

**COMP 322/L—Introduction to Operating Systems and System Architecture**  
**Assignment #2—Batch Process Scheduling**

**Objective:**

To calculate the timing parameters of batch processes based on different scheduling algorithms.

**Specification:**

The program mimics the execution of different processes under different scheduling algorithms. The simulation maintains a table that reflects the current state of the system, based on choosing from a menu of choices, where each choice calls the appropriate procedure, where the choices are:

- 1) Enter parameters
- 2) Schedule processes with FIFO algorithm
- 3) Schedule processes with SJF algorithm (non-preemptive)
- 4) Schedule processes with SRT algorithm (preemptive version of SJF)
- 5) Quit program and free memory

**Assignment:**

- Create a table to record the status of different processes based on the following parameters:
  - *id*: the unique identifier of the process
  - *arrival*: the point in time when the process enters the ready list to be executed by the CPU
  - *total\_cpu*: the amount of CPU time the process will consume between arrival and departure
  - *total\_remaining*: the amount of CPU time remaining for a process to complete {used for SRT scheduling only}
  - *done*: a flag that indicates whether the process has been successfully completed (1) or not (0)
  - *start\_time*: the time when the process has begun being executed by the CPU
  - *already\_started*: a flag that indicated whether the process has already begun (1) or not (0) {used for SRT scheduling only}
  - *end\_time*: the time when the process has been completed by the CPU
  - *turnaround\_time*: the sum of the total CPU time and the waiting time (alternatively: the difference between the end time and the arrival time)
- Calculate the values for the *start\_time*, *end\_time*, and *turnaround\_time* for each process based on the selected scheduling algorithm.

**What NOT to do (any violation will result in an automatic score of 0 on the assignment):**

- Do NOT modify the choice values (1,2,3,4,5) or input characters and then try to convert them to integers--the test script used for grading your assignment will not work correctly.
- Do NOT turn in an alternate version of the assignment downloaded from the Internet (coursehero, chegg, reddit, github, etc.) or submitted from you or another student from a previous semester.
- Do NOT turn in your assignment coded in another programming language (C++, C#, Java).

**What to turn in:**

- The source code as a C file uploaded to Canvas by the deadline of 11:59pm PST (-20% per consecutive day for late submissions, up to the 4th day—note 1 minute late counts as a day late, 1 day and 1 minute late counts as 2 days late, etc.)
- Make sure your code compiles with the online C compiler before submitting:  
[https://www.onlinegdb.com/online\\_c\\_compiler](https://www.onlinegdb.com/online_c_compiler)

## Sample output

### Batch scheduling

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- 1) Enter parameters
- 2) Schedule processes with FIFO algorithm
- 3) Schedule processes with SJF algorithm
- 4) Schedule processes with SRT algorithm
- 5) Quit and free memory

Enter selection: 1

Enter total number of processes: 3

Enter process id: 1

Enter arrival cycle for process P[1]: 0

Enter total cycles for process P[1]: 6

Enter process id: 2

Enter arrival cycle for process P[2]: 1

Enter total cycles for process P[2]: 3

Enter process id: 3

Enter arrival cycle for process P[3]: 3

Enter total cycles for process P[3]: 2

ID	Arrival	Total	Start	End	Turnaround
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1	0	6			
2	1	3			
3	3	2			

### Batch scheduling

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- 1) Enter parameters
- 2) Schedule processes with FIFO algorithm
- 3) Schedule processes with SJF algorithm
- 4) Schedule processes with SRT algorithm
- 5) Quit and free memory

Enter selection: 2

ID	Arrival	Total	Start	End	Turnaround
-----					
1	0	6	0	6	6
2	1	3	6	9	8
3	3	2	9	11	8

### Batch scheduling

-----

- 1) Enter parameters
- 2) Schedule processes with FIFO algorithm
- 3) Schedule processes with SJF algorithm
- 4) Schedule processes with SRT algorithm
- 5) Quit and free memory

Enter selection: 3

ID	Arrival	Total	Start	End	Turnaround
-----					
1	0	6	0	6	6
2	1	3	8	11	10
3	3	2	6	8	5

# Batch scheduling

-----

- 1) Enter parameters
- 2) Schedule processes with FIFO algorithm
- 3) Schedule processes with SJF algorithm
- 4) Schedule processes with SRT algorithm
- 5) Quit and free memory

Enter selection: 4

ID	Arrival	Total	Start	End	Turnaround
-----					
1	0	6	0	11	11
2	1	3	1	4	3
3	3	2	4	6	3

# Batch scheduling

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- 1) Enter parameters
- 2) Schedule processes with FIFO algorithm
- 3) Schedule processes with SJF algorithm
- 4) Schedule processes with SRT algorithm
- 5) Quit and free memory

Enter selection: 5

Quitting program...