Ex. No.: 6a)
Date: 19-02-2025

FIRST COME FIRST SERVE

Aim:

To implement First-come First- serve (FCFS) scheduling technique

Algorithm:

1. Get the number of processes from the user.
2. Read the process name and burst time.
3. Calculate the total process time.
4. Calculate the total waiting time and total turnaround time for each process 5. Display the process name & burst time for each process. 6. Display the total waiting time, average waiting time, turnaround time

Program Code:

```
# include <stdio.h>
int main(){
    int n,i;
    float total_wt=0, total_tat=0;
    printf("Enter the number of processess:");
    scanf("%d", &n);
    int bt[n], wt[n], tat[n];
    char process[n][10];
    printf("Enter the process names:");
    for(i=0; i<n;i++){ scanf("%s", process[i]); }
    printf("Enter the burst time:");
    for(i=0; i<n;i++){
        scanf("%d", &bt[i]);
    }
    wt[0]=0
    for(i=1; i<n; i++){
```

```
    wt[i] = wt[i-1] + bt[i-1];
    total_wt += wt[i];
}
for( i=0; i<n; i++){
    tat[i] = wt[i] + bt[i];
    total_tat += tat[i];
}
// Display
printf("\n Process \t Burst time \t waiting time \t Turn around
        time \n");
for( i=0; i<n; i++){
    printf("%d \t %d \t %d \t \t \n", process[i], bt[i], wt[i],
        tat[i]);
}
printf("\n Average waiting time : %.2f", total_wt/n);
printf("\n Average Turn around time : %.2f", total_tat\n);
return 0;
}
```

Gantt chart:

Process	Burst Time	Waiting Time	Turn Around Time
P1	5	0	5
P2	3	5	8
P3	8	8	16
P4	6	16	22

Average Waiting Time = 7.25 ms

Average Turnaround Time = 12.75 ms

Sample Output:
Enter the number of process:
3
Enter the burst time of the processes:
24 3 3

Process	Burst Time	Waiting Time	Turn Around Time
0	24	0	24
1	3	24	27
2	3	27	30

Average waiting time is: 17.0
Average Turn around Time is: 19.0

Enter the number of processes : 4

Enter the process names : P1 P2 P3 P4

Enter the burst time of the processess : 5 3 8 6

Process	Burst Time	Waiting time	Turn Around Time
P1	5	0	5
P2	3	5	8
P3	8	8	16
P4	6	16	22

Average Waiting Time : 7.25

Average Turnaround Time : 12.75

Result:

Thus the code to implement First come First serve (FCFS) has been executed successfully.

Ex. No.: 6b)
Date: 26-02-2025

SHORTEST JOB FIRST

Aim:

To implement the Shortest Job First (SJF) scheduling technique

Algorithm:

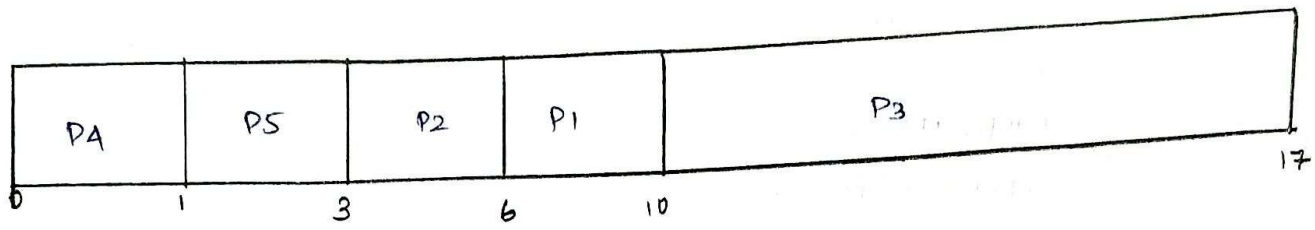
1. Declare the structure and its elements.
2. Get number of processes as input from the user.
3. Read the process name, arrival time and burst time
4. Initialize waiting time, turnaround time & flag of read processes to zero. 5. Sort based on burst time of all processes in ascending order 6. Calculate the waiting time and turnaround time for each process. 7. Calculate the average waiting time and average turnaround time. 8. Display the results.

