WEEK 3

Write a C program to simulate the following CPU scheduling algorithm to find

turnaround time and waiting time.

*Priority (pre-emptive & Non-pre-emptive)

*Round Robin (Experiment with different quantum sizes for RR algorithm)

Lab 2

22/6/2023

Write a C program to stimulate the following CPC scheduling algorithm to find turnaround and waiting time.

Priority:

```
#include <stdio.h>
#include <stdlib.h>
void waitingtime (int proc[], int n, int burst_time[],
int wait_time[])
{  wait_time[0] = 0;
   for(int i = 1; i<n; i++)
   {
    wait_time[i] = burst_time[i-1] + wait_time[i-1];
   }
}
void turnaroundtime (int proc[], int n, int bursttime[],
  int wait_time[], int tat[])
{  for (int i=0; i<n; i++)
    tat[i] = burst_time[i] + wait_time[i];
}
void avgtime (int proc[], int n, int burst_time[])
{ int wait_time[n], tat[n], total_wt = 0, total_tat = 0;
   waitingtime(proc, n, burst_time, wait_time);
   turnaroundtime (proc, n, burst_time, wait_time, tat);
   for(int i=0; i<n; i++)
   { total_wt += wait_time[i];
     total_tat += tat[i];
```

```
printf("\nProcess: %d Bursttime: %d waittime: %d
Turnaround time: %d", proc[i], burst_time[i],
wait_time[i], tat[i]);
}
printf("\n Average wait time: %d Average turnaround
time: %d\n", total_wt/n, total_tat/n);
}
void sort(int proc[], int burst_time[], int n, int priority[])
{ int a,b, c;
for(int i=0; i<n; i++)
{ for(int j=i+1; j<n; j++)
{ if(priority[i]>priority[j])
{ a=burst_time[i];
burst_time[i]=burst_time[j];
burst_time[j]=a;
b=proc[i];
proc[i]=proc[j];
proc[j]=b;
c=priority[i];
priority[i]=priority[j];
priority[j]=c;
}
}
}
}
```

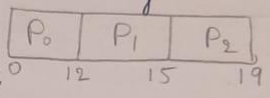
```
void main()
{ int proc[10], burst_time[10], n, priority[10];
  printf("\n Enter the size of n: ");
  scanf("%d", &n);
  for(int i=0; i<n; i++)
  { printf("Enter the processor number:");
    scanf("%d", &proc[i]);
    printf("Enter the burst time: ");
    scanf("%d", &burst_time[i]);
    printf("Enter the priority");
    scanf("%d", &priority[i]);
  }
  printf("\n");
  sort(proc, burst_time, n, priority);
  avgtime(proc, n, burst_time);
}
```

Output:

```
Enter the size of n: 3
Enter the processor number: 1
Enter the burst time: 12
enter the priority: 1
Enter the processor number: 2
Enter the burst time: 3
Enter the priority 2
```

Enter the process number : 3
Enter the burst time : 4
enter the priority 3

Process : 1 BurstTime : 12 Waittime : 0 Turnaround time : 12
process : 2 BurstTime : 3 Waittime : 12 Turnaround time : 15
Process : 3 BurstTime : 4 Waittime : 15 Turnaround time : 19
Average wait time : 9 Average turnaround time : 15



Round robin Scheduling :

```
#include <stdio.h>
#define MAX_PROCESSES 10
void roundRobin (int n, int bt[], int quantum)
{ int rem_bt[MAX PROCESSES], wt[MAX_PROCESSES], i;
  int total_wt=0, total_time=0;

  for(i=0; i<n; i++)
  rem_bt[i] = bt[i];
  while (1)
  { int done=1;
    for (i=0; i<n; i++)
    { if (rem_bt[i]>0)
      { done=0;
      if (rem_bt[i]>quantum)
      { total_time+ = quantum;
        rem_bt[i]- = quantum;
      }
```

```
else
{ total_time += rem_bt[i];
  wt[i] = total_time - bt[i];
  rem_bt[i] = 0;
}
}
}
if (done == 1)
  break;
}
for (i=0; i<n; i++)
  total_wt += wt[i];
printf("Process\t Burst Time\t Waiting Time\n");
for (i=0; i<n; i++)
  printf("%d\t %d\t %d\n", i, bt[i], wt[i]);
  printf("Average waiting time: %.2f\n", (float)total
}
int main()
{ int n, i, bt[MAX_PROCESSES], quantum;
  printf("Enter the number of processes: ");
  scanf("%d", &n);
  printf("Enter burst time for each process: \n");
  for(i=0; i<n; i++)
  { printf("Process %d : ", i);
    scanf("%d", &bt[i]);
  }
```

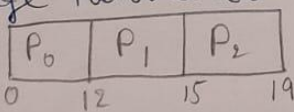
```
printf("Enter the quantum size: ");
scanf("%d", &quantum);
roundRobin(n, bt, quantum);
return 0;
}
```

Output:

Enter the number of processes: 3
Enter burst time for each process:
Process 0: 12
Process 1: 3
Process 2: 4
Enter the quantum size: 5

