FCFS Scheduling Algorithm :

```
import java.util.*;
public class FCFS {
	public static void main(String args[])
	{
		Scanner sc = new Scanner(System.in);
		System.out.println("enter no of process: ");
		int n = sc.nextInt();
		int pid[] = new int[n];   // process ids
		int ar[] = new int[n];    // arrival times
		int bt[] = new int[n];    // burst or execution times
		int ct[] = new int[n];    // completion times
		int ta[] = new int[n];    // turn around times
		int wt[] = new int[n];    // waiting times
		int temp;
		float avgwt=0,avgta=0;

		for(int i = 0; i < n; i++)
		{
			System.out.println("enter process " + (i+1) + " arrival time: ");
			ar[i] = sc.nextInt();
			System.out.println("enter process " + (i+1) + " brust time: ");
			bt[i] = sc.nextInt();
			pid[i] = i+1;
		}

		//sorting according to arrival times
		for(int i = 0 ; i <n; i++)
		{
			for(int  j=0;  j < n-(i+1) ; j++)
			{
				if( ar[j] > ar[j+1] )
				{
```

```
                    temp = ar[j];
                    ar[j] = ar[j+1];
                    ar[j+1] = temp;
                    temp = bt[j];
                    bt[j] = bt[j+1];
                    bt[j+1] = temp;
                    temp = pid[j];
                    pid[j] = pid[j+1];
                    pid[j+1] = temp;
                }
            }
}

// finding completion times
for(int  i = 0 ; i < n; i++)
{
            if( i == 0)
            {
                        ct[i] = ar[i] + bt[i];
            }
            else
            {
                        if( ar[i] > ct[i-1])
                        {
                                    ct[i] = ar[i] + bt[i];
                        }
                        else
                                    ct[i] = ct[i-1] + bt[i];
            }
            ta[i] = ct[i] - ar[i] ;         // turnaround time= completion time- arrival time
            wt[i] = ta[i] - bt[i] ;         // waiting time= turnaround time- burst time
            avgwt += wt[i] ;                // total waiting time
            avgta += ta[i] ;                // total turnaround time
```

```
                }


                System.out.println("\npid  arrival  brust  complete turn waiting");

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

                {

                        System.out.println(pid[i] + "  \t " + ar[i] + "\t" + bt[i] + "\t" + ct[i] + "\t" + ta[i] + "\t"
+ wt[i] ) ;

                }

                sc.close();

                System.out.println("\naverage waiting time: "+ (avgwt/n));     // printing average waiting
time.

                System.out.println("average turnaround time:"+(avgta/n));    // printing average turnaround
time.

        }

}
```

OUTPUT :

Main.java

```
1  import java.util.*;
2
3  public class FCFS {
4      public static void main(String args[])
5      {
6          Scanner sc = new Scanner(System.in);
7          System.out.println("enter no of process: ");
8          int n = sc.nextInt();
9          int pid[] = new int[n];   // process ids
10         int ar[] = new int[n];     // arrival times
11         int bt[] = new int[n];     // burst or execution times
12         int ct[] = new int[n];     // completion times
13         int ta[] = new int[n];     // turn around times
14         int wt[] = new int[n];     // waiting times
15         int temp;
16         float avgwt=0,avgta=0;
17
18         for(int i = 0; i < n; i++)
19         {
20             System.out.println("enter process " + (i+1) + " arrival time: ");
21             ar[i] = sc.nextInt();
22             System.out.println("enter process " + (i+1) + " brust time: ");
23             bt[i] = sc.nextInt();
24             pid[i] = i+1;
25         }
26
27         //sorting according to arrival times
28         for(int i = 0 ; i <n; i++)
29         {
30             for(int  j=0;  j < n-(i+1) ; j++)
31             {
```

