重庆大学《操作系统》课程试卷

●A卷
●B卷

2016—2017 学年第一学期

开课学院：计算机学院课程号：18012035　　考试日期：

考试方式： ●开卷 ●闭卷 ●其他　　**考试时间：120 分钟**

题号	一	二	三	四	五	六	七	八	九	十	总分
得分											

考试提示

1.严禁随身携带通讯工具等电子设备参加考试；

2.考试作弊，留校察看，毕业当年不授学位；请人代考、替他人考试、两次及以上作弊等，属严重作弊，开除学籍。

Part I:True / False Questions（12 points）

1. ( ) The OS is a kind of application program, it manages all hardware resources to work together.
2. ( ) A relocation register is used to check for invalid memory addresses generated by a CPU.
3. ( ) Monitors are a theoretical concept and are not practiced in modern programming languages.
4. ( ) When a user-level thread is created, it cannot be scheduled directly by kernel because the kernel can’t realize it .
5. ( ) Most SMP systems try to avoid migration of processes from one processor to another and attempt to keep a process running on the same processor. This is known as processor affinity.
6. ( ) Record semaphore may cause the problem of busy waiting.
7. ( ) A deadlocked state is an unsafe state, all unsafe states are deadlocks.
8. ( ) In segmentation memory management, to access an operand needs access memory twice.
9. ( ) The system thrashing occurs lots of page-faults. It can result in severe performance problems.
10. ( ) All files in a single-level directory must have unique names.
11. ( ) When continuously reading data on the same cylinder and different disk surface, It is not necessary to move the heads.
12. ( ) Users can use the computer hardware features without going through the operating system.

Part II: Single Choice (22 points)

1、Which one of the following descriptions about command-interpreter (命令解释程序) is correct?（　）

A. the interface between the user and the OS
B. allows users to directly enter commands
C. In the kernel or as a special program
D. the program to interpret commands

2、Which of the following does not correct for memory sharing and message passing? (　)

A. Shared-memory is faster than message passing scheme because data sharing does not need to switch between kernel and user space

B. Shared-memory scheme does not need kernel support. User can do it by themselves.

C. message passing highly replies on the support of kernel.

D. message passing scheme is easy to use for users since most of its function is provided by kernel.

3、 In five states of a process, (　) state can convert from the other three states.

A. NEW　　B. RUN　　C. READY　　D. WAIT

4、A thread is a basic unit of CPU utilization, It shares with other threads belonging to the same process the　(　)

A. code section　B. program counter　　C. register set　　D. stack

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5、Assume 3 processes want to enter critical section, S is the mutual exclusion semaphore, the minimum value and maximum value are ( )

A. -3, 3 B.-3, 0 C.-3, 1 D.-2, 1

6、 In virtual memory, what kind of addresses is used by CPU ( ) .

A. physical address B. linear address

C. logical address D. relative address

7、 In paging system, the size of a page is 1K bytes, if a process has a page table as right, the logical address of an instruction is 463, its corresponding physical address is ( )

A. 2660. B.7583 C.7168 D.4559

Page ID	Frame ID
0	4
1	6
2	7
3	9

8、In order to better use memory space, which of the following methods can be used? ( )

A. caching

B. swapping

C. SPOOLing

D. absolute loading

9、The Belady's anomal (异常现象) probably occurs in ( ) page-replacement algorithm.

A .OPT B.FIFO C.LRU D.none

10、which of the following CPU scheduling is non-preemptive? ( )

A .FCFS B. SJF C. Priority D. round robin

11、Magnetic tapes was used as an early secondary-storage medium. The file stored in it can be accessed in ( )

A. direct access. B. sequential access C. indexed D. none of the above

Part I and II Answer

	1	2	3	4	5	6	7	8	9	10	11	12
I												
II												

Part III : Fill in the blanks（10 points）

1. For an operating systems can be designed in different structure, including simple structure, layered,_____ and _____.
2. ____ is the important structure for a process. It includes much information about a specific process.
3. There are three types of operations can be used for semaphore, including _____, _____ and _____.
4. We can classify page-replacement algorithms into two broad categories: _____allows a process to select a replacement frame from the set of all frames, _____ requires that each process select from only its own set of allocated frames.
5. The time to move disk arm to desired cylinder is called _____.
6. _____ controller can control the device to directly access the main memory.

Part IV: *Short* Answer Questions (32 points)

1. Please list all types of processor scheduling in a computer and explain the main tasks for each type.

2. Why are two modes (user and kernel) needed?

3. Please list as many as possible deadlock recovery schemes (at least 2) and explains their advantages and disadvantages.

4. Please explain the difference between internal and external fragmentation.

5. Please explain why we need to use TLB for memory accesses. What is the principle of TLB.

6. Please explain the role of file directory and the organization structures of file directory.

7. Briefly describe the steps taken to read a block of data from the disk to the memory using DMA controlled I/O.

1. CPU向DMA发请求，传递所要数据
2. DMA 向设备控制器发送
请求 3. 把读到的数据通过总
线存入内存 4. 控制器向DMA发送应答
5. 向CPU发出中断

8. Please explain what are cache and buffer. What are their difference?

Part V: Integrated Exercises (24 points)

1. The OS allocated 4 page frames to each active process. Initially, no page in the main memory. If a process demand pages as follows:

   3,4,5,6,1,0,2,3,6,3,2,1

   Please use **OPT, LRU, and CLOCK** policies separately to replace the page in memory, and calculate the total page fault.

2. Consider the following snapshot of a system with five processes (p1, ... p5) and four resources (r1, ... r4). There are no current outstanding queued unsatisfied requests.

Processes	Allocation				Max				Available			
	R1	R2	R3	R4	R1	R2	R3	R4	R1	R2	R3	R4
P1	0	0	1	2	0	0	1	2	2	1	0	0
P2	2	0	0	0	2	7	5	0				
P3	0	0	3	4	6	6	5	6				
P4	2	3	5	4	4	3	5	6				
P5	0	3	3	2	0	6	5	2				

a) what is the content of the matrix Need?

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

c) If a request from p3 arrives for (0, 1, 0, 0), can that request be safely granted immediately? And why?

3. Assuming there are 5000 cylinders (No.0-4999) in a disk. Read-write head is at cylinder No. 143 right now, and the previous position is No.125. The coming request queue is

86, 1470, 913, 1774, 948, 1509, 1022, 1750, 130.

Starting from the current head position, *please list the access sequences* for the following disk-scheduling algorithms?

a) FCFS, SSTF and SCAN
b) Considering the state-of-the-art storage media, there are some storage media has no arm without seeking latency. In this case, which one of the above scheduler would be the best? Describe your reason