr[i].wt;
  }
  printf("\nAverage TAT: %.2f\nAverage WT: %.2f\n", AvTAT / n, AvWT / n);
  return 0;
}

void sort(sjf arr[], int n) {
  int i, j;
  sjf temp;

  for (i = 0; i < n - 1; i++)
  for (j = i + 1; j < n; j++)

   if (arr[i].arrival > arr[j].arrival) {

    temp = arr[i];

    arr[i] = arr[j];

    arr[j] = temp;

   }

}
```



```
Enter the burst time of process 1: 7
Enter the arrival time of process 1: 1
Enter the burst time of process 2: 3
Enter the arrival time of process 2: 3
Enter the burst time of process 3: 2
Enter the arrival time of process 3: 6
Enter the burst time of process 4: 10
Enter the arrival time of process 4: 7
Enter the burst time of process 5: 8
Enter the arrival time of process 5: 9

PROCESS   ARRIVAL TIME   BURST TIME
  1         1           7
  2         3           3
  3         6           2
  4         7          10
  5         9           8
Process 2 completes execution at time 9
Process 2 completes execution at time 12
Process 4 completes execution at time 20
Process 4 completes execution at time 30

Process   TAT   WT
 1       7       0
 3       3       1
 2       9       6
 5      11       3
 4      23      13

Average TAT: 10.60
Average WT: 4.60
```

3.Shortest Remaining Time Next (SJF Preemptive Algorithm)

```
#include <stdio.h>

#include <stdlib.h>

#define MAX 20


int main() {

  int a[MAX][7], i, count = 0, totalt, small, n;

  float awt, atat;

  printf("Enter no of processes: ");

  scanf("%d", &n);

  printf("\nEnter process name, arrival time and burst time: ");

  for (i = 0; i < n; i++) {

    printf("\nProcess name: ");

    scanf("%d", &a[i][0]);

    printf("\nArrival time: ");

    scanf("%d", &a[i][1]);

    printf("\nBurst time: ");

    scanf("%d", &a[i][2]);

    count += a[i][2];

    a[i][6] = -1;

  }

  count = count + a[0][1];

  totalt = a[0][1];

  while (totalt < count) {

    for (i = 0; i < n; i++) {

      if (a[i][6] == -1 && a[i][1] <= totalt) {

        small = i;

        break;

      }
  }


  for (i = 0; i < n; i++) {


    if (a[i][6] == -1 && a[i][1] <= totalt) {
      if (a[small][2] > a[i][2])
        small = i;
      /*else if(small==i)
        small=i;*/
    }
  }
  totalt = totalt + a[small][2]; // updation total time
  a[small][3] = totalt;          // ct of process
  a[small][6] = 0;               // flag for process status
  // printf("\nTime %d",totalt);
}
atat = 0.0;
awt = 0.0;
printf("\nProcess\tAT\tBT\tCT\tTAT\tWT\t");
for (i = 0; i < n; i++) {
  printf("\n %d", a[i][0]);
  printf("\t %d", a[i][1]);
  printf("\t %d", a[i][2]);
  printf("\t %d", a[i][3]);
  a[i][4] = a[i][3] - a[i][1];
  printf("\t %d", a[i][4]);
  a[i][5] = a[i][4] - a[i][2];
  printf("\t %d", a[i][5]);
  awt = awt + a[i][5];
  atat = atat + a[i][4];
  }

  atat = atat / n;

  awt = awt / n;

  printf("\nAverage TAT: %f", atat);

  printf("\nAverage WT: %f", awt);


  return 0;

}
```



```
Enter no of processes: 3

Enter process name, arrival time and burst time:
Process name: 1

Arrival time: 0

Burst time: 5

Process name: 2

Arrival time: 2

Burst time: 3

Process name: 3

Arrival time: 4

Burst time: 4

Process AT  BT  CT  TAT WT
 1   0   5   5   5   0
 2   2   3   8   6   3
 3   4   4   12  8   4
Average TAT: 6.333333
Average WT: 2.333333
```