2. 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)

Code:

```
#include<stdio.h>

int at[10],t,pt[10],tat[10],wt[10],n,time=0,i,ready[10],pry[10],op=0, maxpr,x,p[10];
float atat=0,awt=0;

void main()
{
   printf("Enter number of processes \n");
   scanf("%d",&n);

   printf("Enter araival times: \n");
   for(i=0;i<n;i++)
   scanf("%d",&at[i]);

   printf("Enter process times: \n");
   for(i=0;i<n;i++)
   scanf("%d",&pt[i]);

   printf("Enter priority: \n");
   for(i=0;i<n;i++)
   scanf("%d",&pry[i]);

   for(i=0;i<n;i++)
   ready[i]=0;

   for(i=0;i<n;i++)
   p[i]=pt[i];

   for(i=0;i<n;i++)
   time+=pt[i];
   t=n;
   while(t--)
   {
      for(i=0;i<n;i++)
      if(op>=at[i])
      ready[i]=1;
```

```
    for(i=0;i<n;i++)
    if(pt[i]==0)
    pry[i]=0;


    //finding index of max priority
    maxpr=pry[0];
    for(i=0;i<n;i++)
    if(ready[i]==1)
    if(pry[i]>maxpr)
    maxpr=pry[i];

    for(i=0;i<n;i++)
    if(maxpr==pry[i])
    x=i;

    //printing chart
    printf("%d p%d ",op,(x+1));


    op=op+pt[x];
    tat[x]=op;
    ready[x]=0;
    pry[x]=0;
}
printf("%d",op);

//finding avgtat and avg wt
for(i=0;i<n;i++)
{
    tat[i]=tat[i]-at[i];
}

for(i=0;i<n;i++)
{
    atat+=tat[i];
    wt[i]=tat[i]-pt[i];
}
for(i=0;i<n;i++)
awt+=wt[i];

awt=awt/n;
atat=atat/n;
```

```
    //printing final values
    printf("\n");
    for(i=0;i<n;i++)
    printf("P%d  %d  %d \n",(i+1),tat[i],wt[i]);
    printf("ATAT=%f  \nAWT=%f ",atat,awt);
}
```

Output:

Observation :

28-06-23 write a C program to simulate CPU scheduling
(i) Non-preemptive priority (ii) Round Robin.

```
#include<stdio.h>
int at[10], t, pt[10], tat[10], wt[10], n, time=0, i, ready[10], pr[10]
op=0, maxpr, x, p[10];
float atat=0, awt=0;

void main()
{
  printf("Enter no of process \n");
  scanf("%d", &n);

  printf("Enter arrival times : \n");
  for(i=0; i<n; i++)
  scanf("%d", &at[i]);

  printf("Enter process times: \n");
  for(i=0; i<n; i++)
  scanf("%d", &pt[i]);

  printf("Enter priority : \n");
  for(i=0; i<n; i++)
  scanf("%d", &pry[i]);

  for(i=0; i<n; i++)
  ready[i]=0;

  for(i=0; i<n; i++)
  p[i]=pr[i];

  for(i=0; i<n; i++)
  time+=pr[i];

  t=n;

  while(t--)
  {
    for(i=0; i<n; i++)
    if(op>=at[i])
      ready[i]=1;
      for(i=0; i<n; i++)
      if(pr[i]==0)
      pry[i]=0;

      maxpr=pry[0];

    for(i=0; i<n; i++)
    if(ready[i]==1)
      if(pry[i]>maxpr)
        maxpr=pry[i];
```

```
for(i=0; i<n; i++)
  if(maxpr==pry
    x=i;

printf("%d p%d

op=op+pr[x];
tat[x]=op;
ready[x]=0;
pry[x]=0;
}
printf("%d", op);

for(i=0; i<n; i++)
{ tat[i]=tat[i]-

}
for(i=0; i<n; i++)
{ atat+=tat[i]
  wt[i]=tat[

}
for(i=0; i<n;
  awt+=wt[

awt=awt/n;
atat=atat/n;

printf("\n");
for(i=0; i<n;
printf("p%d
printf(" ATAT
}.
```

