四川大学期末考试试题（闭卷）

（2023~2024 学年第 1 学期）　　A　　卷

课程号：311006040　课程名称：操作系统　任课教师：左航、熊运余、陈楷民

适用专业年级：　　学号：　　姓名：

评阅教师	得分

一、单项选择题（本大题共 20 小题，每小题 1.5 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

16	17	18	19	20

1.A Control/Status register that contains the address of the next instruction to be fetched is called the:
A.Instruction Register (IR)
B.Program Counter (PC)
C.Program Status Word (PSW)
D.All of the above
2.The principle objective of a time sharing, multi-programming system is to:
A.Maximize response time
B.Maximize processor use
C.Provide exclusive access to hardware
D.None of the above
3.In the Process Based O/S:
A.Major kernel functions are organized as separate process
B.The User Process Image includes a kernel stack
C.O/S code and data are contained in the shared address space
D.None of the above
4.The Process Image element that contains the modifiable part of the user space is called the:
A.User Program
B.System Stack
C.Process Control Block
D.None of the above
5.In modern operating system, what is the basic unit of resource allocation and what is the basic unit of CPU dispatching:
A.Memory; Tread　　B. Process; Task;
C. Tread; Process　　D. Process;Thread
6.In synchronization involving message passing, the sender of a message can be :
A.Either blocking or non-blocking
B.Only blocking

C.Only blocking
D.All of the above
7.In a uni-processor system, mutual exclusion can be guaranteed by:
A.Disabling interrupts
B.Interleaving processes
C.Overlapping processes
D. All of the above
8.The Dining Philosopher's Problem is a standard test case for evaluating approaches to implementing:
A.Deadlock
B.Starvation
C.Synchronization
D.All of the above
9. in a system employing a segmentation scheme for memory management, wasted space is due to:
A.external fragmentation
B.internal fragmentation
C.segments of different sizes
D.none of the above
10. a reference to a memory location independent of the current assignment of data to memory is called a:
A.relative address
B.logical address
C.absolute address
D.virtual address
11. 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.overlaying
B.sharing
C.relocation
D.none of the above
12. About equal-size partition, which statements is correct:
A. May lead to external fragmentation
B. Can not hold a program whose size is too large to fit in one partition.
C. Replace policy is much simpler than dynamic partition policy.
D. none of the above
13. the concept associated with determining the number of processes that will be resident in main memory is referred to as:
A.a cleaning policy
B.load control
C.the page fault frequency
D.none of the above
14. A certain system uses a 32-bit logical address, a page size of 4kbytes, and a 33 bit physical address. If using an inverted page table with a page table entry of 10Byte, what is the page table size in the system?
A. 10MB B. 20MB C. 40MB D. 80MB
15.in terms of frequency of execution, the short-term scheduler is usually the one that executes:
A.most frequently
B.about the same as the other schedulers
C.least frequently
D.none of the above
16.which of the following scheduling policies require prior knowledge or estimation of process length:

A.highest response ratio next (hrrn)
B.shortest remaining time (srt)
C.shortest process next (spn)
D.all of the above
17.the disk cache replacement strategy that replaces the block that has experienced the fewest references is called:
A.least recently used (lru)
B.least frequently used (lfu)
C.least referenced (lr)
D.all of the above
18.the scenario where multiple buffers are used in an attempt to alleviate the problem of absorbing rapid bursts of i/o is typically referred to as:
A.double buffering
B.circular buffering
C.single buffering
D.none of the above
19.a file is generally defined to be:
A.a collection of similar records
B.a collection of related fields
C.a basic element of data
D.all of the above
20.record access in a pile file can be conducted by:
A.partial index
B.exhaustive search
C.key field
D.all of the above

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二、简单题（本大题共 6 小题，每小题 5 分，共 30 分）。

1. Please describe the deadlock conditions and the main strategies for dealing with deadlocks.

2. Please describe the steps for the Process Creation.

3. Please briefly explain how best-fit algorithm works in dynamic partition, and analyze why the performance is the worst.

4. List a few(at least 3) advantages of choosing 4MB instead of 4KB as the page size.

5. What is the difference between turnaround time and response time?

6. List and briefly define three techniques for performing I/O.

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三、问答题（本大题共 3 小题，共 40 分）。

1. (15 分) The basket can hold four apples, while the plate can carry two apples. There is no limit for apples. The fathers keep adding apples to the basket, only one apple at a time. Mothers take one apple from the basket, peel it, and put it on the plate. When the children see the apple on the plate, they pick one apple and eat it without restricting their appetite. The initial plate and basket are both empty. Use the semaphore method to simulate the synchronization and mutual exclusion.

2. (15 分)Giving a system X with 20 bits virtual address and 4K page size and adopts one level page table as below. The process is allocated a fixed resident set containing 7 memory frames and uses a local replace policy. Now, a clock policy is adopted and the page list with the clock hands is shown below. The memory access time is 20ns, and the cost of handling page fault is 1ms (including data transfer from disk and the page table update cost, there is no need to read the page table again).

Page No 0x01	Page No 0x03	Page No 0x02	Page No 0x11	Page No 0x27	Page No 0x19	Page No 0x04
Use bit 1	Use bit 1	Use bit 0	Use bit 1	Use bit 1	Use bit 0	Use bit 1
↑ beginning						end

Page table

Page No	0	1	2	3	4	…	0x11	…	0x19	…	0x23	…	0x27
Frame No	-	0x33	0x51	0x63	0x38		0x67		0x68		-		0x47
Valid bit	0	1	1	1	1		1		1		0		1

(1) (9 分)Calculate the corresponding physical address and total access time when try to read data with logical address 0x23115 and explain why.

(2) (6 分)Calculate the corresponding physical address and total access time when try to read data with logical address 0x03127 and explain why.

3. (10 分) Here is a table of processes and their associated arrival and Service times：

Process ID	Arrival Time	Service Time
A	0	3
B	2	5
C	4	2
D	5	3

a) Show the scheduling order for these processes under Round-Robin (RR q=1) and Shortest remaining time(SRT) .(5 分)

Note: Each square represents the time , Please write the process ID into a square to indicate the currently scheduled process.

time	0	1	2	3	4	5	6	7	8	9	10	11	12
RR(q=1)													
SRT													

b) What is the average turnaround time of each scheduling algorithm (5 分)