CS266

ASSIGNMENT 5

NAME:

ARCHIT AGRAWAL

ROLL NO. :

202051213

SECTION:

2

First Come First Serve

Code

```c
#include<stdio.h>

void arrangeArrival(int num, int mat[][6]){
    for (int i = 0; i < num; i++) {
        for (int j = 0; j < num - i - 1; j++) {
            if (mat[j][1] > mat[j + 1][1]) {
                for (int k = 0; k < 5; k++) {

                    int temp = mat[j][k];
                    mat[j][k] = mat[j + 1][k];
                    mat[j + 1][k] = temp;
                }
            }
        }
    }
}

void completionTime(int num, int mat[][6]){
    mat[0][3] = mat[0][2];


    for(int i = 1; i < num; i++){
        if(mat[i - 1][3] < mat[i][1]){
            mat[i][3] = mat[i][1] + mat[i][2];
        } else {
            mat[i][3] = mat[i - 1][3] + mat[i][2];
        }
    }

    for(int i = 0; i < num; i++){
        mat[i][5] = mat[i][3] - mat[i][1];
    }

    for(int i = 0; i < num; i++){
        mat[i][4] = mat[i][5] - mat[i][2];
    }
}

double avgWaitTime(int num, int mat[][6]){
```

```
    int totalWaitTime = 0;
    for(int i = 0; i < num; i++){
        totalWaitTime += mat[i][4];
    }

    return (double) totalWaitTime/num;
}

double avgTATime(int num, int mat[][6]){
    int totalTATime = 0;
    for(int i = 0; i < num; i++){
        totalTATime += mat[i][5];
    }

    return (double) totalTATime/num;
}



int main(){
   int n;
   printf("Enter the number of processes ");
   scanf("%d", &n);
   int mat[n][6];

   for(int i = 0; i < n; i++){
       printf("Enter Process ID ");
       int id, at, bt;
       scanf("%d", &id);
       mat[i][0] = id;
       printf("Enter Arrival Time ");
       scanf("%d", &at);
       mat[i][1] = at;
       printf("Enter Burst Time ");
       scanf("%d", &bt);
       mat[i][2] = bt;
    }

    arrangeArrival(n, mat);
    completionTime(n, mat);

    printf("\t\t\t\tFirst Come First Serve\n");
    printf("Process ID \t Arrival Time \t Burst Time \t Completion Time \t
Turn Around Time \t Waiting Time\n");
    for(int i = 0; i < n; i++){
        printf("    %2d\t\t\t%d\t     %d\t\t\t%d\t\t\t%d\t\t\t%d\n",
mat[i][0], mat[i][1], mat[i][2], mat[i][3], mat[i][5], mat[i][4]);
```

```
    }

    printf("Average Wait Time : %f\n", avgWaitTime(n, mat));
    printf("Average Turn Around Time : %f", avgTATime(n, mat));

}
```