Process	Burst time	Waiting Time
0	12	7
1	3	5
2	4	8

Average waiting time: 6.67.
Average turnaround time: 13



22/6/23

Priority C Program:

```
#include <stdio.h>
#include <stdlib.h>
void waitingtime(int proc[], int n, int burst_time[], int wait_time[])
{
 wait_time[0] = 0;
 for (int i = 1; i < n; i++)
 {
 wait_time[i] = burst_time[i - 1] + wait_time[i - 1];
 }
}
void turnaroundtime(int proc[], int n, int burst_time[], int wait_time[], int tat[])
{
 for (int i = 0; i < n; i++)
 tat[i] = burst_time[i] + wait_time[i];
}
void avgtime(int proc[], int n, int burst_time[])
{
```

```
 int wait_time[n], tat[n], total_wt = 0, total_tat = 0;
 waitingtime(proc, n, burst_time, wait_time);
 turnaroundtime(proc, n, burst_time, wait_time, tat);
 printf("\n Process \t Burst Time \t Wait Time \t Turnaround time");
 for (int i = 0; i < n; i++)
 {
 total_wt += wait_time[i];
 total_tat += tat[i];
 printf("\n %d\t\t%d\t\t%d\t\t%d", proc[i], burst_time[i], wait_time[i], tat[i]);
}
printf("\nAverage wait time:%d Average turnaround time:%d \n", total_wt / n, total_tat / n);
}
void sort(int proc[],int burst_time[],int n,int priority[]){
 int a,b,c;
 for(int i=0;i<n;i++){
 for(int j=i+1;j<n;j++){
 if(priority[i]>priority[j]){
 // swap priority
```

```
 a=burst_time[i];
 burst_time[i]=burst_time[j];
 burst_time[j]=a;
 // swap proc accordingly
 b=proc[i];
 proc[i]=proc[j];
 proc[j]=b;
 // swap priority
 c=priority[i];
 priority[i]=priority[j];
 priority[j]=c;
 }
 }
 }
}
void main()
{
 int proc[10], burst_time[10], n,priority[10];
 printf("\n Enter the size of n:");
 scanf("%d", &n);
```

```
 for (int i = 0; i < n; i++)
 {
 printf("Enter the processor number:");
 scanf("%d", &proc[i]);
 printf("Enter the burst time:");
 scanf("%d", &burst_time[i]);
 printf("enter the priority:");
 scanf("%d",&priority[i]);
 }
 sort(proc,burst_time,n,priority);
 avgtime(proc, n, burst_time);
}
```

OUTPUT:

```
Enter the size of n:3
Enter the processor number:1
Enter the burst time:34
enter the priority:2
Enter the processor number:2
Enter the burst time:4
enter the priority:1
Enter the processor number:3
Enter the burst time:5
enter the priority:3
Process       Burst Time     Wait Time    Turnaround time
 2      4       0       4
 1      34      4       38
 3      5       38      43
Average wait time:14  Average turnaround time:28
```

Round Robin C program:

```
#include<stdio.h>
#define MAX_PROCESSES 10
void roundRobin(int n, int bt[], int quantum) {
 int rem_bt[MAX_PROCESSES], wt[MAX_PROCESSES],
i,tat[MAX_PROCESSES];
 int total_wt = 0, total_time = 0,total_tat=0 ;
 for (i = 0; i < n; i++)
 rem_bt[i] = bt[i];
 while (1) {
 int done = 1;
 for (i = 0; i < n; i++) {
 // If burst time remaining for the process
 if (rem_bt[i] > 0) {
 done = 0; // There is still a pending process
 // If burst time is greater than quantum
 if (rem_bt[i] > quantum) {
 total_time += quantum;
 rem_bt[i] -= quantum;
 } else {
```

```
// Last cycle for this process
total_time += rem_bt[i];
wt[i] = total_time - bt[i];
rem_bt[i] = 0;
}
}
}
// If all processes are done
if (done == 1)
break;
}
for (i = 0; i < n; i++)
tat[i]=wt[i]+bt[i];
// Calculate total waiting time
for (i = 0; i < n; i++)
{
total_wt += wt[i];
total_tat+=tat[i];
}
// Print results
```

```
 printf("Process\tBurst Time\tWaiting
Time\tTurnaround time\n");
 for (i = 0; i < n; i++)
 printf("%d\t%d\t\t%d\t%d\n", i, bt[i], wt[i],tat[i]);
 printf("Average waiting time: %.2f\nAverage
turnaround time: %.2f\n ", (float)total_wt /
n,(float)total_tat / n);
}
int main() {
 int n, i, bt[MAX_PROCESSES], quantum;
 printf("Enter the number of processes: ");
 scanf("%d", &n);
 printf("Enter burst time for each process:\n");
 for (i = 0; i < n; i++) {
 printf("Process %d: ", i);
 scanf("%d", &bt[i]);
 }
 printf("Enter the quantum size: ");
 scanf("%d", &quantum);
 roundRobin(n, bt, quantum);
```

```
 return 0;
}
```

OUTPUT:

```
Enter the number of processes: 3
Enter burst time for each process:
Process 0: 4
Process 1: 3
Process 2: 5
Enter the quantum size: 2
Process Burst Time  Waiting Time    Turnaround time
0   4       4   8
1   3       6   9
2   5       7   12
Average waiting time: 5.67
Average turnaround time: 9.67
```