四川大学期末考试试题（闭卷）

（2022~2023 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.As one proceeds down the memory hierarchy (i.e., from inboard memory to offline storage), the following condition(s) apply:（ ）
A.Increasing cost per bit
B.Decreasing capacity
C.Increasing access time
D.All of the above
2. A fetched instruction is normally loaded into the:( )
A.Instruction Register (IR)
B.Program Counter (PC)
C.Accumulator (AC)
D.None of the above
3. 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
4.In a Process Model that implements two suspend states, a valid state transition is represented by: ( )
A.Ready/Suspend -> Ready
B.Running -> Ready/Suspend
C.Ready -> Ready/Suspend
D.All of the above
5.One of the disadvantages of User-Level Threads (ULTs) compared to Kernel-Level Threads (KLTs) is ( )
A.Scheduling is application specific
B. Thread switching does not require kernel mode privileges
C. When a ULT executes a system call, all threads in the process are blocked
D.All of the above
6.The following requirement must be met by any facility or capability that is to provide support for mutual exclusion:

( )
A.A process remains in its critical code section for a finite time only
B.Only one process at a time can be allowed into a critical code section
C.No assumptions can be made about relative process speeds
D.All of the above
7.In the Resource Allocation Denial approach to Deadlock Avoidance, a safe state is defined as one in which:( )
A.Several potential process sequences do not result in a deadlock:
B.All potential process sequences do not result in a deadlock:
C.At least one potential process sequence does not result in a deadlock
D.None of the above
8. The concept of memory management satisfies certain system requirements, including:( )
A. protection
B. physical organization
C. relocation
D. all of the above
9. the concept of virtual memory is based on one or both of two basic techniques:( )
A. overlaying and relocation
B. segmentation and paging
C. segmentation and partitioning
D. none of the above
10. in the dynamic partitioning technique of memory management, the placement algorithm that chooses the block that is closest in size to the request is called ( )
A. best-fit
B. first-fit
C. next-fit
D. none of the above
11.A segment table for each process contains the following information of each segment.( )
A. segment base and length
B. frame number and length
C. page number
D. offset and length
12. Which policy does nearly as well as an optimal policy, but is difficult to implement and imposes significant overhead.( )
A. LRU
B. FIFO
C. CLOCK
D. SCAN
13. By which approach, a fixed proportion of real memory is required for the tables regardless of the number of processes or virtual pages supported. ( )
A. one-level page table
B. multiple-level page tables
C. TLB
D. The inverted page table
14.The data structure that maintains information on available disk space is called the ( )
A. File Allocation Table (FAT)
B. Disk Allocation Table
C. Bit Table
D. Page Table

15.the technique of free disk space management that employs a pointer and length value of each free portion is the ( )
A. indexing
B. free block list
C. bit tables
D. none of the above
16.which of the following scheduling policies allow the o/s to interrupt the currently running process and move it to the ready state ( )
A. preemptive
B. first-come-first-served
C. non-preemptive
D. none of the above
17.in the round robin scheduling technique, the principle design issue is: ( )
A. determining the fair distribution of time quanta to individual processes
B. determining the length of the time quantum
C. determining the method of cycling through a given set of processes
D. none of the above
18.an example of a block-oriented i/o device is ( )
A. modem
B. Printer
C. CD-ROM
D. all of the above
19.in a hierarchical structure for managing i/o on a secondary storage device that supports a file system, the layer that is closest to the hardware is the:( )
A. device i/o layer
B. directory management layer
C. physical organization layer
D. none of the above
20.a typical way to overcome starvation of lower-priority processes in a priority-based scheduling system is to:( )
A. change a process priority with its age
B. change a process priority randomly
C. round-robin cycling of processes in a priority queue
D. all of the above

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二、填空题（本大题共 20 小题，每小题 1 分，共 20 分）。

1. Registers that are used by system programs to minimize main memory references by optimizing register use are called _____.
2. In Deadlock Avoidance, the Resource Allocation Denial strategy is also referred to as the _____.
3. A resource that can be created (produced) and destroyed (consumed) is called a _____ resource.
4. The technique in which a process can do nothing until it gets permission to enter its critical section but continues to test the appropriate variable to gain entrance is called _____.
5. The processing required for a single instruction is called a(n) _____ cycle.
6. The operating system’s _____ refers to its inherent flexibility in permitting functional modifications to the system without interruption of services.
7. In a system that employs a paging memory management scheme, the _____ shows the frame

location for each page of the process。

8. A _____ is an actual location in main memory.
9. Fixed Partitioning will lead to_____ fragmentation。
10. The condition that system spends most of its time swapping pages in and out rather than executing instructions is known as _____。
11. The principle of _____states that program and data references within a process tend to cluster.
12. The virtual memory schemes make use of a special high-speed cache for page table entries, usually called a _____ 。
13. In a system employing virtual memory, the portion of a process that is actually in main memory at any given time is defined to be the _____ of the process.
14. The I/O technique where the processor busy waits for an I/O operation to complete is called_____.
15. _____blocking is the common mode of file blocking for sequential files with fixed-length records.
16. In a tree-structured directory, the series of directory names that culminates in a file name is referred to as the _____ _____.
17. the type of scheduling that involves the decision to add a process to those that are at least partially in main memory and therefore available for execution is referred to as _____.
18. in terms of the queuing model, the total time that a process spends in a system (waiting time plus service time) is called_____.
19. record access in a pile file can be conducted by _____.
20. In the _____I/O technique, the processor issues an i/o request, continues with other work and eventually receives notification that the request was fulfilled.