Program Code:

```
#include <stdio.h>
int main()
{
    int bt[20], p[20], wt[20], tat[20], i, j, n, total=0, pos, temp;
    float avg_wt, avg_tat;
    printf("Enter number of process:");
    scanf("%d",&n);
    printf("Enter Burst Time :\n");
    for(i=0; i<n; i++)
    {
        printf("\n%d", i+1);
        scanf("%d",&bt[i]);
        p[i] = i+1;
    }
    for(i=0; i<n; i++)
    {
        pos = i;
        for(j=i+1; j<n; j++)
        {
```

```
        if (bt[j] < bt[pos])
            pos = j;
    }
    temp = bt[i];
    bt[i] = bt[pos];
    bt[pos] = temp;

    temp = p[i];
    p[i] = p[pos];
    p[pos] = temp;
}
wt[0] = 0;

for (i = 1; i < n; i++)
{
    wt[i] = 0
    for (j = 0; j < i; j++)
        wt[i] += bt[j];

    total += wt[i];
}
avg_wt = (float) total / n;
total = 0;
printf("Process    Burst Time    Waiting Time    Turnaround Time");

for (i = 0; i < n; i++)
{
    tat[i] = bt[i] + wt[i];
    total += tat[i]
    printf("\np%d    %d    %d    %d", p[i], bt[i], wt[i], tat[i]
}
avg_tat = (float) total / n;
printf("\nAverage Waiting Time = %f", avg_wt);
printf("\nAverage Turnaround Time = %f\n", avg_tat);
}
```

Gantt chart



Process	Burst Time	Waiting Time	Turnaround Time
P4	1	0	1
P5	2	1	3
P2	3	3	6
P1	4	6	10
P3	7	10	17

Average Waiting Time = 4.00 ms

Average Turnaround Time = 7.4ms

Sample Output:

Enter the number of process:
4
Enter the burst time of the processes:
8 4 9 5

Process	Burst Time	Waiting Time	Turn Around Time
2	4	0	4
4	5	4	9
1	8	9	17
3	9	17	26

Average waiting time is: 7.5
Average Turn Around Time is: 13.0

Enter number of process : 5

Enter Burst Time: 4 3 7 1 2

Process	Burst Time	Waiting Time	Turnaround Time
P4	1	0	1
P5	2	1	3
P2	3	3	6
P1	4	6	10
P3	7	10	17

Average Waiting Time = 4.000000
Average Turnaround Time = 7.400000

Result:

Thus the code to implement the shortest Job First (SJF) scheduling technique is executed successfully.

Ex. No.: 6c)
Date: 06-03-2025

PRIORITY SCHEDULING

Aim:

To implement priority scheduling technique

Algorithm:

1. Get the number of processes from the user.
2. Read the process name, burst time and priority of process.
3. Sort based on burst time of all processes in ascending order based priority 4.
Calculate the total waiting time and total turnaround time for each process 5.
Display the process name & burst time for each process.
6. Display the total waiting time, average waiting time, turnaround time

Program Code:

```
# include <stdio.h>
void swap()
{  int temp = *a;
    *a = *b;
    *b = temp;
}
int main()
{
   int n;
    printf("Enter the number of processes: ");
    scanf("%d", &n);

    int b[n], p[n], index[n],index2[n];
    printf("Enter Burst Time: ");
    for (int i=0 ; i<n ; i++)
    {
        printf(" Enter Burst Time : ");
        scanf("%d", &b[i]);
        index[i]=i+1;
    }
```

```
printf (" Enter Priority values");
for (int i=0 ; i<n ; i++){
    scanf("%d", &p[i]);
    index[i] = i+1;
}

for (int i=0 ; i<n ; i++)
{
    int a = p[i];
    int val = i;

    for (int j=i ; j<n ; j++)
    {   if( p[j] > a)
        {
            a=p[j];
            val =j ;
        }
    }
    swap ( &p[i], &p[m]);
    swap (&b[i], &b[m]);
    swap (& index[i], & index[m]);
}
```

(sort based on priority)