Output

```
PS C:\Users\Archit\Desktop\cprog> cd "c:\Users\Archit\Desktop\cprog\" ; if ($?) { gcc fcfs.c -o fcfs } ; if ($?) { .
Enter the number of processes 4
Enter Process ID 1
Enter Arrival Time 2
Enter Burst Time 3
Enter Process ID 2
Enter Arrival Time 0
Enter Burst Time 4
Enter Process ID 3
Enter Arrival Time 4
Enter Burst Time 2
Enter Process ID 4
Enter Arrival Time 5
Enter Burst Time 4
                        First Come First Serve
Process ID      Arrival Time    Burst Time      Completion Time         Turn Around Time        Waiting Time
    2               0               4               4                       4                       0
    1               2               3               7                       5                       2
    3               4               2               9                       5                       3
    4               5               4               13                      8                       4
Average Wait Time : 2.250000
Average Turn Around Time : 5.500000
PS C:\Users\Archit\Desktop\cprog>
```

```
PS C:\Users\Archit\Desktop\cprog> cd "c:\Users\Archit\Desktop\cprog\" ; if ($?) { gcc fcfs.c -o fcfs } ; if ($?) { .
Enter the number of processes 5
Enter Process ID 1
Enter Arrival Time 0
Enter Burst Time 4
Enter Process ID 2
Enter Arrival Time 2
Enter Burst Time 3
Enter Process ID 3
Enter Arrival Time 2
Enter Burst Time 2
Enter Process ID 4
Enter Arrival Time 4
Enter Burst Time 4
Enter Process ID 5
Enter Arrival Time 5
Enter Burst Time 5
                        First Come First Serve
Process ID      Arrival Time    Burst Time      Completion Time         Turn Around Time        Waiting Time
    1               0               4               4                       4                       0
    2               2               3               7                       5                       2
    3               2               2               9                       7                       5
    4               4               4               13                      9                       5
    5               5               5               18                      13                      8
Average Wait Time : 4.000000
Average Turn Around Time : 7.600000
PS C:\Users\Archit\Desktop\cprog>
```

```
PS C:\Users\Archit\Desktop\cprog> cd "c:\Users\Archit\Desktop\cprog\" ; if ($?) { gcc fcfs.c -o fcfs } ; if ($?) { .\fcfs }
Enter the number of processes 3
Enter Process ID 1
Enter Arrival Time 0
Enter Burst Time 4
Enter Process ID 2
Enter Arrival Time 5
Enter Burst Time 3
Enter Process ID 3
Enter Arrival Time 9
Enter Burst Time 2
                        First Come First Serve
Process ID      Arrival Time    Burst Time      Completion Time         Turn Around Time        Waiting Time
    1               0               4               4                       4                       0
    2               5               3               8                       3                       0
    3               9               2               11                      2                       0
Average Wait Time : 0.000000
Average Turn Around Time : 3.000000
PS C:\Users\Archit\Desktop\cprog>
```

Shortest Job First

Code

```c
#include<stdio.h>

void arrangeArrival(int num, int mat[][6]){
    for (int i = 0; i < num; i++) {
        for (int j = 0; j < num - i - 1; j++) {
            if (mat[j][1] > mat[j + 1][1]) {
                for (int k = 0; k < 5; k++) {

                    int temp = mat[j][k];
                    mat[j][k] = mat[j + 1][k];
                    mat[j + 1][k] = temp;
                }
            }
        }
    }
}

void completionTime(int num, int mat[][6]){
    int temp, val;
```

```
    mat[0][3] = mat[0][1] + mat[0][2];
    mat[0][5] = mat[0][3] - mat[0][1];
    mat[0][4] = mat[0][5] - mat[0][2];

    for (int i = 1; i < num; i++) {
        temp = mat[i - 1][3];

        //in case if CPU is idle
        //we will neglect that time
        if(temp < mat[i][1]){
            temp = mat[i][1];
        }
        int low = mat[i][2];
        for (int j = i; j < num; j++) {
            if (temp >= mat[j][1] && low >= mat[j][2]) {
                low = mat[j][2];
                val = j;
            }
        }
        mat[val][3] = temp + mat[val][2];
        mat[val][5] = mat[val][3] - mat[val][1];
        mat[val][4] = mat[val][5] - mat[val][2];
        for (int k = 0; k < 6; k++) {

            int temp1 = mat[val][k];
            mat[val][k] = mat[i][k];
            mat[i][k] = temp1;
        }
    }
}

double avgWaitTime(int num, int mat[][6]){
    int totalWaitTime = 0;
    for(int i = 0; i < num; i++){
        totalWaitTime += mat[i][4];
    }

    return (double) totalWaitTime/num;
}

double avgTATime(int num, int mat[][6]){
    int totalTATime = 0;
    for(int i = 0; i < num; i++){
        totalTATime += mat[i][5];
    }

    return (double) totalTATime/num;
```

```
}

int main(){
   int n;
   printf("Enter the number of processes ");
   scanf("%d", &n);
   int mat[n][6];

   for(int i = 0; i < n; i++){
       printf("Enter Process ID ");
       int id, at, bt;
       scanf("%d", &id);
       mat[i][0] = id;
       printf("Enter Arrival Time ");
       scanf("%d", &at);
       mat[i][1] = at;
       printf("Enter Burst Time ");
       scanf("%d", &bt);
       mat[i][2] = bt;
    }

    arrangeArrival(n, mat);
    completionTime(n, mat);

    printf("\t\t\t\tShortest Job First\n");
    printf("Process ID \t Arrival Time \t Burst Time \t Completion Time \t
Turn Around Time \t Waiting Time\n");
    for(int i = 0; i < n; i++){
        printf("    %2d\t\t\t%d\t     %d\t\t\t%d\t\t\t%d\t\t\t%d\n",
mat[i][0], mat[i][1], mat[i][2], mat[i][3], mat[i][5], mat[i][4]);
    }

    printf("Average Wait Time : %f\n", avgWaitTime(n, mat));
    printf("Average Turn Around Time : %f", avgTATime(n, mat));
}
```

