

بسم الله الرحمن الرحيم



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Operating systems Project Part 1

Simulate a CPU scheduler

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The idea of the project is to receive a list of processes n processes (dynamic number of process) with different arrival times and different CPU bursts

the PCB for each process that contains all information about the , Here process :

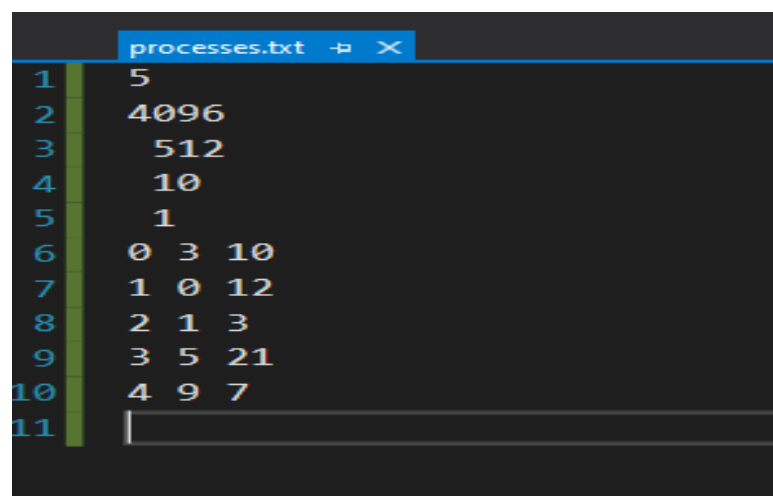
```
using namespace std;

struct Process {
    int pid; //process id
    int AT ; //arrival time
    int BurstT; //burst time
    int time_left; //for round robin
    int cs = 1;
    int wt; //waiting time
    int Ta_time; // turnaround time
    int f_time; //finish time
}
```

This is the data that we read from the text file:

Context Switch, Round Robin Quantum, Number of process

,CPU Burst ,Arrival Time ,Process ID : Each process information as



Line	Process ID	Arrival Time	CPU Burst
1	5		
2	4096		
3	512		
4	10		
5	1		
6	0	3	10
7	1	0	12
8	2	1	3
9	3	5	21
10	4	9	7
11			

We use this function to Rearrange processes upwards depending on arrival time

```
void sorty() {
    bool swapped;
    do {
        swapped = false;
        for (int i = 0; i < n1 - 1; i++) {
            if (process[i].AT > process[i + 1].AT) {
                swap(process[i], process[i + 1]);
                swapped = true;
            }
        }
    } while (swapped);
}
```

: we will see this screen When we run the project for the first time

```
----- AYAT ABUALLAN 191060 -----
your file information :
Process | Arrival Time | Burst Time
P(0)    | 3             | 10
P(1)    | 0             | 12
P(2)    | 1             | 3
P(3)    | 5             | 21
P(4)    | 9             | 7

select choice
1 - First Come First serves
2 - Shortest job first
3 - Round Robin
```

if you press 1 , you will select a choice for which algorithm you want , Then

You will get the results as below for First come first serves algorithm :

```
C:\Users\ayato\source\repos\OS\Debug\OS.exe

select choice
1 - First Come First serves
2 - Shortest job first
3 - Round Robin

First Come First is
-----
Gantt Chart
-----
(0)|==P1==|(13)|==P2==|(17)|==P0==|(28)|==P3==|(50)|==P4==|(57)
Process |TurnAround Time|Waiting Time |finish Time
P(1)    | 12             | 0           | 12
P(2)    | 15             | 12          | 16
P(0)    | 24             | 14          | 27
P(3)    | 44             | 23          | 49
P(4)    | 48             | 41          | 56
Average Wating Time: ~18
Average Turnaround Time: ~28.6
cpu Utilization 92.9825 %

select choice
1 - First Come First serves
2 - Shortest job first
3 - Round Robin
```

In each algorithm we calculate :

Average waiting time

Average turnAround Time

CPU Utilization

If you press 2 the result for **Shortest job first** will be :

```
C:\Users\ayato\source\repos\OS\Debug\OS.exe

select choice
1 - First Come First serves
2 - Shortest job first
3 - Round Robin
4
3JF (nonpreemptive)

-----
Gantt Chart
-----

(0)|==P1==|(13)|==P2==|(17)|==P4==|(25)|==P0==|(36)|==P3==|(57)
Process |TurnAround Time|Waiting Time |finish Time
P(1)    |      12      |        0      |      12
P(2)    |      15      |       12      |      16
P(4)    |      15      |        8      |      24
P(0)    |      32      |       22      |      35
P(3)    |      52      |       31      |      56
Average Waiting Time: =14.6
Average Turnaround Time: =25.2
Cpu Utilization 92.9825 %

select choice
1 - First Come First serves
2 - Shortest job first
3 - Round Robin
```

the result as below , The last choice is for **Round Robin** algorithm, Finally

```
C:\Users\ayato\source\repos\OS\Debug\OS.exe

select choice
1 - First Come First serves
2 - Shortest job first
3 - Round Robin
4
3
Round Robin

Gantt Chart
(0)|==P1==|(11)|==P2==|(15)|==P0==|(26)|==P3==|(37)|==P4==|(45)|==P1==|(48)|==P2==|(48)|==P0==|(48)|==P3==|(59)|==P4==|(59)|==P1==|(59)|==P2==|(59)|==P0==|(59)|==P3==|(61)
Process |TurnAround Time|Waiting Time |finish Time
P(1)    |      60      |       48      |      47
P(2)    |      17      |       14      |      14
P(0)    |      33      |       23      |      25
P(3)    |      77      |       56      |      60
P(4)    |      43      |       36      |      44
-----

Avg Waiting time = 35.4
Avg Turnaround time = 46
Cpu Utilization 86.8852 %

select choice
1 - First Come First serves
2 - Shortest job first
3 - Round Robin
```