SJF (Premption) :

CODE:

import java.util.Scanner;

public class SJFPreemptive {

public static void main(String[] args) {

Scanner sc = new Scanner(System.in);

System.out.print("Enter the number of processes: ");

int n = sc.nextInt();

int[] bt = new int[n];

int[] at = new int[n];

int[] rt = new int[n];

int[] wt = new int[n];

int[] tat = new int[n];

boolean[] completed = new boolean[n];

System.out.println("Enter Arrival Time and Burst Time of the processes:");

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

System.out.print("P" + (i + 1) + ": ");

at[i] = sc.nextInt();

bt[i] = sc.nextInt();

rt[i] = bt[i]; // remaining time

}

int completedProcesses = 0, currentTime = 0, shortest = 0;

boolean found;

String ganttChart = "";

while (completedProcesses < n) {

found = false;

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

if (!completed[i] && at[i] <= currentTime && (found == false || rt[i] < rt[shortest])) {

shortest = i;

found = true;

}

}

if (found) {

rt[shortest]--;

ganttChart += "P" + (shortest + 1) + " ";

currentTime++;

if (rt[shortest] == 0) {

completed[shortest] = true;

completedProcesses++;

tat[shortest] = currentTime - at[shortest];

wt[shortest] = tat[shortest] - bt[shortest];

}

} else {

currentTime++;

ganttChart += "idle ";

}

}

// Output Gantt Chart

System.out.println("Gantt Chart: " + ganttChart);

// Calculate Average WT and TAT

float avgWT = 0, avgTAT = 0;

System.out.println("Process\tArrival\tBurst\tWaiting\tTurnaround");

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

avgWT += wt[i];

avgTAT += tat[i];

System.out.println("P" + (i + 1) + "\t" + at[i] + "\t" + bt[i] + "\t" + wt[i] + "\t" + tat[i]);

}

avgWT /= n;

avgTAT /= n;

System.out.println("Average Waiting Time: " + avgWT);

System.out.println("Average Turnaround Time: " + avgTAT);

sc.close();

}

}

OUTPUT :

Enter the number of processes: 5

Enter Arrival Time and Burst Time of the processes:

P1: 2 6

P2: 5 2

P3: 1 8

P4: 0 3

P5: 4 4

Gantt Chart: P4 P4 P4 P1 P5 P2 P2 P5 P5 P5 P1 P1 P1 P1 P1 P3 P3 P3 P3 P3 P3 P3 P3

Process Arrival Burst Waiting Turnaround

P1 2 6 7 13

P2 5 2 0 2

P3 1 8 14 22

P4 0 3 0 3

P5 4 4 2 6

Average Waiting Time: 4.6

Average Turnaround Time: 9.2