output:

```
Enter number of
4
Enter arrival tim
 0 1 2 3
Enter process time
 4 3 3 5
Enter priority:
 3 4 6 5

0 P1 4 P3 7

P1  4  0
P2  14 11
P3  5  2
P4  9  4
ATAT = 8.000
```

```
for (i=0; i<n; i++)
    if (tmppr == pry[i])
        n=i;

printf("%d  p%d ", op, (n+1));

op=op+pr[n];
tat[n]=op;
ready[n]=0;
pry[n]=0;
}
printf("%d", op);

for(i=0;i<n;i++)
{ tat[i]=tat[i]-at[i];
}
for(i=0; i<n; i++)
{ atat+=tat[i];
  wt[i] = tat[i]-pt[i];
}
for (i=0; i<n; i++)
    awt+=wt[i];

awt=awt/n;
atat = atat/n;

printf("\n");
for(i=0;i<n;i++)
printf("p%d  %d  %d \n", (i+1), tat[i], wt[i]);
printf("ATAT=%f \n AWT=%f", atat, awt);
}.
```

Output:

```
Enter number of processes
4
Enter arrival times:
 0  1  2  3
Enter process times:
 4  3  3  5
Enter priority:
 3  4  6  5

0  P1  4  P3  7  P4  12  P2  15.

P1   4   0
P2   14  11
P3   5   2
P4   9   4
ATAT = 8.000      AWT = 4.2500.
```

P1	P3	P4	P2
0	4	7	12	15

Code:

```
#include<stdio.h>

    int tq, at[10], pt[10], p[10], time=0, op=0, i,j ,n, ready[10],q[100];
    int r=-1,f=0,tat[10],wt[10],z,fg,y=9999,ch;
    float atat,awt;

int rr(int x)
{
    if(pt[x]>tq)
    {
        pt[x]-=tq;
        op+=tq;
    }
    else
    {
        op+=pt[x];
        pt[x]=0;
        tat[x]=op;
        ready[x]=0;
    }
    return x;
}

void main()
{
    printf("Enter number or processes \n");
    scanf("%d",&n);

    printf("Enter araival times: \n");
    for(i=0;i<n;i++)
    scanf("%d",&at[i]);

    printf("Enter process times: \n");
    for(i=0;i<n;i++)
    scanf("%d",&pt[i]);

    printf("Enter TQ \n");
    scanf("%d",&tq);

    for(i=0;i<n;i++)
    ready[i]=0;
```

```
for(i=0;i<n;i++)
q[i]=9999;

for(i=0;i<n;i++)
p[i]=pt[i];

for(i=0;i<n;i++)
time+=pt[i];


for(i=0;i<n;i++)
    if(op>=at[i])
    ready[i]=1;

for(i=0;i<n;i++)
    if(ready[i]==1)
    {
        q[++r]=i;
    }

while(op!=time)
{
    printf("%d ",op);
    if(z==y)
    q[++f];
    y=z;

    ch=q[f];
    if(pt[ch]!=0)
    {
    z=rr(q[f]);

    printf("P%d ",(z+1));

    for(i=0;i<n;i++)
    {
       if(op>=at[i] && pt[i]!=0)
       {
        fg=0;
        j=f;
        while(j<=r)
        {
            if(i==q[j])
            fg=1;
```

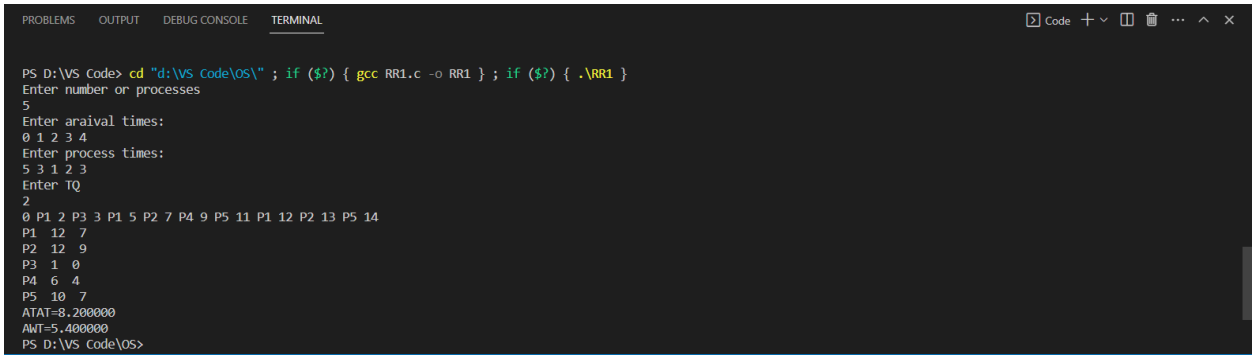
```
            j++;
          }
          if(fg==0)
          {
              q[++r]=i;
          }
         }
       }
       if(pt[z]!=0)
       q[++r]=z;
       }
       f++;
   }

   printf("%d ",op);

   for(i=0;i<n;i++)
   {
       tat[i]=tat[i]-at[i];
       wt[i]=tat[i]-p[i];
       atat+=tat[i];
       awt+=wt[i];
   }
   atat=atat/n;
   awt=awt/n;

   printf("\n");
   for(i=0;i<n;i++)
   printf("P%d %d %d \n",(i+1),tat[i],wt[i]);
   printf("ATAT=%f \nAWT=%f ",atat,awt);
}
```