Run

Output

```
java -cp /tmp/U19cP2OpO8 FCFS
enter no of process:
5
enter process 1 arrival time:
1
enter process 1 brust time:
5
enter process 2 arrival time:
3
enter process 2 brust time: 2
enter process 3 arrival time:
4
enter process 3 brust time:
6
enter process 4 arrival time:
4
enter process 4 brust time:
2
enter process 5 arrival time:
3
enter process 5 brust time:
2
pid  arrival  brust  complete turn waiting
1    1  5   6   5   0
2    3  2   8   5   3
5    3  2   10  7   5
3    4  6   16  12  6
4    4  2   18  14  12
average waiting time: 5.2
average turnaround time:8.6
```

Priority Scheduling Algorithm :

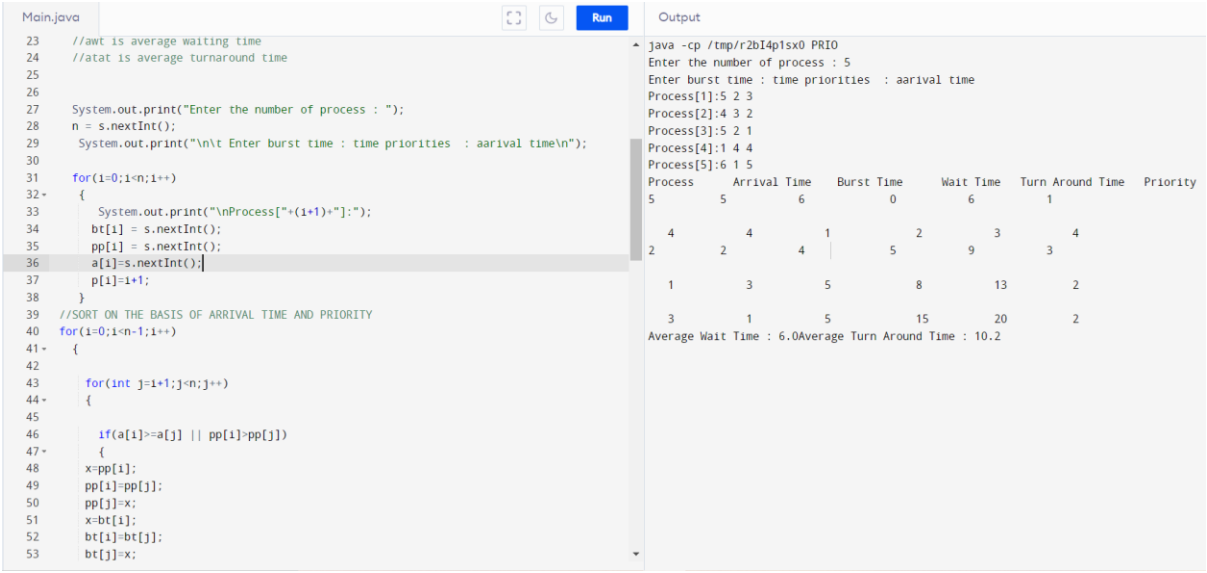
```
import java.util.Scanner;


public class PRIO {


   public static void main(String args[]) {
        Scanner s = new Scanner(System.in);


        int ct[],a[],x,n,p[],pp[],bt[],w[],t[],i,k=0;
                        float atat,awt;
        p = new int[10];
        pp = new int[10];
        bt = new int[10];
        w = new int[10];
        t = new int[10];
              a= new int[10];
              ct=new int[10];
  //n is number of process
  //p is process
  //pp is process priority
  //bt is process burst time
  //w is wait time
  // t is turnaround time
  //awt is average waiting time
  //atat is average turnaround time



  System.out.print("Enter the number of process : ");
  n = s.nextInt();
   System.out.print("\n\t Enter burst time : time priorities  : aarival time\n");


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

