四川大学期末考试试题（闭卷）

（2014~2015 学年第 2 学期）

课程号：311006040 课程名称：操作系统（B 卷） 任课教师：

适用专业年级：软件工程 2013 级 学号： 姓名：

考试须知

四川大学学生参加由学校组织或由学校承办的各级各类考试，必须严格执行《四川大学考试工作管理办法》和《四川大学考场规则》。有考试违纪作弊行为的，一律按照《四川大学学生考试违纪作弊处罚条例》进行处理。

四川大学各级各类考试的监考人员，必须严格执行《四川大学考试工作管理办法》、《四川大学考场规则》和《四川大学监考人员职责》。有违反学校有关规定的，严格按照《四川大学教学事故认定及处理办法》进行处理。

题　号	一(20%)	二(44%)	三(36%)	卷面成绩
得　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 10 小题，每小题 2 分，共 20 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

1. As a program that controls the execution of application programs and acts as an interface between applications and the computer hardware, which one is not the main objectives an OS should have(　　)

   (A) Convenience

   (B) Simultaneously handle request from multiple users

   (C) Efficiency

   (D) Ability to evolve

2. When process state changed from running to blocked, the reason may be(　　)

   (A) The process is completed

   (B) The process executed illegal instructions

   (C) The running process called semWait

   (D) The running process called semSignal

3. Most processors support at least two modes of execution. The less-privileged mode is often referred to as( )

   (A) System mode

   (B) User mode

   (C) Kernel mode

   (D) None of the above

4. The approach to enforce mutual exclusion is prone to high processing overhead and bugs is ( )

   (A) Leaving the responsibility with the processes that wish to execute concurrently

   (B) Compare & Swap instruction

   (C) Interrupt disabling

   (D) Exchange instruction

5. Defining a linear ordering of allocation of resources can destroy the condition ( )to avoid deadlock.

   (A) Mutual exclusive

   (B) No preemption

   (C) Hold and wait

   (D) Circular wait

6. The practice in which a program that is swapped out can be swapped in to different region of memory is called( )

   (A) Sharing

   (B) Overlaying

   (C) Relocation

   (D) None of the above

7. In a virtual memory system, the relation of page fault rate to the number of page frames allocated is( )

   (A) Monotonically increasing

   (B) Monotonically decreasing

   (C) Fixed ratio

   (D) Direct ratio

8. The most suitable schedule algorithm for time-shared system is( )

   (A) FCFS

   (B) SPN

   (C) SRT

   (D) RR

9. There are great differences across device classes and even substantial differences within each device class. Among the key differences are the following except (　　).

(A) Data rate

(B) Application

(C) Unit of data transfer

(D) Price

10. Compared to sequential file, the indexed sequential file are optimal in scenarios involving (　　)

(A) Applications that frequently query desired record

(B) Applications that require frequent access to all records

(C) Applications that require frequent updates

(D) None of the above

评阅教师	得分

二、简答题（本大题共 7 小题，共 44 分）。

1. Describe what Operating System is and give a description of its Evolution. (7 分)

2. Draw a figure to show seven-state process model, and briefly describe events that lead to each state transition. （7 分）

3. List the four control problems associated with concurrency and briefly define each. （6分）

4. Give a description of the similarities and differences between dynamic partitioning and segmentation（5 分）

5. Figure to show the process of Address-Translation in virtual paging system. Show the TLB, one-level page table, M and Disk in this figure（8 分）.

6. What is the meaning and relationship of Long-term scheduling，Middle-term scheduling，short-term scheduling. （6 分）

7. List and briefly describe delay elements are involved in a disk read or write. （5 分）

评阅教师	得分

三、问答题（本大题共 3 小题，共 36 分）。

1. There are two processes, add and sub are executed concurrently and share variables s0, s1 and x. (共 12 分)

Initialization	
Semaphore s0 =1; Semaphore s1 =1; x=0;	
Processes	

void add()
{
while(TRUE)
{
semWait (s0);
semWait (s1);
x + +;
semSignal (s0);
semSignal (s1);
}
}
	void sub(void)
	{
	while(TRUE)
	{
	semWait (s1);
	semWait (s0);
	x - -;
	semSignal (s1);
	semSignal (s0);
	}
	}

Main	

void main()
{
parbegin(add, sub);
}	

Answer the following questions:

(A) Can the concurrent execution of these two processes result in being blocked forever? If yes, give an execution sequence in which they are blocked forever. (4 分)

(B) Can the concurrent execution of these two processes result in the indefinite postponement of one of them? If yes, give an execution sequence in which one is indefinitely postponed.(4 分)

(C) Give a scheme to resolve possible problems if any. (4 分)

2. There are 5 processes: P1, P2, P3, P4, P5, and 3 types of resources: A, B, C. The current resource allocation state as followed: （共 12 分）

	Claim			Allocation		
	A	B	C	A	B	C
P1	9	5	8	4	1	3
P2	4	8	5	3	1	1
P3	5	3	5	1	2	3
P4	3	2	6	2	2	3
P5	4	4	8	4	1	1

Available		
A	B	C
2	2	3

Please answer the following questions by Banker's Algorithm.

(A) The current stats are safe state? (2 分)

Please provide the reasons and steps. (4 分)

(B) If process P1 make a request {1, 1, 0}, the OS should accept it? (2 分)
Why? (4 分)

3. Suppose that the following processes arrive for execution at the times indicated, each process will run the listed amount of time. (共 12 分)

Process	Arrival Time	Service Time
P1	0	5
P2	3	6
P3	5	3
P4	7	4

(A) Draw Gantt charts that illustrate the execution of these processes using first-come-first served (**FCFS),** round-robin **(RR),** shortest process next **(SPN),** Shortest remaining time **(SRT).** (每种调度算法 2 分，共 8 分)

(B) Calculate Turnaround time (Tr) and Tr/Ts of each process for each of the scheduling algorithm. (每种调度算法 1 分，共 4 分)