Output

```
PS C:\Users\Archit\Desktop\cprog> cd "c:\Users\Archit\Desktop\cprog\" ; if ($?) { gcc sjf.c -o sjf } ; if ($?) { .\sjf }
Enter the number of processes 4
Enter Process ID 1
Enter Arrival Time 2
Enter Burst Time 3
Enter Process ID 2
Enter Arrival Time 0
Enter Burst Time 4
Enter Process ID 3
Enter Arrival Time 4
Enter Burst Time 2
Enter Process ID 4
Enter Arrival Time 5
Enter Burst Time 4
                        Shortest Job First
Process ID      Arrival Time    Burst Time      Completion Time         Turn Around Time        Waiting Time
    2               0               4               4                       4                       0
    3               4               2               6                       2                       0
    1               2               3               9                       7                       4
    4               5               4               13                      8                       4
Average Wait Time : 2.000000
Average Turn Around Time : 5.250000
PS C:\Users\Archit\Desktop\cprog>
```

```
PS C:\Users\Archit\Desktop\cprog> cd "c:\Users\Archit\Desktop\cprog\" ; if ($?) { gcc sjf.c -o sjf } ; if ($?) { .\sjf }
Enter the number of processes 5
Enter Process ID 1
Enter Arrival Time 0
Enter Burst Time 4
Enter Process ID 2
Enter Arrival Time 2
Enter Burst Time 3
Enter Process ID 3
Enter Arrival Time 2
Enter Burst Time 2
Enter Process ID 4
Enter Arrival Time 4
Enter Burst Time 4
Enter Process ID 5
Enter Arrival Time 5
Enter Burst Time 5
                        Shortest Job First
Process ID      Arrival Time    Burst Time      Completion Time         Turn Around Time        Waiting Time
    1               0               4               4                       4                       0
    3               2               2               6                       4                       2
    2               2               3               9                       7                       4
    4               4               4               13                      9                       5
    5               5               5               18                      13                      8
Average Wait Time : 3.800000
Average Turn Around Time : 7.400000
PS C:\Users\Archit\Desktop\cprog>
```

```
PS C:\Users\Archit\Desktop\cprog> cd "c:\Users\Archit\Desktop\cprog\" ; if ($?) { gcc sjf.c -o sjf } ; if ($?) { .\sjf }
Enter the number of processes 3
Enter Process ID 1
Enter Arrival Time 0
Enter Burst Time 3
Enter Process ID 2
Enter Arrival Time 4
Enter Burst Time 5
Enter Process ID 3
Enter Arrival Time 10
Enter Burst Time 2
                        Shortest Job First
Process ID      Arrival Time    Burst Time      Completion Time         Turn Around Time        Waiting Time
    1               0               3               3                       3                       0
    2               4               5               9                       5                       0
    3               10              2               12                      2                       0
Average Wait Time : 0.000000
Average Turn Around Time : 3.333333
PS C:\Users\Archit\Desktop\cprog>
```