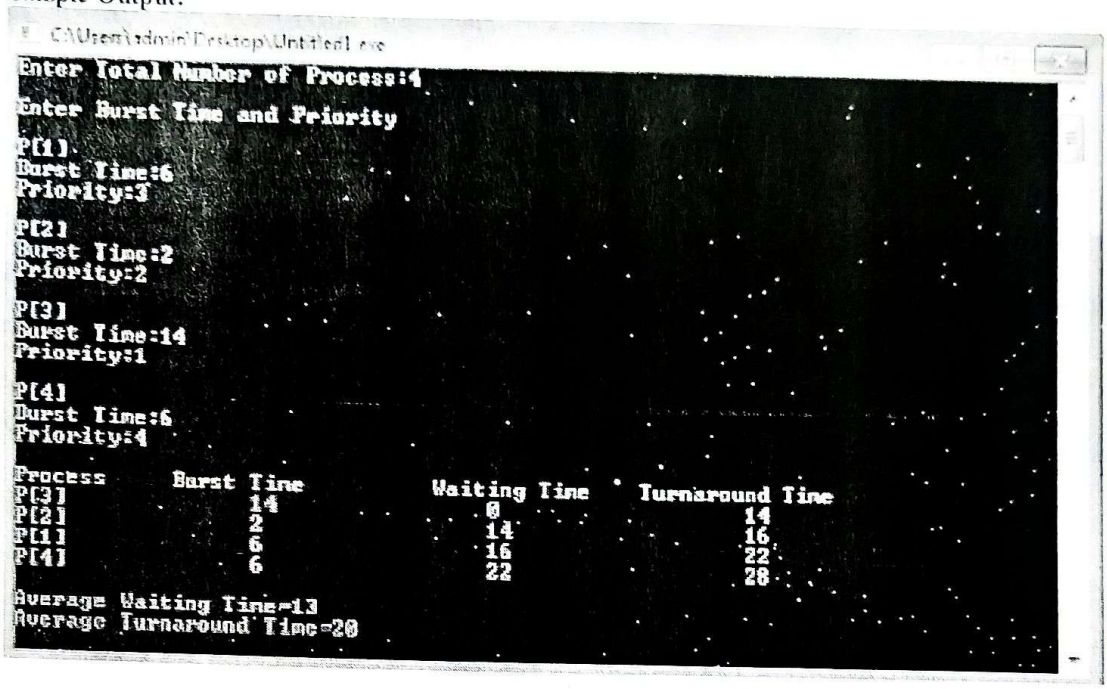
```
printf(" Process ID    Burst Time    Waiting Time    TurnAround Time \n");
int wait_time =0 , avg_wt =0, avg_tat =0;

for ( int i=0 ; i<n ;i++)
{   printf("P%d    %d    %d    %d \n", index[i], b[i] , wait_time, wait time+b[i])
    wait_time +=b[i];
    avg_wt += wait_time ;
    avg_tat += (wait_time += b[i]);
}
printf(" Average Turnaround time : %d ", avg_tat/4);
printf("Average Waiting time : %d", avg_wt/4);
}
```

Process	Burst time	Waiting time	Twin Around Time
P[0]	8	0	8
P[1]	5	8	13
P[2]	6	13	19
P[3]	3	19	22

Average Waiting time = 10 ms

Average Twin Around time = 15 ms

Sample Output:



Enter the number of process : 4

Enter the Burst Time : 5 8 3 6

Priority : 2 1 4 3

Result:

Thus the priority scheduling technique is implemented.

Ex. No.: 6d)
Date

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 rem_bt[i] > quantum
   (i) t = t + quantum
   (ii) bt_rem[i] -= quantum;
   b- Else // Last cycle for this process
   (i) t = t + bt_rem[i];
   (ii) wt[i] = t - bt[i]
   (iii) 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.