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三、判断题（本大题共 10 小题，每小题 1 分，共 10 分）。

1. Although each strategy that deals with deadlocks has its advantages and disadvantages, the best solution to the problem is to choose one and stick with it.（ ）
2. In a pure User-Level Thread (ULT) facility, all of the work of thread management is done by the application, but the kernel is aware of the existence of threads.（ ）
3. A process trace is a listing of the sequence of instructions that execute for that process.( )
4. The Process Image refers to the binary form of the program code.（ ）
5. A multiprogramming system, main memory is divided into two sections: one for the operating system and one for the running processes。( )
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 overlaying。 ( )
7. In the Dynamic Partitioning technique of memory management, the first-fit placement algorithm scans memory from the location of the last placement and chooses the first available block it finds that satisfies the request。( )
8. fixed file blocking experiences the potential problem of external fragmentation. ( )
9. 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 double buffering. ( )
10. the shortest remaining time (srt) scheduling policy is a preemptive version of the shortest process next (spn) scheduling policy.( )

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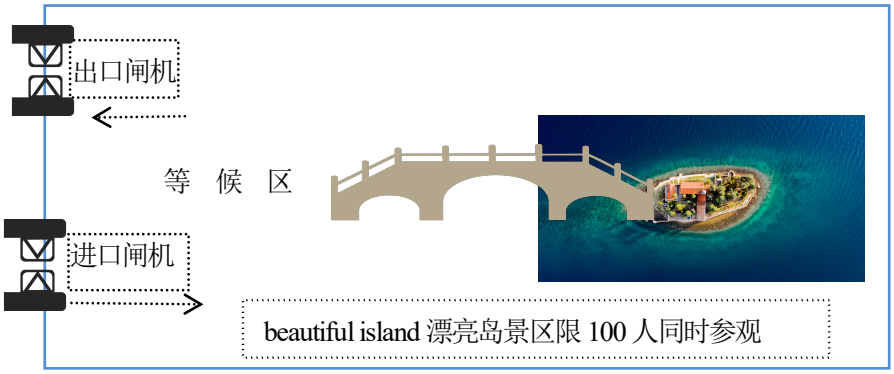
四、问答题（本大题共 3 小题，共 40 分）。

1. (15 分) The beautiful island can accommodate 100 people to visit at the same time. As shown in the figure,there is a one-way gate to enter and leave the scenic area, and only one person can pass through each gate. After entering the scenic spot, the person must enter and leave the island through a one-way bridge for tourism. Only one direction is allowed on the bridge at a time. If people in one direction occupy the one-way bridge, let people in that direction have the priority to cross the bridge.

1) If there is no rule restriction, at least several tourists will have deadlocks for the one-way bridge. Please explain the causes of one-way bridge deadlocks.

2) Use the semaphore method to simulate the entering and leaving of the beautiful island.



2. In an OS adopts demand paging fetch policy. Before loading process A, which contains 4 pages, the frame numbers in the system free frame chain list are 3, 33, 9, 17(decimal 十进制)。The OS will allocate two frames for process A as resident set. The page size is 4kB. Ignore all the effects by other processes.

(1) Assume virtual address 0x0100 and 0x1200 of process A will be accessed immediately, now please fill in the following the page table of process A, none for uncertain item and use a few words to explain the reason. (5 分)

Page number	Frame number	Valid bit
0		
1		
2		
3		

The reason is :

(2) The OS adopts one-level hierarchical page table, fixed allocation and local replacement policy and LRU replacement policy. The memory access time is 100ns, one page fault process time is 500ns (include the process to load one page and update page table). The address is translated by one-level hierarchical page table only. If the valid bit is 0, the access to the page triggers a page fault. The page fault handler will load the page into main memory and re-execute the instruction that triggers the interrupt (ignore the time re-access the page table).
Now, the program needs to access data in virtual address 0x1100 and 0x3345.
Please answer:
(2.1)Calculate the access time for the two data. (4 分)

0x1100:

0x3345:

(2.2)Fill in the following the page table of process A after the previous access and use a few words to explain why. (6 分)

Page number	Frame number	Valid bit
0		
1		
2		
3		

The reason is :

3. (10 分) There is sequence of disk track requests:90,88,148,190,92,210,179,245,45,250,56,70,80. Assume that the disk head is initially positioned over track 95 and is moving in the direction of increasing track number.

Question: For SSTF and CSCAN

a. What is the tracking order?

b. What is Average seek Length?