Project 01

Project Description

Please write a program to perform process scheduling according to the following requirements:

- The programming language is of your choice.
- It can be run on the Windows operating system.
- It can be executed via the command line using the following syntax:

  MSSV1_MSSV2.exe <INPUT_FILE> <OUTPUT_FILE>

  For example:

  MSSV1_MSSV2.exe input.txt output.txt
- The input and output files are both saved in text format (*.txt).
- Syntax of the **<INPUT_FILE>**:

  - The first line: an integer from 1 to 4 representing the scheduling algorithm

#	Scheduling algorithm
1	FCFS (First Come First Serve)
2	RR (Round Robin)
3	SJF (Shortest Job First)
4	SRTN (Shortest Remaining Time Next)

  - In case of the Round Robin scheduling algorithm, the second line is a positive integer representing the time quantum.
  - The next line: a positive integer N representing the number of processes to be scheduled, up to maximum of 4 processes.
  - The following N lines: each line describes the scheduling information of a process with the syntax:

    <Arrival time in Ready Queue> [<CPU Burst Time> <Resource Usage Time>(<ResourceID>)]
  - It is known that:

- In the scheduling table, each process can use CPU and R multiple times, but up to a maximum of 2 times for each (CPU/R)
- In the scheduling table, a process may complete earlier than other processes. This means that the number of CPU and R usages for each process is different.
- The system has a maximum of two resources R. The scheduling algorithm on resource R is always FCFS.
- Give priority to processes that have not used the CPU for a long time in case of conflict in the entrance of the Ready Queue.

For example:

FCFS/SJF/SRTN

1

3

0 5 3(R1) 4

1 4

2 3 3(R2)

#	Arrival Time	CPU	R	CPU
P1	0	5	3(R1)	4
P2	1	4		
P3	2	3	3(R2)	

Round Robin

2

3

4

0 5 3(R1) 4

2 4

5 3 3(R2)

3 6 2(R1) 3 8(R1)

#	AT	CPU	R	CPU	R
P1	0	5	3(R1)	4	
P2	2	4			
P3	5	3	3(R2)		
P4	3	6	2(R1)	3	8(R1)

- Syntax of the **<OUTPUT_FILE>**:

- The first line: an integer sequence separated by a single whitespace, represents the Gantt chart of the process scheduling on the CPU. Note that the numbers 1, 2, 3, 4

represent processes P1, P2, P3, P4; and a hyphen (_) denotes the time slot during which no process is using the CPU.

- The following K line: has a similar structure to the first line, but they represent the scheduling on the resources R.
- The next line: an integer sequence separated by a single whitespace, represents the turn-around time of all processes.
- The last line: an integer sequence separated by a single whitespace, represents the waiting time of all processes.

For example:

Input	Output
1 3 0 5 3(R) 4 1 4 2 3 3(R)	1 1 1 1 1 2 2 2 2 3 3 3 1 1 1 1 _ _ _ _ _ 1 1 1 _ _ _ _ 3 3 3 16 8 13 4 4 7

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
CPU	P1	P1	P1	P1	P1	P2	P2	P2	P2	P3	P3	P3	P1	P1	P1	P1	
R						P1	P1	P1					P3	P3	P3		

	Turn-around Time	Waiting Time
P1	16	4
P2	8	4
P3	13	7

Submission

- Deadline: **23h59 March 14, 2025.**
- Team size: 1-2 students/team.
- The project must be submitted by the deadline and formatted according to the requirements.
  - ***MSSV1_MSSV2*** folder contains:

        - ***MSSV1_MSSV2-Code*** folder: the entire source code of the program, remove all irrelevant subfolders to reduce the size.
        - ***MSSV1_MSSV2.EXE*** file: a executive program that can be run via the command line on Windows.
        - ***Input.txt*** file: a sample input file that your program can be executed.
        - ***Output.txt*** file: a sample output file that your program writes out corresponding to the input file above.
    - ***Compress*** the entire MSSV folder above and name it ***MSSV1_MSSV2.zip (accept .zip format only)***

Important Notes

- **Each student must understand clearly the code for a minimum 2 of 4 scheduling algorithms**, as determined by the teacher through questioning.
- Do not accept any late submissions for any reason.
- Submitting in the wrong format as required will result in a point deduction.
- Do not accept any copying of work from other students for any reason. Any violation of this policy will result in failure of the assignment/course.

-- THE END --