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Academic Task-3 (Operating System)

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Course Code: CSE 316

Course Title: Operating System

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GitHub Link: https://github.com/amit805/OS-Assignment

QUESTION

The following processes are being scheduled using a preemptive, round robin scheduling algorithm. Each process is assigned a numerical priority, with a higher number indicating a higher relative priority. In addition to the processes listed below, the system also has an ***idle task*** (which consumes no CPU resources and is identified as *P_idle*). This task has priority 0 and is scheduled whenever the system has no other available processes to run. The length of a time quantum is 10 units. If a process is preempted by a higher-priority process, the preempted process is placed at the end of the queue.

Thread Priority Burst Arrival

P1 40 20 0
P2 30 25 25
P3 30 25 30
P4 35 15 60
P5 5 10 100
P6 10 10 105

Write a C code to

a. Show the scheduling order of the processes using a Gantt chart.
b. What is the turnaround time for each process?
c. What is the waiting time for each process?
d. What is the CPU utilization rate?

CODE

```
#include<stdio.h>

#include<conio.h>

#include<stdlib.h>

int main()

 {

   int a,n,i,j;

   int p[20],pp[20],bt[20],tq,wt[20],tat[20],avgwt,avgtat,at[20];


   printf("Enter no of process: ");

   scanf("%d",&n);

   printf("Enter time quantum:");
```

```
 scanf("%d",&tq);
 printf("\nEnter burst time,time priorities,Arrival time \n");

 for(i=0;i<n;i++)
  {
    printf("\n Process%d ",i+1);
    scanf("%d %d %d",&bt[i],&pp[i],&at[i]);
          p[i]=i+1;
  }

for(i=0;i<n-1;i++)
 {
   for(j=i+1;j<n;j++)
   {
     if(pp[i]<pp[j])
     {
   a=pp[i];
   pp[i]=pp[j];
   pp[j]=a;
   a=bt[i];
   bt[i]=bt[j];
   bt[j]=a;
   a=p[i];
   p[i]=p[j];
   p[j]=a;
    }

  }
}
```

```
wt[0]=0;
avgwt=0;
tat[0]=bt[0];
avgtat=tat[0];
for(i=1;i<n;i++)
 {
   if(tq<n || tq>n)
          {
    wt[i]=tat[i-1];
    avgwt+=wt[i];
    tat[i]=wt[i]+bt[i];
    avgtat+=tat[i];
   }
 }

printf("\n Required Gantt chart is: \n");
for(i=0;i<n;i++)
{
          printf("P%d",p[i]);
}

for(i=0;i<n;i++)
{
printf("\n  %d",p[i]);
printf("\t\t %d",bt[i]);
printf("\t\t %d",wt[i]);
printf("\t\t %d",tat[i]);
printf("\t\t %d",pp[i]);
printf("\t\t %d",at[i]);
```

```
}
avgwt/=n;
avgtat/=n;
printf("\n Average Wait Time : %d ",avgwt);
printf("\n Average Turn Around Time : %d",avgtat);
getch();
}
```

DESCRIPTION

In this question we are given certain process which are being scheduled in preemptive round robin scheduling so the above code follows the question and solve the problem according to required. Here we are given time quantum=10.

In this code we have to provide information like no. of processes, time quantum, brust time,time priorities according to given in question.

So the required results are produced which are shown in the test case below.

TEST CASE

Thread Priority Burst Arrival
P1 40 20 0
P2 30 25 25
P3 30 25 30
P4 35 15 60
P5 5 10 100
P6 10 10 105

H:\que1new.exe

```
Enter no of process: 6
Enter time quantum:10

Enter burst time,time priorities,Arrival time

 Process1 20
40
0

 Process2 25
30
25

 Process3 25
30
30

 Process4 15
35
60

 Process5 10
5
100

 Process6 10
10
105

 Required Gantt chart is:
P1P4P3P2P6P5
  1              20             0              20             40             0
  4              15             20             35             35             25
  3              25             35             60             30             30
  2              25             60             85             30             60
  6              10             85             95             10             100
  5              10             95             105            5              105
 Average Wait Time : 49
 Average Turn Around Time : 66
```

QUESTION:2

Ten students (s1,s2,s3,s4,s5,s6,s7,s8,s9,s10) are going to attend an event. There are lots of gift shops, they all are going to the gift shops and randomly picking the gifts. After picking the gifts they are randomly arriving in the billing counter. The accountant gives the preference to that student who has maximum number of gifts. Create a C program to define order of billed students?