```
      System.out.print("\nProcess["+(i+1)+"]:");
     bt[i] = s.nextInt();
     pp[i] = s.nextInt();
     a[i]=s.nextInt();
     p[i]=i+1;
   }
 //SORT ON THE BASIS OF ARRIVAL TIME AND PRIORITY
 for(i=0;i<n-1;i++)
  {

    for(int j=i+1;j<n;j++)
    {

      if(a[i]>=a[j] || pp[i]>pp[j])
      {
    x=pp[i];
    pp[i]=pp[j];
    pp[j]=x;
    x=bt[i];
    bt[i]=bt[j];
    bt[j]=x;
    x=p[i];
    p[i]=p[j];
    p[j]=x;
      x=a[i];
    a[i]=a[j];
    a[j]=x;
  }

  }

}
//sorting on the basis of priority
```

```
 for(i=1;i<=n;i++)
  {
   if(i==1)
    {  k=bt[0];


            ct[0]=k;}
   else{
     k=bt[i-1]+k;
            ct[i-1]=k;}
    for(int j=i+1;j<=n;j++)
    {


     if(pp[i]<pp[j] && a[j]<=k)
     {
    x=pp[i];
    pp[i]=pp[j];
    pp[j]=x;
    x=bt[i];
    bt[i]=bt[j];
    bt[j]=x;
    x=p[i];
    p[i]=p[j];
    p[j]=x;
    x=a[i];
    a[i]=a[j];
    a[j]=x;
   }
   }
}
w[0]=0;
awt=0;
t[0]=bt[0];
atat=t[0];
```

```
for(i=1;i<n;i++)
 {

  t[i]=ct[i]-a[i];
  w[i]=t[i]-bt[i];
  awt+=w[i];
  atat+=t[i];
 }

//prority logic

//Displaying the process

 System.out.print("\n\nProcess \t Arrival Time \t Burst Time \t Wait Time \t Turn Around Time   Priority \n");
for(i=0;i<n;i++)
 System.out.print("\n   "+p[i]+"\t\t  "+a[i]+"\t\t  "+bt[i]+"\t\t    "+w[i]+"\t\t    "+t[i]+"\t\t    "+pp[i]+"\n");
awt/=n;  atat/=n;
 System.out.print("\n Average Wait Time : "+awt);
System.out.print("\n Average Turn Around Time : "+atat);
      }
}
```

Output :



SRTF Scheduling Algorithm :

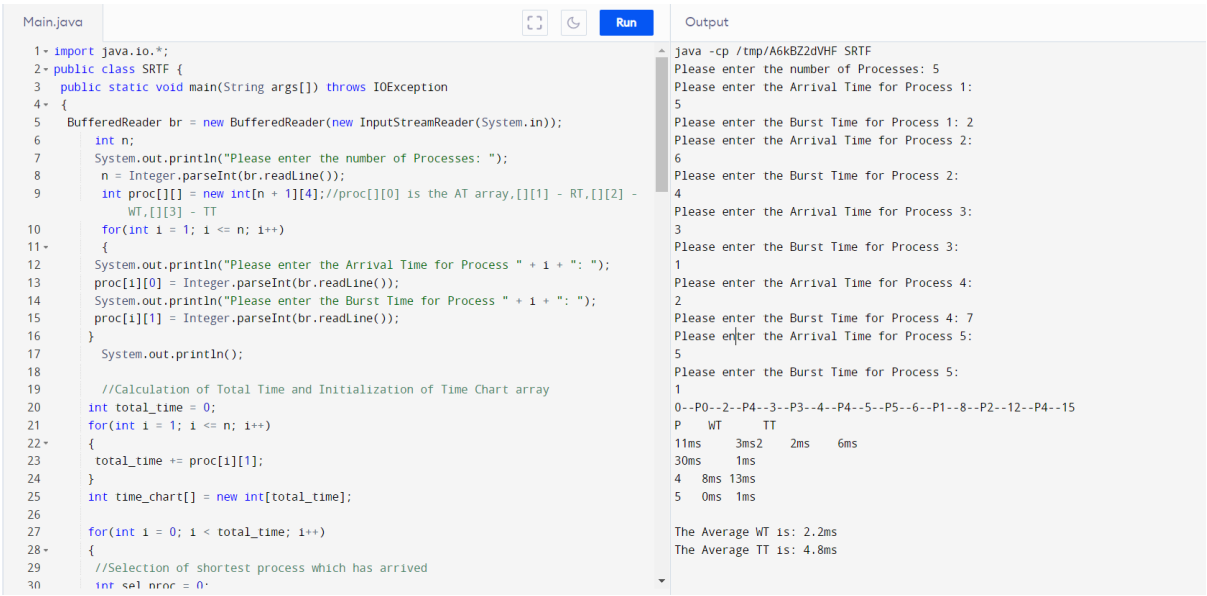
```
import java.io.*;
public class SRTF {
 public static void main(String args[]) throws IOException
 {
  BufferedReader br = new BufferedReader(new InputStreamReader(System.in));
     int n;
     System.out.println("Please enter the number of Processes: ");
      n = Integer.parseInt(br.readLine());
      int proc[][] = new int[n + 1][4];//proc[][0] is the AT array,[][1] - RT,[][2] - WT,[][3] - TT
      for(int i = 1; i <= n; i++)
      {
     System.out.println("Please enter the Arrival Time for Process " + i + ": ");
     proc[i][0] = Integer.parseInt(br.readLine());
     System.out.println("Please enter the Burst Time for Process " + i + ": ");
     proc[i][1] = Integer.parseInt(br.readLine());
    }
      System.out.println();

