四川大学期末考试试题（闭卷）

（2018~2019 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 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. A Control/Status register that contains the address of the next instruction to be fetched is called the:
   (A) Program Counter (PC)
   (B) Program Status Word (PSW)
   (C) Instruction Register (IR)
   (D) Stack Pointer (SP)
2. The processing required for a single instruction is called an instruction cycle. Using a simplified two-step description without interrupt. These two steps can be referred to as
   (A) the fetch stage and the swap stage
   (B) the load stage and the execute stage
   (C) the fetch stage and the execute stage
   (D) the load stage and the swap stage
3. Which of the following is not 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 more time to switch between two different processes than to switch between two threads within the same process
(C) It takes more time to terminate a process than a thread
(D) Process is unit of scheduling/execution. Thread is unit of resource allocation and unit of protection.

4. The basic Two-State Process Model defines two possible states for a process in relationship to the processor:
   (A) Running and Executing
   (B) Running and Not Running
   (C) Executing and Waiting
   (D) None of the above
5. Concurrency plays a major part in which of the following specific contexts
   (A) Structured applications
   (B) Multiple applications
   (C) O/S structure
   (D) All of the above
6. A semaphore that specify the order in which processes are removed from the queue is called a
   (A) Binary semaphore
   (B) Strong semaphore
   (C) Weak semaphore
   (D) None of the above
7. The permanent blocking of a set of processes that either compete for system resources or communicate with each other is called:
   (A) Starvation
   (B) Deadlock
   (C) Prioritization
   (D) All of the above
8. In the Resource Allocation Denial approach to Deadlock Avoidance, a safe state is defined as one in which:
   (A) At least one potential process sequence does not result in a deadlock
   (B) All potential process sequences do not result in a deadlock:
   (C) Several potential process sequences do not result in a deadlock:
   (D) None of the above
9. A physical location in main memory is called a

(A) Logical address
(B) Absolute address
(C) Relative address
(D) None of the above

10. When the size of a page increases, which statement is TRUE
(A) Generally speaking the internal fragmentation within pages increase.
(B) Generally speaking the internal fragmentation within pages decrease.
(C) Generally speaking the internal fragmentation remains the same.
(D) Generally speaking the number of ready threads may increase.

11. The replacement policy that chooses only among the resident pages of the process that generated the page fault in selecting a page to replace is referred to as a:
(A) Random replacement policy
(B) Local replacement policy
(C) Sequential replacement policy
(D) Indexing replacement policy

12. 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

13. Fixed file blocking experiences the following potential problem:
(A) Internal fragmentation
(B) Gaps due to hardware design
(C) External fragmentation
(D) None of the above

14. The following disk scheduling policy is useful as a benchmark against which to evaluate other disk scheduling policies because it provides a worst-case scenario:
(A) fifo scheduling
(B) random scheduling
(C) priority scheduling
(D) none of the above

15. In general, there are some techniques are possible for I/O operations:
(A) programmed I/O
(B) interrupt-driven I/O
(C) direct memory access (DMA)
(D) All 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. Describe the decision mode in processor scheduling.

2. Please illustrate the seven-state process state transition diagram.

3. In chapter 5 of our textbook. We focus on concurrency, what are the three difficulties of concurrency?

4. 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 round-robin (RR) scheduling algorithm with q=1.

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

5. Consider a segmentation system that has the following segment table. For each of the following logical addresses, determine the physical address or indicate if a segment fault occurs:

Segment Table		
Segment number	Base Address	Length (bytes)
0	60	248
1	852	422
2	422	198

Logical address			
Segment number	logical offset addresses		physical addresses/ segment fault
1	567		
2	60		
0	210		

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.

FIFO：

	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 = _____

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 = _____

2. Use Semaphore describing the following process.

   During the road repairing of Renmin Road, the two-way traffic between North and South has become one-way traffic. Cars can either go from south to north or from north to south. Only one direction of vehicles is allowed to enter the construction section at a time. In order to avoid occupying the section for a long time, it is necessary to ensure that the two directions pass fairly.

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	0	0	1	2	0	0	1	2	1	5	2	0
P1	1	0	0	0	1	7	5	0				
P2	1	3	5	4	2	3	5	6				
P3	0	6	3	2	0	6	5	2				
P4	0	0	1	4	0	6	5	6				

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. Is the system in a safe state? Explain why?

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

Safe sequence: _____

4. Perform analysis as the following Table for the following sequence of disk track requests: 129, 77, 110, 186, 147, 101, 10, 64, 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	