四川大学期末考试试题（闭卷）

（2018~2019 学年第 2 学期）　　B 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 2017 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 (30%)	二 (30%)		三 (40%)
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。

评阅教师	得分

一、单项选择题（本大题共 15 小题，每小题 2 分，共 30 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	12	13	14	15

1. Small, fast memory located between the processor and main memory is called
   (A) Cache memory
   (B) Register
   (C) CD-RW memory
   (D) WORM memory

2. The two basic types of processor registers are:
   (A) Control and Status registers
   (B) User-visible and user-invisible registers
   (C) User-visible and Control/Status registers
   (D) None of the above

3. An example of a consumable resource is the following:
   (A) Messages
   (B) Printers
   (C) Main Memory
   (D) All of the above

4. The following description of thread is incorrect
   (A) Takes less time to create a new thread than a process
   (B) Less time to terminate a thread than a process
   (C) Less time to switch between two threads within the same process
   (D) Have a virtual address space
5. The Reader/Writer problem requires that certain conditions be satisfied, such as
   (A) Multiple writers may write to the file simultaneously
   (B) Any number of readers may simultaneously read from the file
   (C) Readers may read from the file while writers are writing to it
   (D) None of the above
6. A semaphore that does not specify the order in which processes are removed from the queue is called a
   (A) Binary semaphore
   (B) Strong semaphore
   (C) Weak semaphore
   (D) Mutex
7. A conservative strategy for dealing with deadlocks that involves limiting access to resources and imposing restrictions on processes is called:
   (A) Deadlock Prevention
   (B) Deadlock Avoidance
   (C) Deadlock Detection
   (D) None of the above
8. A process switch may occur any time that the OS has gained control from the currently running process. The possible events that may give control to the OS include:
   (A) Interrupt
   (B) Trap
   (C) System Call
   (D) All of the above
9. The aim of processor scheduling is to assign processes to be executed by the processor or processors over time. In many systems, this scheduling activity is broken down into some separate functions:
   (A) long-scheduling
   (B) medium-scheduling
   (C) short-term scheduling
   (D) All of the above
10. In a single CPU computer system, which statement is NOT TRUE
    (A) Each process owns one page table.
    (B) All processes share the same TLB.
    (C) TLB is in the main memory.
    (D) Page table is in the main memory.
11. The basic technique the virtual memory based on is:
    (A) Overlaying

(B) relocation
(C) blocking
(D) paging

12. In a combined paging/segmentation system, a user's address space is broken up into a number of:
(A) Blocks and sectors
(B) Segments or pages, at the discretion of the programmer
(C) Variable-sized Segments, which are in turn broken down into fixed-size pages
(D) Fixed-size pages, which are in turn broken down into variable-sized segments

13. The system configuration that includes an i/o module which is a separate processor with a specialized instruction set can be referred to using the following terminology:
(A) i/o channel
(B) i/o processor
(C) direct memory access (DMA)
(D) all of the above

14. Indexed sequential files similar to sequential files, but contain two added features:
(A) Hash function and an overflow file
(B) Hash function and file index
(C) File index and overflow file
(D) All of the above

15. The data structure that maintains information on available disk space is called the:
(A) Disk Allocation Table
(B) Bit Table
(C) File Allocation Table (FAT)
(D) None of the above

评阅教师	得分

二、简答题（本大题共 5 小题，每小题 6 分，共 30 分）。

1. Please describe the steps involved in a full process switch.

2. Describe the difference between Boolean semaphores and integer semaphores.

3. Suppose that the following four processes,A,B,C and D, arrive for execution. Their arrival time and service time are illustrated in the below Table.Please draw charts to illustrate the execution of these processes using first-come-first served (FCFS) scheduling algorithm.

Process	Arrival Time	Service Time
A	0	5
B	3	3
C	7	2
D	8	3

4. Consider a paging system that has the following page table. For each of the following logical addresses, determine the physical addresses.

Page Table
0x 77
0x 35

Logical address			
Page number	logical offset addresses		physical addresses
0001b	0x 001A		
0010b	0x 101F		

5. What is the difference between logical I/O and device I/O?

评阅教师	得分

三、问答题（本大题共 4 小题，每小题 10 分，共 40 分）。

1. A process contains eight virtual pages on disk and is assigned a fixed allocation of four page frames in main memory. The following page trace occurs; compute the hit ratio in main memory for each policy. Assume all frames are initially empty and the Hit ratio should be computed from the beginning.

LRU

	1	0	2	2	1	7	6	7	0	1	2	0	3	0	4	5	1	5	2	4	5	6
1																						
2																						
3																						
4																						

Hit ratio = _____ /22 = _____

OPT

	1	0	2	2	1	7	6	7	0	1	2	0	3	0	4	5	1	5	2	4	5	6
1																						
2																						
3																						
4																						

Hit ratio = _____ /22 = _____

2. Use Semaphore describing the following process.

   There is a courier cabinet (快递柜) in the community, which has 20 lattices. The courier (快递员) is responsible for putting parcels into the courier cabinet (only one package can be put in each time), putting a package in place and issuing a pick-up notice. Residents (居民) can take their own parcels from the designated courier cabinet by courier notice, and only one resident can pick up parcels at a time. Assuming the cabinet is empty at the beginning.

3. Consider the following snapshot of a system with four resource types A, B, C and D, and five processes P0, P1, P2, P3 and P4

	Allocation				Max				Available			
	A	**B**	**C**	**D**	**A**	**B**	**C**	**D**	**A**	**B**	**C**	**D**
P0	1	1	0	0	1	5	5	0	1	4	1	0
P1	1	3	5	4	3	3	5	6				
P2	0	0	0	2	0	0	1	2				
P3	0	6	3	2	0	6	5	2				
P4	0	0	1	4	0	4	2	5				

Answer the following questions using banker's algorithm.

A. Fill in the contents of the Need matrix below.

	Need			
	A	**B**	**C**	**D**
P0				
P1				
P2				
P3				
P4				

B. Give a process sequence to prove that this system is in a safe state. You're your computation in the following table:

P#	Work			
	A	**B**	**C**	**D**

Safe sequence: _____

4. Perform analysis as the following Table for the following sequence of disk track requests: 129, 17, 110, 86, 147, 101, 10, 14, 120. Assume that the disk head is initially positioned over track 100 and is moving in the direction of decreasing track number.

FIFO		SSTF		SCAN		C-SCAN	
Next track accessed	Number of tracks traversed	Next track accessed	Number of tracks traversed	Next track accessed	Number of tracks traversed	Next track accessed	Number of tracks traversed
Average seek length		Average seek length		Average seek length		Average seek length	