      //Calculation of Total Time and Initialization of Time Chart array
    int total_time = 0;
    for(int i = 1; i <= n; i++)
    {
     total_time += proc[i][1];
    }
    int time_chart[] = new int[total_time];

    for(int i = 0; i < total_time; i++)
    {
     //Selection of shortest process which has arrived
     int sel_proc = 0;
     int min = 99999;
     for(int j = 1; j <= n; j++)
```

```
    {
     if(proc[j][0] <= i)//Condition to check if Process has arrived
     {
      if(proc[j][1] < min && proc[j][1] != 0)
      {
       min = proc[j][1];
       sel_proc = j;
      }
     }
    }

    //Assign selected process to current time in the Chart
    time_chart[i] = sel_proc;

    //Decrement Remaining Time of selected process by 1 since it has been assigned the CPU for 1 unit of time
    proc[sel_proc][1]--;

    //WT and TT Calculation
    for(int j = 1; j <= n; j++)
    {
     if(proc[j][0] <= i)
     {
      if(proc[j][1] != 0)
      {
       proc[j][3]++;//If process has arrived and it has not already completed execution its TT is incremented by 1
         if(j != sel_proc)//If the process has not been currently assigned the CPU and has arrived its WT is incremented by 1
          proc[j][2]++;
      }
      else if(j == sel_proc)//This is a special case in which the process has been assigned CPU and has completed its execution
       proc[j][3]++;
     }
    }
```

```
    //Printing the Time Chart
    if(i != 0)
    {
     if(sel_proc != time_chart[i - 1])
      //If the CPU has been assigned to a different Process we need to print the current value of time and the name of
      //the new Process
     {
      System.out.print("--" + i + "--P" + sel_proc);
     }
    }
    else//If the current time is 0 i.e the printing has just started we need to print the name of the First selected Process
     System.out.print(i + "--P" + sel_proc);
    if(i == total_time - 1)//All the process names have been printed now we have to print the time at which execution ends
     System.out.print("--" + (i + 1));

   }
   System.out.println();
   System.out.println();

   //Printing the WT and TT for each Process
   System.out.println("P\t WT \t TT ");
   for(int i = 1; i <= n; i++)
   {
    System.out.printf("%d\t%2dms\t%2dms",i,proc[i][2],proc[i][3]);
    System.out.println();
   }