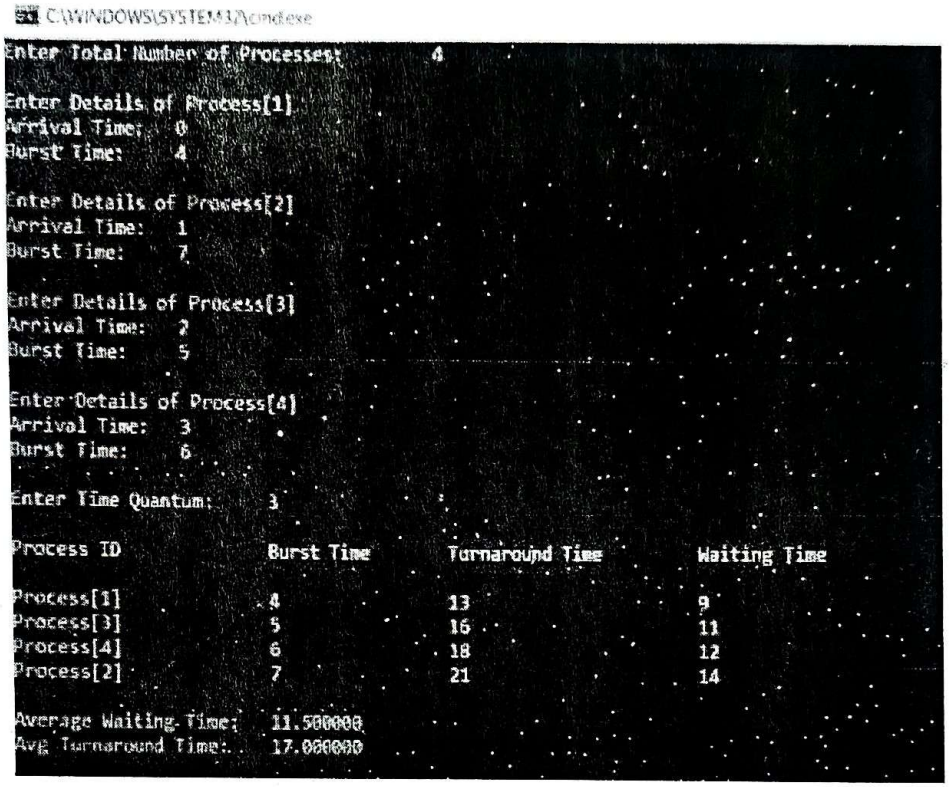
Program Code:

```
# include <stdio.h>

int main(){

    int n, quantum;
    printf("Enter number of processes: ");
    scanf("%d",&n);
    int processes[n], bt[n], at[n], wt[n], tat[n], rem_bt[n];
    printf("Enter the time quantum: ");
    scanf("%d",&quantum);
    for(int i=0; i<n; i++){
```

```
if ( i==0 ){ printf (" Enter Arrival time ")
else { printf ("Enter Burst time")

for (int j=0 ; j<n ; j++ ){
        processes [j] = i+1 ;
        scanf
        if ( i=0) { scanf ("%d", &at[j] );}
        else { scanf ("%d", &bt [j] ); }
             rem_bt[i] = bt[i]; }
        wt [j]=0
}
int t=0
int count ;
do {
    count =1 ;
    for (int i=0 ; i<n ; i++){
        if ( rem_bt[i] >0){
            count=0;
            if ( rem_bt[i] > quantum){
(completion time)   t += quantum;
                    rem_bt[i] -= quantum ;
            }
            else{
                t += rem_bt[i];
                wt[i] =t - bt[i] -at[i];
                rem_bt[i]=0
            }
        }
    }
}while ( !count)
```

```
float total_wt =0, total_tat =0;
printf("\n Process \t AT \t BT \t WT \t TAT \n");
for(int i=0 ; i<n ; i++){
        tat[i] = bt[i] + wt[i];
        total_wt += wt[i]
        total_tat += tat[i];
        printf("p %d \t %d \t %d \t %d \t %d \n", processes[i], at[i],
                bt[i], wt[i], tat[i]);
}
printf("\n Average Waiting Time : %.2f", total_wt/n);
printf("\n Average Turnaround Time : %.2f \n", total_tat/n);
return 0;
}
```

Sample Output:



Input

Enter the number of process : 4

Enter Time Quantum : 2

Enter Arrival Time : 3 0 2 9

Enter Burst Time : 5 7 1 9

OUTPUT :

Process	AT	BT	WT	TAT
P1	3	5	6	11
P2	0	7	12	19
P3	2	1	2	3
P4	9	9	4	13

Average Waiting Time : 6.00 ms

Average Turnaround Time : 11.50 ms

Result:

Thus, Round Robin scheduling technique is implemented.