

- SJE

and SJF for process scheduling

```
# include <stdio.h>
int a[20], p[20];
void main()
{ int awt, atat, n, i, j, choice;
printf ("Enter no. of processes n");
scanf ("%d", &n);
printf ("Enter arrival time and burst time ");
for (i=0; i<n; i++)
    scanf ("%d %d", &at[i], &bt[i]);
printf ("Item 1-FCFS | 2-Non preemptive
            3-Preemptive | 4-RSJF");
while (1)
{ Scanf ("1|2|3|4", &choice);
switch (choice)
{ case 1: fcfs(n);
break;
case 2: sjf(n);
break;
case 3: srtf(n);
break;
}
```

```
int cbmt [20], tat [20], wt [20];  
float awt = 0; atat = 0; sum_burst_time = 0;  
int sum = 0; smallest = 9999; temp = 0;  
for (i = 0; i < n; i++)  
{ sum_burst_time += cbmt[i]; }
```

```
y  
cbmt [9] = 9999;  
while (sum < sum_burst_time)  
{ smallest = 9999;  
for (i = 0; i < n; i++)  
{ if ((at[i] <= sum) && cbmt[i] > 0) &&  
    cbmt[i] < cbmt[smallest])  
    smallest = i; }
```

```
y  
printf ("%d %d %d", smallest, sum + cbmt[smallest],  
        - at[smallest], sum - at[smallest]);  
awt += sum + cbmt[smallest] - at[smallest];  
awt += sum - at[smallest];  
sum += cbmt[smallest];  
cbmt[smallest] = 0;
```

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

```
printf ("Average waiting time (%f", awt);  
printf ("Average turnaround time (%f", atat);
```

```

void fcfs( int n)
{
    int cpmt[20], tat[20], wt[20];
    float awt[20], atat[20];
    int sum[20];
    for (T=0; T<n; i++)
        cpmt[T] = opmt[T];
    sum[0] = cpmt[0];
    cpmt[0] = sum[0];
    for (i=1; i<n; i++)
    {
        if (cpmt[i] < sum[i])
            sum[i] = cpmt[i];
        else
            sum[i] = sum[i-1];
        cpmt[i] = sum[i];
    }
    for (i=0; i<n; i++)
        tat[i] = cpwt[i] - at[i];
    for (i=0; i<n; i++)
        wt[i] = tat[i] - cpmt[i];
    awt = awt / n;
    atat = atat / n;
    printf("Process A Seival Time CP O\n");
    printf("Time Waiting Time Turnaround\nTime");
```

Time

```

    for (i=0; i<n; i++)
        printf("P %d d %d d %d - %d", i+1, at[i], cpmt[i], wt[i], tat[i]);
    printf(" Average Waiting Time %f", awt);
    printf(" Average Turnaround Time %f", atat);
    getch();
}

```

```

void sstf [ ]
{
    int r[20];
    float ar[20];
    int ci[20];
    sum[0];
    for (i=0; i<n; i++)
        if (tat[i] < sum[i])
            sum[i] = tat[i];
        else
            sum[i] = sum[i-1];
    for (i=0; i<n; i++)
        if (cpwt[i] < ar[i])
            ar[i] = cpwt[i];
        else
            ar[i] = ar[i-1];
    for (i=0; i<n; i++)
        if (cpmt[i] < r[i])
            r[i] = cpmt[i];
        else
            r[i] = r[i-1];
    for (i=0; i<n; i++)
        if (tat[i] < sum[i])
            sum[i] = tat[i];
        else
            sum[i] = sum[i-1];
    for (i=0; i<n; i++)
        if (wt[i] < sum[i])
            sum[i] = wt[i];
        else
            sum[i] = sum[i-1];
    awt = awt / n;
    atat = atat / n;
    printf("Process A Seival Time CP O\n");
    printf("Time Waiting Time Turnaround\nTime");
```