   System.out.println();

   //Printing the average WT & TT
```

```
    float WT = 0,TT = 0;
    for(int i = 1; i <= n; i++)
    {
     WT += proc[i][2];
     TT += proc[i][3];
    }
    WT /= n;
    TT /= n;
    System.out.println("The Average WT is: " + WT + "ms");
    System.out.println("The Average TT is: " + TT + "ms");
 }
}
```

Output :



Main.java

Run

Output

```
import java.io.*;
public class SRTF {
 public static void main(String args[]) throws IOException
 {
  BufferedReader br = new BufferedReader(new InputStreamReader(System.in));
      int n;
      System.out.println("Please enter the number of Processes: ");
       n = Integer.parseInt(br.readLine());
       int proc[][] = new int[n + 1][4];//proc[][0] is the AT array,[][1] - RT,[][2] -
           WT,[][3] - TT
      for(int i = 1; i <= n; i++)
      {
      System.out.println("Please enter the Arrival Time for Process " + i + ": ");
      proc[i][0] = Integer.parseInt(br.readLine());
      System.out.println("Please enter the Burst Time for Process " + i + ": ");
      proc[i][1] = Integer.parseInt(br.readLine());
      }
        System.out.println();

        //Calculation of Total Time and Initialization of Time Chart array
      int total_time = 0;
      for(int i = 1; i <= n; i++)
      {
       total_time += proc[i][1];
      }
      int time_chart[] = new int[total_time];

      for(int i = 0; i < total_time; i++)
      {
       //Selection of shortest process which has arrived
       int sel_proc = 0;
```

```
java -cp /tmp/A6kBZ2dVHF SRTF
Please enter the number of Processes: 5
Please enter the Arrival Time for Process 1:
5
Please enter the Burst Time for Process 1: 2
Please enter the Arrival Time for Process 2:
6
Please enter the Burst Time for Process 2:
4
Please enter the Arrival Time for Process 3:
3
Please enter the Burst Time for Process 3:
1
Please enter the Arrival Time for Process 4:
2
Please enter the Burst Time for Process 4: 7
Please enter the Arrival Time for Process 5:
5
Please enter the Burst Time for Process 5:
1
0--P0--2--P4--3--P3--4--P4--5--P5--6--P1--8--P2--12--P4--15
P    WT      TT
11ms     3ms2    2ms    6ms
30ms     1ms
4    8ms 13ms
5    0ms  1ms

The Average WT is: 2.2ms
The Average TT is: 4.8ms
```

Round Robin Scheduling Algorithm :

```
import java.util.Scanner;


public class ROBIN {


   public static void main(String args[]) {
         Scanner s = new Scanner(System.in);


        int wtime[],btime[],rtime[],num,quantum,total;


        wtime = new int[10];
        btime = new int[10];
        rtime = new int[10];


System.out.print("Enter number of processes(MAX 10): ");
num = s.nextInt();
System.out.print("Enter burst time");
for(int i=0;i<num;i++) { System.out.print("\nP["+(i+1)+"]: "); btime[i] = s.nextInt(); rtime[i] = btime[i];
wtime[i]=0; } System.out.print("\n\nEnter quantum: "); quantum = s.nextInt(); int rp = num; int i=0; int time=0;
System.out.print("0"); wtime[0]=0; while(rp!=0) { if(rtime[i]>quantum)
 {
   rtime[i]=rtime[i]-quantum;
   System.out.print(" | P["+(i+1)+"] | ");
   time+=quantum;
   System.out.print(time);
   }
 else if(rtime[i]<=quantum && rtime[i]>0)
 {time+=rtime[i];
  rtime[i]=rtime[i]-rtime[i];
  System.out.print(" | P["+(i+1)+"] | ");
  rp--;
System.out.print(time);
 }
```

```
i++;
if(i==num)
{
i=0;
}

}


    }
}
```

Output :