

(2014~2015 学年第 2 学期)

适用专业年级: **软件工程 2013 级** 学号: 姓名:

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。

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。

A horizontal line of small, stylized airplane icons, each facing right, arranged in a row.

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. Operating system provides many types of services to end-users, programmers and system designers, including:
 - (A) Built-in user applications
 - (B) Error detection and response
 - (C) Relational database capabilities with the internal file system
 - (D) None of the above
2. The main advantage of batch processing is:
 - (A) Reduce the time of interaction with users
 - (B) Increasing the CPU utilization rate
 - (C) Reduce the program errors
 - (D) All of the above

本题共 7 页，本页为第 1 页
教务处试题编号：311-2

3. Which of the following is true regarding multithreading:
- (A) Multithreading refers to the ability of an OS to support multiple, concurrent paths of execution within a single process
 - (B) In a multithreaded environment, a process is defined as the unit of resource allocation and a unit of protection.
 - (C) The concept of thread synchronization is required in multithreaded systems because threads of a single process share the process's process control block (PCB).
 - (D) None of the above
4. In order to implement mutual exclusion on a critical resource for competing processes, only one program at a time should be allowed ()
- (A) In the critical section of the program
 - (B) To perform message passing
 - (C) To Exhibit cooperation
 - (D) None of the above
5. 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 k:
 - (C) Several potential process sequences do not result in a deadlock:
 - (D) None of the above
6. The practice in which a program and data are organized in such a way that various modules can be assigned the same region of memory is called:
- (A) Sharing
 - (B) Overlaying
 - (C) Relocation
 - (D) None of the above
7. Which one of the following is true regarding virtual memory
- (A) The condition known as thrashing occurs when the majority of the processes in main memory require repetitive blocking on a single shared I/O device in the system.
 - (B) The modify (M) bit is a control bit in a page table entry that indicates whether the contents of the corresponding page have been altered since the page was last loaded into memory.

- (C) A Page Fault occurs when the desired page table entry is not found in the Translation Lookaside Buffer (TLB).
- (D) In a combined paging/segmentation system, a user's address space is broken up into a number of fixed-size pages, which in turn are broken up into a number of segments.
8. CPU-scheduling decisions may take place under the following circumstances except which one:
- (A) When a process switches from the running state to the blocked state
- (B) When a process switches from the running state to the ready state
- (C) When a process switches from the blocked state to the ready state
- (D) When a process switches from the ready state to the suspend state
9. The I/O technique where interrupt mechanism is not employed is:
- (A) Programmed I/O (B) Interrupt-driven I/O
- (C) Direct memory access (DMA) (D) None of the above
10. Compared to sequential file, the indexed sequential file are optimal in scenarios involving:
- (A) Applications that rarely require the processing of all records in the file
- (B) Applications that require or updates of individual records
- (C) Applications that require infrequent updates
- (D) All of the above

评阅教师	得分

二、简答题（本大题共 7 小题，共 44 分）。

1. From the perspective of design, what are the main modules inside the OS kernel? And give a short description of each of them.(5 分)

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5. Give a description of the similarities and differences between simple paging and fixed partition. (5 分)
6. Figure to show the process of Address-Translation in a Combined Paging/Segmentation System and describe the process of address translation. (7 分)
7. What is I/O buffer? Give a description of different ways of the organization of I/O buffer. (7 分)

评阅教师	得分

三、问答题（本大题共 3 小题，每个题 12 分，共 36 分）。

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

Process	Arrival Time	Service Time
P1	0	5
P2	4	6
P3	6	8
P4	10	4

- (A) Draw Gantt charts that illustrate the execution of these processes using first-come-first served (**FCFS**), shortest process next (**SPN**), Shortest remaining time (**SRT**).
- (B) Calculate Turnaround time (T_r) and T_r/T_s of each process for each of the scheduling algorithm.

2. A process contains 8 virtual pages on disk and is assigned a fixed allocation of 4 page frames in main memory. The following page trace occurs: (12 分)

1,5,1,0,6, 5, 6 ,0,1,7,0,3, 6,1,0,4,5, 8,7,4

Compute number of page faults using the following replacement strategy? Please give the detail step of each replacement process.

- LRU replacement.
- FIFO replacement.
- Clock replacement.

(A) LRU replacement

Page fault number: _____

(B) FIFO replacement

Page fault number: _____

(C) Clock replacement

Page fault number: _____

3. There are four resources in the system: A, B, C and D, and the resource allocation situation of five processes P0, P1, P2, P3 and P4 is as following, (12 分)

Process	Allocation				Claim					Available		
	A	B	C	D	A	B	C	D	A	B	C	D
P0	0	0	3	2	0	0	4	4	1	6	2	2
P1	1	0	0	0	2	7	5	0				
P2	1	3	5	4	3	6	10	10				
P3	0	3	3	2	0	9	8	4				
P4	0	0	1	4	0	6	6	10				

(C) Is the system in the safe state, please give the calculation process.

(D) If P2 claims resource (1,2,2,2), can this requirement be allowed, why?