Time

```

    for (i=0; i<n; i++)
        printf("P %d d %d d %d - %d", i+1, ar[i], r[i], wt[i], tat[i]);
    printf(" Average Waiting Time %f", awt);
    printf(" Average Turnaround Time %f", atat);
    getch();
}

```

join -> if (int u)
 {
 int s = 20, tat[20], wt[20],
 c[20], smallest, time[20];
 float ant[20], at[20];
 bu1[i][20]; i < n; i++)
 remaining[i] = c[i];
 time[20] = 0; ant[20] = 0;
 while (i < count[i] < n),
 i++ and 99;
 }
 count[i] = 20; i < n, i++)
 if (tat[i] + 60 <= time[i])
 {
 if (count[i] <= time[i] + 8 * (R))
 {
 if (smallest == -1) remaining[i] =
 remaining[smallest++];
 if (smallest == -1)
 time++;
 continue;
 }
 remaining[smallest] = -1;
 if (8 * (smallest) == 20)
 count[i] = 20;
 c[smallest] = time + 1;
 wt[smallest] = c[smallest] -
 at[smallest] - cut(smallest);
 at[smallest] = c[smallest] -
 at[smallest];
 time++;
 }

- men
- 1) FCFS
 - 2) ST
 - 3) SD
 - 4) PS

1) PROC

PC
P

P2
P

Average
Average

2

```

    awt = wt(1)
    awt = wt + 2 * tat(1)
    awt = awt + min(wt, tat)
    awt = awt + tat(1)

print ("In Process 1 Actual Time +"
      " CPU Time + Waiting Time is +"
      " Turnaround Time is");
for (i=0; i < n; i++)
    cout << " Job " << i << " at " << at[i] << " CPU " << CPU[i]
    cout << " wt[" << i << "], tat[" << i << "]");

print ("Average waiting time = - 7.0");
print ("In Average Turnaround Time is");

```

Output:

Put the number of processes

Enter arrival time and chn. time for each process

0 3 resp 10

1 6 10

2 4 10

3 2 10

Average

Avg

- mem
 1) FCFS
 2) SJF (non preemptive) first come first serve
 3) SRTF (non preemptive)
 4) PSCF

Process	Arrival time	Completion time	Waiting time	Turnaround time
P ₀	0	3	0	3
P ₁	4	6	2	8
P ₂	6	10	4	9
P ₃	8	12	4	9

Average waiting time = $\frac{3+5}{2} = 4$.
 Average turnaround time = $\frac{7+12}{2} = 9.5$.

Process	Waiting time	Turnaround time
P[0]	(0), 93	(0), 9
P[1]	(0), 98	3
P[3]	5	3
P[2]	11	7

Average waiting time = $\frac{0+93+98+5+11}{5} = 6.75$.
 Average turnaround time = $\frac{0+9+9+8+11}{5} = 3.00$.

Process Arrival Time

			3	6	8	10	12	14	16
0	0								
1	1								
2	4								
3	6	8	0	2					
8	0	6	8	0					

Average Waiting Time -- 2.50000

Average Turnaround Time -- 6.25000

(1) FCFS.

P ₀	P ₁	P ₂	P ₁	P ₁	P ₂	P ₃
0	1	3	4	6	9	13
P ₀₍₃₎	P ₀₍₂₎		P ₁₍₅₎		P ₂₍₄₎	
P ₁₍₆₎			P ₂₍₄₎		P ₃₍₂₎	
		P ₁₍₆₎				
			$\Sigma P_1(3)$			
			P ₂₍₄₎			
			8 P ₃₍₂₎			

(2) SJF

P ₀	P ₀	P ₁	P ₁	P ₁	P ₃	P ₂
0	1	3	4	6	9	11
P ₀₍₃₎		P ₂₍₆₎				
P ₀₍₂₎			P ₁₍₅₎	P ₂₍₄₎	P ₃₍₄₎	
P ₁₍₆₎			P ₂₍₄₎	P ₃₍₂₎		
			P ₃₍₂₎			

