

# Operating System Course Design

## 一、Objective

The principles of operating systems are a core course in computer science. The purpose of this course design is to deepen students' understanding of the kernel of computer operating systems, and to improve their ability to analyze and extend the kernel of operating systems. In the theoretical teaching of the course, much emphasis is placed on explaining the theory and implementation principles of operating systems. Through the course design, students can better grasp the principles and implementation methods of operating systems, deepen their understanding of the basic theory and important algorithms of operating systems, and strengthen their practical skills.

## 二、Schedule

Weeks 9-16.

Submission deadline: 18:00 PM, June 11th, 2023.

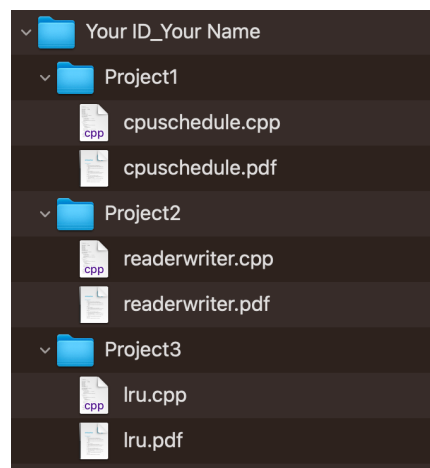
## 三、Assignment

N O	Project Name	Content Summary	State	Type
1	Process Scheduling Algorithm Simulation	1、 Simulate the operation of the round-robin algorithm for process scheduling. 2、 Create at least 15 processes and output their scheduling situation under the scheduling algorithm mentioned above and output it to the terminal to check the execution of the algorithm. 3、 The output should include the arrival time of the processes, the end time, and the average execution time.	Essential	General
2	Readers-Writer Problem Implementation	1、 A data set is shared among several concurrent processes: Readers – only read the data set; they do <i>not</i> perform any updates. Writers – can both read and write. 2、 Problem – allow multiple readers (at most 8) to read at the same time. Only one single writer can access the shared data at the same time.	Essential	General

3	Program for Least Recently used Algorithm	1、 Create a page access sequence (page number range 0-18) using a random function. The sequence length is 54 and assume that the number of main memory frames allocated to the thread is 6, that is, $M = 6$ . 2、 Implement the LRU algorithm for page replacement on the above access sequence. 3、 Output the page replacement sequence and the page fault rate.	Essential	General
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#### 四、Requirements

- For each experiment project, submit a design report and code. The report should be in PDF format, and the code should be implemented in C++. The requirements are as follows:
  - The cover of the design report should include the student ID and name.
  - The content of the design report should include the design ideas and implementation.
  - The results of the design report should include testing and running results (screenshots of screen outputs).
  - The conclusion of the design report should summarize the problems encountered, the solutions and experiences during the implementation process.
- The submitted document should be a compressed folder named "ID\_Name.zip". After decompression, there should be a folder named "ID\_Name" containing the following file structure (for example):



#### 五、Grading

The course design score is calculated on a 5-point scale and is based on the design documentation and the project source code (which should be compilable and executable). The score is calculated as follows: Design documentation \* 50% + Source code \* 50%.