

四川大学期末考试试题（闭卷）

（2017~2018 学年第 2 学期）

A 卷

课程号: 311006040 课程名称: 操作系统 任课教师: _____

适用专业年级: 软件工程 2016 级 学号: _____ 姓名: _____

考生承诺

我已认真阅读并知晓《四川大学考场规则》和《四川大学本科学生考试违纪作弊处分规定（修订）》，郑重承诺：

- 1、已按要求将考试禁止携带的文具用品或与考试有关的物品放置在指定地点；
- 2、不带手机进入考场；
- 3、考试期间遵守以上两项规定，若有违规行为，同意按照有关条款接受处理。

考生签名: _____

题 号	一(22%)	二(44%)	三(34%)
得 分			
卷面总分		阅卷时间	

- 注意事项:** 1. 请务必将本人所在学院、姓名、学号、任课教师姓名等信息准确填写在试题纸和添卷纸上；
2. 请将答案全部填写在本试题纸上；
3. 考试结束，请将试题纸、添卷纸和草稿纸一并交给监考老师。
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评阅教师	得分

一、单项选择题（本大题共 11 小题，每小题 2 分，共 22 分）

提示：在每小题列出的四个备选项中只有一个是符合题目要求的，请将其代码填写在下表中。错选、多选或未选均无分

1	2	3	4	5	6	7	8	9	10	11

1. Which of the following module is or are the techniques for I/O operation? ()
 - a. programmed I/O
 - b. Interrupt
 - c. DMA
 - d. All of the above
2. Which of the following modules belong to Operating System? ()
 - I. Process; II. Memory management; III. I/O management; IV. Processor
 - a. I
 - b. I,II
 - c. I, II, and III
 - d. All of them

3. A process switch may occur when the system encounters an interrupt condition, such as that generated by : ()
- a. System call
 - b. Page fault
 - c. Timer interrupt
 - d. All of the above
4. Which of the following is true regarding the relationship between process and thread: ()
- a. It takes far less time to create a new thread in an existing process than to create a new process
 - b. It takes less time to switch between two different processes than to switch between two threads within the same process
 - c. It takes less time to terminate a process than a thread
 - d. All of the above
5. In a uniprocessor system, mutual exclusion can be guaranteed by ()
- a. Interleaving processes
 - b. Disabling interrupts
 - c. Overlapping processes
 - d. Race condition
6. One approach to an integrated strategy for dealing with deadlocks involves the implementation of: ()
- a. Virtual memory
 - b. Resource classes
 - c. Process rollbacks
 - d. None of the above
7. In a system employing a segmentation scheme for memory management, a process is divided into: ()
- a. A number of segments which must be of equal size
 - b. One segment per thread
 - c. A number of segments which need not be of equal size
 - d. None of the above
8. A fundamental choice in the design of the memory-management portion of an O/S is: ()
- a. Whether or not to use virtual memory techniques
 - b. Whether to use paging, segmentation or a combination of the two
 - c. The algorithms employed for various aspects of memory management
 - d. All of the above

9. One approach to an integrated strategy for dealing with deadlocks: ()
- a. Virtual memory
 - b. None of the above
 - c. Process priorities
 - d. The degree of multiprogramming
10. In a hierarchical structure for managing I/O on a secondary storage device that supports a file system, the layer that is closest to the hardware is the: ()
- a. Physical organization layer
 - b. Device I/O layer
 - c. Directory management layer
 - d. None of the above
11. The data structure that maintains information on available disk space is called the: ()
- a. Disk Allocation Table
 - b. Bit Table
 - c. None of the above
 - d. File Allocation Table (FAT)

评阅教师	得分

二、简答题（本大题共7小题，共44分）。

1. What is batch multi-programming OS? What is Time sharing OS? And please describe their difference. (6分)

2. What is mode switch? What is process switch? And please describe their relationship. (6 分)
3. In chapter 5 and 6 of our textbook. We focus on concurrency. From the title of these two chapters, what are the four challenges of concurrency? And please explain their meaning after you list them. (8 分)
4. What is Page fault? And please describe the process of how to handle it. (notes: drawing a photo is suggested) (6 分)

5. What is Process Schedule? And please draw a photo to show the types. (8 分)

6. What is file system. And please draw a photo to show its architecture. (6 分)

7. Why OS is a very important course for our major? Please give your reasons.. (4 分)

评阅教师	得分

四、问答题（本大题共3小题，共34分）。

1. （共12分）

Here is a table of processes and their associated arrival and running times.

Process ID	Arrival Time	Service Time
Process 1	0	4
Process 2	2	5
Process 3	3	3
Process 4	8	4

Show the scheduling order for these processes under First-In-FirstOut (FIFO), Round-Robin (RR), and Shortest Process Next (SPN).

Time	FIFO	RR (q=1)	SPN
0			
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			

2. (共 12 分)

Consider the following snapshot of a system with five processes (P1, P2, P3, P4, P5) and four resources (R1, R2, R3, R4). There are no current outstanding queued unsatisfied requests.

Currently Available Resources

R1	R2	R3	R4
2	1	2	0

Process	Current Allocation				Max Need				Still Needs			
	R1	R2	R3	R4	R1	R2	R3	R4	R1	R2	R3	R4
P1	0	0	1	2	0	0	3	2	0	0	2	0
P2	2	0	0	0	2	7	5	0	0	7	5	0
P3	0	0	3	4	6	6	5	6	6	6	2	2
P4	2	3	5	4	4	3	5	6	2	0	0	2
P5	0	3	3	2	0	6	5	2	0	3	2	0

(A) Is this system currently deadlocked, or can any process become deadlocked? Why or why not? If not deadlocked, give an execution order.

(B) If a request from a process P1 arrives for (0, 4, 2, 0), can the request be immediately granted? Why or why not? If yes, show an execution order.

(C) If a request from a process P2 arrives for (0, 1, 2, 0), can the request be immediately granted? Why or why not? If yes, show an execution order

3. (共 10 分)

A system receives a series of page references in the following order: 1, 1, 3, 5, 2, 2, 6, 8, 7, 6, 2, 1, 5, 5, 5, 1, 4, 9, 7, 7. The system has **five** page frames. If all of the frames are initially empty, calculate the number of page faults using each of these algorithms. (Notes: the code miss should not be included, as shown in the example of our text book.)

(A) LRU replacement

(B) FIFO replacement