Name:

Class:

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大 连 理 工 大 学

课 程 名 称: 操作系统 试 卷: C 考试形式 闭卷

授课院（系）: 国际信息与软件学院 考试日期: 2020 年 5 月 日 试卷共 6 页

	一	二	三	四	五	六	七	总分
标准分	20	60	20					100
得 分								

一、Are the following sentences correct? Answer A if correct, B if incorrect.

(2 points * 10 = 20 points)

1. The percentage of times a page number is found in the TLB is known as miss ratio. B
2. Termination of the process terminates all threads within the process.
3. A minimum of **two** variable(s) is/are required to be shared between processes to solve the critical section problem. A
4. Concurrent access to shared data may result in data consistency. A
5. The OS X has hybrid kernel. A
6. RPC provides a stub on the client side, a separate one for each remote procedure.
7. In a magnetic disk, data is recorded in a set of concentric tracks which are subdivided into zones.
8. When high priority task is indirectly preempted by medium priority task effectively inverting the relative priority of the two tasks, the scenario is called priority inversion.
9. The circular wait condition can be prevented by defining a linear ordering of resource types.
10. An un-interruptible unit is known as atomic. A

1	2	3	4	5	6	7	8	9	10

二. Multiple choice questions (Note: only one option is correct)

(2 points * 30 = 60 points)

1. When one thread immediately terminates the target thread, it is called _____
A. asynchronous cancellation B. systematic cancellation
C. sudden Termination D. deferred cancellation

2. Operating system goals are to:
A. execute user programs and make solving user problems easier
B. make the computer system convenient to use

C. use the computer hardware in an efficient manner
D. All of the above

3. Which is built directly on the hardware?
A. Computer Environment B. Application Software
C. Operating System D. Database System

4. Which of the following Operating System does not implement multitasking truly?
A. Windows 98 B. Windows NT C. Windows XP D. MS DOS

5. Which is not the function of the Operating System?
A. Virus Protection B. Application management
C. Memory management D. Disk management

6. How does the software trigger an interrupt?
A. Sending signals to CPU through bus
B. Executing a special operation called system call
C. Executing a special program called system program
D. Executing a special program called interrupt trigger program

7. An interrupt vector
A. is an address that is indexed to an interrupt handler
B. is a unique device number that is indexed by an address
C. is a unique identity given to an interrupt
D. none of the mentioned

8. To access the services of operating system, the interface is provided by the _____
A. System calls B. API C. Library D. Assembly instructions

9. What is the main function of the command interpreter?
A. to get and execute the next user-specified command
B. to provide the interface between the API and application program
C. to handle the files in operating system
D. none of the mentioned

10. What is inter-process communication?
A. communication within the process
B. communication between two processes
C. communication between two threads of same process
D. none of the mentioned

11. A process stack does not contain _____
A. Function parameters B. Local variables
C. Return addresses D. PID of child process

12. Which system call returns the process identifier of a terminated child?
A. wait B.exit C. fork D. get

13. A Process Control Block(PCB) does not contain which of the following?
A. Code B. Stack C. Bootstrap program D. Data

14. The state of a process is defined by _____
A. the final activity of the process B. the activity just executed by the process
C. the activity to next be executed by the process D. the current activity of the process

15. Which of the following is not the state of a process?
A. New B. Old C. Waiting D. Running

16. The entry of all the PCBs of the current processes is in _____
A. Process Register B. Program Counter C. Process Table D. Process Unit

17. What is the degree of multiprogramming?
A. the number of processes executed per unit time
B. the number of processes in the waiting queue
C. the number of processes in the I/O queue
D. the number of processes in memory

18. What will happen when a process terminates?
A. It is removed from all queues B. It is removed from all, but the job queue
C. Its process control block is de-allocated
D. Its process control block is never de-allocated

19. The Zero Capacity queue _____
A. is referred to as a message system with buffering
B. is referred to as a message system with no buffering
C. is referred to as a link D. none of the mentioned

20. A parent process calling _____ system call will be suspended until children processes terminate.
A. wait B. fork C. exit D. exec

21. Turnaround time is :
A. the total waiting time for a process to finish execution
B. the total time spent in the ready queue
C. the total time spent in the running queue
D. the total time from the completion till the submission of a process

22. Which module gives control of the CPU to the process selected by the short-term scheduler?

A. dispatcher B. interrupt C. scheduler D. none of the mentioned

23. Process are classified into different groups in
A. shortest job scheduling algorithm
B. round robin scheduling algorithm
C. priority scheduling algorithm
D. multilevel queue scheduling algorithm

24. Which of the following conditions must be satisfied to solve the critical section problem?
A. Mutual Exclusion B. Progress C. Bounded Waiting D. All of the mentioned

25. What is the main disadvantage of spinlocks?
A. they are not sufficient for many process
B. they require busy waiting
C. they are unreliable sometimes
D. they are too complex for programmers

26. What are the two kinds of semaphores?
A. mutex & counting B. binary & counting
C. counting & decimal D. decimal & binary

27. A system is in the safe state if _____
A. the system can allocate resources to each process in some order and still avoid a deadlock
B. there exist a safe sequence
C. all of the mentioned
D. none of the mentioned

28. Binding of instructions and data to memory addresses can be done at _____
A. Compile time B. Load time C. Execution time D. All of the mentioned

29. Swapping requires a _____
A. motherboard B. keyboard C. monitor D. backing store

30. CPU fetches the instruction from memory according to the value of _____
A. program counter B. status register
C. instruction register D. program status word

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30

三. Short answer questions (20 points)

1. A system has 15 magnetic tape drives, there are 3 processes : P0, P1, and P2. Process P0 requires 12 tape drives, P1 requires 4 and P2 requires 9 tape drives. The maximum needs thus are (12, 5, 9), the numbers of tape drives allocated to the three processes are (3, 4, 2), please give a safe sequence. (**4 points**)

一个系统有15个磁带驱动器，共有3个过程：P0，P1和P2。 流程P0需要12个磁带驱动器，P1需要4个磁带，而P2需要9个磁带驱动器。 因此，最大需求为（12、5、9），分配给这三个进程的磁带机数量为（3、4、2），请给出一个安全的顺序。 （4分）

2. In a computer system, a disk drive has 150 cylinders, consider a disk queue with requests for I/O to blocks on cylinders 35, 52, 37, 17, 80, 120, 135, 104. If the disk head is initially at cylinder 90. Please calculate the total distance (in cylinders) that the disk arm moves to satisfy all the pending requests by the shortest-seek-time-first (SSTF) disk scheduling algorithm? Writing necessary computation steps. (**4 points**)

3. Given that the hit ratio (the percentage of times that a page number of interest is found in the TLB) is 99%, the TLB (translation look-aside buffers) search time is 30ns, the normal memory access time is 100ns, please calculate the effective access time (EAT). (**4 points**)

4. There are 4 processes P_1 to P_4, the arriving time and running time of each process is given in the following table. (**8 points**)

Requirement: write down the necessary calculating steps.

Process	Arrival time	CPU burst time
P_1	0	6
P_2	1	8
P_3	3	2
P_4	5	4

Please calculate the **average waiting time** of all processes,
if (1) we adopt First Come First Served (FCFS) scheduling algorithm. (**4 points**)

(2) we adopt shortest-job-first scheduling algorithm (**non-preemptive**). (**4 points**)