

Ex. No.: 6d)

Date 24/2/25

ROUND ROBIN SCHEDULING

Aim:

To implement the Round Robin (RR) scheduling technique

Algorithm:

1. Declare the structure and its elements.
2. Get number of processes and Time quantum as input from the user.
3. Read the process name, arrival time and burst time
4. Create an array **rem_bt[]** to keep track of remaining burst time of processes which is initially copy of **bt[]** (burst times array)
5. Create another array **wt[]** to store waiting times of processes. Initialize this array as 0. 6. Initialize time : $t = 0$
7. Keep traversing the all processes while all processes are not done. Do following for i'th process if it is not done yet.
 - a- If $\text{rem_bt}[i] > \text{quantum}$
 - (i) $t = t + \text{quantum}$
 - (ii) $\text{bt_rem}[i] -= \text{quantum};$
 - b- Else // Last cycle for this process
 - (i) $t = t + \text{bt_rem}[i];$
 - (ii) $\text{wt}[i] = t - \text{bt}[i]$
 - (iii) $\text{bt_rem}[i] = 0;$ // This process is over
8. Calculate the waiting time and turnaround time for each process.
9. Calculate the average waiting time and average turnaround time.
10. Display the results.

Program Code:



```

n = int(input("Enter number of process:"))
p = [(i+1) for i in range(n)]
at = []
bt = []

```

```

for i in range(n):

```

```

    print(f"P{i+1}:-")
    at = int(input("Arrival Time:"))
    at.append(at)
    bt = int(input("Burst Time:"))
    bt.append(bt)

```

```

tqt = int(input("Enter time quantum:"))

```

```

rem_bt = bt[:]

```

```

ct = [0]*n

```

```

wt = [0]*n

```

```

tat = [0]*n

```

```

time = 0

```

```

rq = []

```

```

visited = [False]*n

```

```

for i in range(n):

```

```

    if at[i] == 0:
        rq.append(i)
        visited[i] = True

```

```

while rq:

```

```

    i = rq.pop(0)

```

```

    if rem_bt[i] > tqt:

```

```

        time += tqt

```

```

        rem_bt[i] -= tqt

```

```

    else:

```

```

        time += rem_bt[i]

```

```

        rem_bt[i] = 0

```

```

        ct[i] = time

```

```

for j in range(n):

```

```

    if at[j] <= time and not visited[j]:

```

```

        rq.append(j)

```

```

        visited[j] = True

```

```

if rem_bt[i] > 0:

```

```

    rq.append(i)

```


for i in range(n):

$$tot[i] = at[i] - bt[i]$$

$$wt[i] = tot[i] - dt[i]$$

print("\nProcess\t AT\t BT\t CT\t FAT\t WT")

for i in range(n):

print(f"P{i} {tot[i]} {at[i]} {bt[i]} {ct[i]} {fat[i]} {wt[i]}")

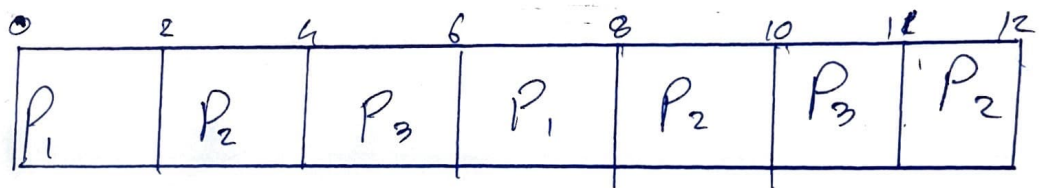
$$atot = sum(tot)/n$$

$$awt = sum(wt)/n$$

print(f"Average Turnaround Time: %.2f" % atot)

print(f"Average waiting time: %.2f" % awt)

Gantt Chart:-



Sample Output:

```
C:\WINDOWS\SYSTEM32\cmd.exe
Enter Total Number of Processes: 4

Enter Details of Process[1]
Arrival Time: 0
Burst Time: 4

Enter Details of Process[2]
Arrival Time: 1
Burst Time: 7

Enter Details of Process[3]
Arrival Time: 2
Burst Time: 5

Enter Details of Process[4]
Arrival Time: 3
Burst Time: 6

Enter Time Quantum: 3

Process ID      Burst Time      Turnaround Time      Waiting Time
Process[1]      4               13                   9
Process[3]      5               16                   11
Process[4]      6               18                   12
Process[2]      7               21                   14

Average Waiting Time: 11.500000
Avg Turnaround Time: 17.000000
```

Enter Total number of processes: 3

Enter Details

P1 :-

Arrival Time: 0

Burst Time: 4

P2

Arrival Time: 0

Burst Time: 5

P3

Arrival Time: 0

Burst Time: 3

Enter Time Quantum: 2

Process	AT	BT	CT	TAT	WT
P ₁	0	4	8	8	4
P ₂	0	5	12	12	7
P ₃	0	3	4	11	8

Average Turnaround Time : 10.33ms

Average Waiting Time : 6.33ms

Result:

The program to implement Round Robin CPU scheduling has been executed successfully.

Dr. V.