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package ass5Nonpreemptiveprioruty;
import java.util.Scanner;

public class ass5Nonpreemptiveprioruty {

   public static void main(String[] args) {

     System.out.println("*** Priority Scheduling (Non Preemptive) ***");

     System.out.print("Enter Number of Process: ");
     Scanner sc = new Scanner(System.in);
     int n = sc.nextInt();
     int process[] = new int[n];
     int arrivaltime[] = new int[n];
     int burstTime[] = new int[n];
     int completionTime[] = new int[n];
     int priority[] = new int[n];
     int TAT[] = new int[n];
     int waitingTime[] = new int[n];
     int arrivaltimecopy[] = new int[n];
     int burstTimecopy[] = new int[n];
     int max = -1, min = 9999;
     int totalTime = 0, tLap, temp;
     int minIndex = 0, currentIndex = 0;
     double avgWT = 0, avgTAT = 0;
     for (int i = 0; i < n; i++) {
       process[i] = (i + 1);
       System.out.println("");
       System.out.print("Enter Arrival Time for processor " + (i + 1) + ":");
       arrivaltime[i] = sc.nextInt();
       System.out.print("Enter Burst Time for processor " + (i + 1) + " : ");
       burstTime[i] = sc.nextInt();
       System.out.print("Enter Priority for " + (i + 1) + " process: ");
       priority[i] = sc.nextInt();
     }
     for (int i = 0; i < n - 1; i++) {
       for (int j = i + 1; j < n; j++) {
         if (arrivaltime[i] > arrivaltime[j]) {
           temp = process[i];
           process[i] = process[j];
           process[j] = temp;
           temp = arrivaltime[j];
           arrivaltime[j] = arrivaltime[i];
           arrivaltime[i] = temp;
           temp = priority[j];
           priority[j] = priority[i];
           priority[i] = temp;
           temp = burstTime[j];
           burstTime[j] = burstTime[i];
           burstTime[i] = temp;
         } else if (arrivaltime[i] == arrivaltime[j] && priority[j] > priority[i]) {
           temp = process[i];
           process[i] = process[j];
           process[j] = temp;
           temp = arrivaltime[j];
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      arrivaltime[j] = arrivaltime[i];
      arrivaltime[i] = temp;
      temp = priority[j];
      priority[j] = priority[i];
      priority[i] = temp;
      temp = burstTime[j];
      burstTime[j] = burstTime[i];
      burstTime[i] = temp;
    }
  }
}
System.arraycopy(arrivaltime, 0, arrivaltimecopy, 0, n);
System.arraycopy(burstTime, 0, burstTimecopy, 0, n);

for (int i = 0; i < n; i++) {
  totalTime += burstTime[i];
  if (arrivaltime[i] < min) {
    max = arrivaltime[i];
  }
}

for (int i = 0; i < n; i++) {
  if (arrivaltime[i] < min) {
    min = arrivaltime[i];
    minIndex = i;
    currentIndex = i;
  }
}

totalTime = min + totalTime;
tLap = min;
int tot = 0;
while (tLap < totalTime) {
  for (int i = 0; i < n; i++) {
    if (arrivaltimecopy[i] <= tLap) {
      if (priority[i] < priority[minIndex]) {
        minIndex = i;
        currentIndex = i;
      }
    }
  }
  tLap = tLap + burstTimecopy[currentIndex];
  completionTime[currentIndex] = tLap;
  priority[currentIndex] = 9999;
  for (int i = 0; i < n; i++) {
    tot = tot + priority[i];
  }
}
for (int i = 0; i < n; i++) {
  TAT[i] = completionTime[i] - arrivaltime[i];
  waitingTime[i] = TAT[i] - burstTime[i];
  avgTAT += TAT[i];
  avgWT += waitingTime[i];
}
System.out.println("\n*** Priority Scheduling (Non Preemptive) ***");
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    System.out.println("Processor\tArrival time\tBrust time\tCompletion Time\t\tTurn around time\tWaiting ti
me");
    System.out.println(
        "-------------------------------------------------------------------------------------------------------");
    for (int i = 0; i < n; i++) {
      System.out.println("P" + process[i] + "\t\t" + arrivaltime[i] + "ms\t\t" + burstTime[i] + "ms\t\t"
          + completionTime[i] + "ms\t\t\t" + TAT[i] + "ms\t\t\t" + waitingTime[i] + "ms");

    }
    avgWT /= n;
    avgTAT /= n;
    System.out.println("\nAverage Wating Time: " + avgWT);
    System.out.println("Average Turn Around Time: " + avgTAT);
    sc.close();

  }
 }
/*
*** Priority Scheduling (Non Preemptive) ***
Enter Number of Process: 4

Enter Arrival Time for processor 1:0
Enter Burst Time for processor 1 : 5
Enter Priority for 1 process: 10

Enter Arrival Time for processor 2:1
Enter Burst Time for processor 2 : 4
Enter Priority for 2 process: 20

Enter Arrival Time for processor 3:2
Enter Burst Time for processor 3 : 2
Enter Priority for 3 process: 30

Enter Arrival Time for processor 4:4
Enter Burst Time for processor 4 : 1
Enter Priority for 4 process: 40

*** Priority Scheduling (Non Preemptive) ***
Processor Arrival time Brust time Completion Time  Turn around time Waiting time
---------------------------------------------------------------------------------------------------------
P1  0ms  5ms  5ms   5ms   0ms
P2  1ms  4ms  9ms   8ms   4ms
P3  2ms  2ms  11ms   9ms   7ms
P4  4ms  1ms  12ms   8ms   7ms


Gantt chart = p1  p4  p3  p2
           0   5   6   8   12

criteria = "Priority"
Mode = "non preemptuve"
TAT = CT - AT
WT = TAT - BT
Average Wating Time: 4.5
Average Turn Around Time: 7.5
```

*/