Output:



Observation:

(11)

```
#include <stdio.h>
int tq, at[10], pt[10], p[10], time=0, op=0, i, j, n, ready[10], q[10];
int r=-1, f=0; tat[10], wt[10], z0, tq, y=9999, ch;
float atat, awt;

int rr(int n)
{
  if(pt[n]>tq)
  { pt[n]-=tq;
    op+=tq;
  }
  else{
    op+= pt[n];
    pt[n]=0;
    tat[n]= op;
    ready[n]=0;
  }
  return n;
}

Void main()
{
  printf(" Enter number of processes \n");
  scanf("%d", &n);
  printf(" Enter arrival times: \n");
  for(i=0; i<n; i++)
  scanf("%d", &at[i]);
  printf(" Enter process times: \n");
  for(i=0; i<n; i++)
  scanf("%d", &pt[i]);
  printf(" Enter TQ");
  scanf("%d", &tq);

  for(i=0; i<n; i++)
   ready[i]=0;

  for(i=0; i<n; i++)
   q[i]= 9999;

  for(i=0; i<n; i++)
   p[i]= pt[i];

  for(i=0; i<n; i++)
  time+= pt[i];

  for(i=0; i<n; i++)
   if(op>=at[i])
    ready[i]=1;
```

```
for(i=0; i<n
 if(ready[i
  q[++r]
 }
while(op!=
{
  printf("
  if(
   q[i+
   y=z

  ch=q
  if(pt
  {
   z
  pri
  for
  {
   f++
  }
  for(i=0
  { tat[i]
    wt[i]
    atat
  } awt
  atat = ata
  printf(" p
  printf(" A
}
```

Output:

```
Enter no.:0
Enter arr
Enter proc
Enter T
 0  P1  2
 P1  12
 P2  12
 P3  1
 P4  6
 P5  10
```

```
for(i=0; i<n; i++)
if(ready[i]==1)
{ q[++r]=i;
}
while(op!=time)
{
printf("\nop=%d", op);
if(z==-1)
q[++f]
y=z;

ch=q[f];
if(pt[ch]!=0)
{
z=dr(q[f]);
printf("\n p=%d", (z+1));
for(i=0; i<n; i++)
{ if(op>=at[i] && pt[i]!=0)
{ fg=0;
j=f;
while(j<=r)
{ if(i==q[j])
fg=1;
j++;
}
if(fg==0)
q[++r]=i;
}
if(pt[z]!=0)
q[++r]=z;
}
f++;
}
for(i=0; i<n; i++)
{ tat[i]=tat[i]-at[i];
wt[i]=tat[i]-p[i];
atat+=tat[i];
awt+=wt[i];
}
atat=atat/n; awt=awt/n;
printf("\np=%d %d %d %d", (i+1), tat[i], wt[i]);
printf("\n ATAT=%f In AWT=%f", atat, awt);
}
```

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Output:

```
Enter no. of process 5
Enter arrival times 0 1 2 3 4
Enter process times 5 3 1 2 3
Enter TQ 2
```

P1	P3	P1	P2	P4	P5	P1	P2
0	2	3	5	7	9	11	12	13

0 P1 2 P3 3 P1 5 P2 7 P4 9 P5 11 P1 12 P2 13 P5 14

P1	12	7
P2	12	9
P3	1	0
P4	6	4
P5	10	7

ATAT = 8.0

AWT = 5.4.