CODE

```
#include<stdio.h>
#include<conio.h>
#include<string.h>
void main()
{
	int i,j;
	int pt[10],gp[10];
	char p[10][5],temp[5],temp1;
	printf("Enter the details of 10 students who went to the event:\n");
	for(i=0;i<10;i++)
	{
		printf("enter students %d name:",i+1);
		scanf("%s",&p[i]);
		printf("enter process time for purchasing gifts:");
		scanf("%d",&pt[i]);
		printf("enter no of gifts purchased:");
		scanf("%d",&gp[i]);
	}
	for(i=0;i<10-1;i++)
	{
		for(j=i+1;j<10;j++)
		{
			if(pt[i]>pt[j])
			{
				temp1=pt[i];
				pt[i]=pt[j];
```

```
                pt[j]=temp1;
                temp1=gp[i];
                gp[i]=gp[j];
                gp[j]=temp1;
                strcpy(temp,p[i]);
                strcpy(p[i],p[j]);
                strcpy(p[j],temp);
            }
        }
}

printf("---Order in which students arrive at billing counter---\n");
printf("S_name\t P_time\t No.Gifts\n");
for(i=0;i<10;i++)
{
  printf(" %s\t %d\t %d\t \n" ,p[i],pt[i],gp[i]);
}

for(i=0;i<10-1;i++)
{
        for(j=i+1;j<10;j++)
        {
            if(gp[i]>gp[j])
            {
                temp1=gp[i];
                gp[i]=gp[j];
                gp[j]=temp1;
                temp1=pt[i];
                pt[i]=pt[j];
```

```
                    pt[j]=temp1;
                    strcpy(temp,p[i]);
                    strcpy(p[i],p[j]);
                    strcpy(p[j],temp);
                }
            }
        }

        printf("\n---Order in which accountant billed the students---\n");
        printf("S_name\t P_time\t No.Gifts\n");
        for(i=0;i<10;i++)
        {
          printf(" %s\t %d\t %d\t \n" ,p[i],pt[i],gp[i]);
        }
        getch();
}
```

DESCRIPTION

According to the question here we made a code which first ask about information of students who went to the event which are to be given by the user according to the question.

On compilation of the above code first we get the information about the order in which the students arrived the billing counter,then the code prints about the order in which the accountant billed the students which is as per the no. of gifts purchased by them.

TEST CASE

Ten students (s1,s2,s3,s4,s5,s6,s7,s8,s9,s10)

H:\osnewproj.exe

```
Enter the details of 10 students who went to the event:
enter students 1 name:s1
enter process time for purchasing gifts:5
enter no of gifts purchased:1
enter students 2 name:s2
enter process time for purchasing gifts:6
enter no of gifts purchased:8
enter students 3 name:s3
enter process time for purchasing gifts:5
enter no of gifts purchased:9
enter students 4 name:s4
enter process time for purchasing gifts:2
enter no of gifts purchased:7
enter students 5 name:s5
enter process time for purchasing gifts:6
enter no of gifts purchased:3
enter students 6 name:s6
enter process time for purchasing gifts:8
enter no of gifts purchased:5
enter students 7 name:s7
enter process time for purchasing gifts:3
enter no of gifts purchased:2
enter students 8 name:s8
enter process time for purchasing gifts:4
enter no of gifts purchased:0
enter students 9 name:s9
enter process time for purchasing gifts:5
enter no of gifts purchased:1
enter students 10 name:s10
enter process time for purchasing gifts:3
enter no of gifts purchased:1
---Order in which students arrive at billing counter---
S_name   P_time  No.Gifts
 s4      2       7
 s7      3       2
 s10     3       1
 s8      4       0
 s1      5       1
 s9      5       1
 s3      5       9
 s2      6       8
 s5      6       3
 s6      8       5
```

```
---Order in which students arrive at billing counter---
S_name   P_time  No.Gifts
 s4      2       7
 s7      3       2
 s10     3       1
 s8      4       0
 s1      5       1
 s9      5       1
 s3      5       9
 s2      6       8
 s5      6       3
 s6      8       5

---Order in which accountant billed the students---
S_name   P_time  No.Gifts
 s8      4       0
 s10     3       1
 s1      5       1
 s9      5       1
 s7      3       2
 s5      6       3
 s6      8       5
 s4      2       7
 s2      6       8
 s3      5       9
```