(3) SRT F

P ₀	P ₁
G	I
P ₀₍₃₎	P ₀₍₂₎

P_0	P_1	P_{11}	P_2	P_{21}	P_3	P_{12}
0	1	3	4	6	8	10
$P_0(3)$	$P_0(2)$	$P_1(6)$		$P_2(2)$	$P_1(5)$	$P_1(5)$
$P_1(6)$		$P_1(5)$		$P_1(5)$	$P_3(2)$	$P_1(5)$
			$P_2(4)$	$P_3(2)$		

$\cancel{P_{12}(6) / 2^3}$

(b) $\text{loss} \rightarrow \text{loss}$ $\text{prior} \rightarrow \text{loss}$ loss
 $\text{est} \rightarrow \text{loss}$ $\text{loss} \rightarrow \text{loss}$ $\text{loss} \rightarrow \text{loss}$
 $\text{loss} \rightarrow \text{loss}$ $\text{loss} \rightarrow \text{loss}$

(c) $\text{loss} \rightarrow \text{loss}$ $\text{loss} \rightarrow \text{loss}$ $\text{loss} \rightarrow \text{loss}$
 $\text{loss} \rightarrow \text{loss}$ $\text{loss} \rightarrow \text{loss}$

(d) $\text{loss} \rightarrow \text{loss}$ $\text{loss} \rightarrow \text{loss}$

(e) $\text{loss} \rightarrow \text{loss}$ $\text{loss} \rightarrow \text{loss}$ $\text{loss} \rightarrow \text{loss}$
 $\text{loss} \rightarrow \text{loss}$

(f) $\text{loss} \rightarrow \text{loss}$ $\text{loss} \rightarrow \text{loss}$

(g) $\text{loss} \rightarrow \text{loss}$ $\text{loss} \rightarrow \text{loss}$ $\text{loss} \rightarrow \text{loss}$
 $\text{loss} \rightarrow \text{loss}$

(h) $\text{loss} \rightarrow \text{loss}$ $\text{loss} \rightarrow \text{loss}$

(i) $\text{loss} \rightarrow \text{loss}$ $\text{loss} \rightarrow \text{loss}$

(j) $\text{loss} \rightarrow \text{loss}$ $\text{loss} \rightarrow \text{loss}$

```

Enter the number of processes
4
Enter arrival time and cpu time for each process respectively
0
3
1
4
4
6
6
2
Menu
1.FCFS
2.SJF(Non Preemptive)
3.SRTF(Preemptive)
4.Exit
1
      PROCESS      ARRIVAL TIME      CPU TIME      WAITING TIME      TURNAROUND TIME
      P0            0                  3                0                  3
      P1            1                  4                2                  6
      P2            4                  6                3                  9
      P3            6                  2                7                  9
Average Waiting Time -- 3.000000
Average Turnaround Time -- 6.750000

```

```

Enter the number of processes
4
Enter arrival time and cpu time for each process respectively
0
3
1
4
4
6
6
2
Menu
1.FCFS
2.SJF(Non Preemptive)
3.SRTF(Preemptive)
4.Exit
2
      PROCESS      WAITING TIME      TURNAROUND TIME
      P[0]            3                  0
      P[1]            6                  2
      P[3]            3                  1
      P[2]           11                  5
Average Waiting Time -- 5.750000
Average Turnaround Time -- 2.000000

```

```

Enter the number of processes
4
Enter arrival time and cpu time for each process respectively
0
3
1
4
4
6
6
2
Menu
1.FCFS
2.SJF(Non Preemptive)
3.SRTF(Preemptive)
4.Exit
3
      Process  Arrival Time      CPU Time      Waiting Time      Turnaround Time
      0          0                  3                0                  3
      1          1                  4                2                  6
      2          4                  6                5                 11
      3          6                  2                1                  3
Average Waiting Time -- 2.000000
Average Turnaround Time -- 5.750000

```