浙江大学 2005－2006 学年秋季学期

《操作系统原理》课程期末考试试卷

开课学院：计算机学院、软件学院，　　　考试形式：有限开卷，只允许带 3 张 A4 纸入场

考试时间：＿＿＿年＿＿＿月＿＿＿日，　所需时间：<u>120 分钟</u>　　　教师姓名：＿＿＿＿＿＿

考生姓名：＿＿＿＿＿＿＿＿学号：＿＿＿＿＿＿＿＿专业：＿＿＿＿＿＿＿　得分：＿＿＿＿＿＿

答案：

题号	答　　案									得分
1-10										
11-20										
21-30										
31-40										
41-50										
51-60										
61-70										
71-80										
81-90										
91-100										

For every following question, please select your best answer only!!!

1. An operating system is a program that manages the _____.
   A.) computer hardware
   B.) computer software
   C.) computer resources
   D.) application programs

2. An operating system is designed for ease of use and/or _____.
   A.) speed
   B.) compatibility
   C.) resource utilization
   D.) flexibility

3. Which OS is the oldest?
   A.) UNIX
   B.) MULTICS
   C.) Windows 3.x
   D.) Windows XP

4. The evolution of operating systems for mainframes is roughly like from _____.
   A.) no software → multi-programming→ multi-tasking
   B.) no software → multi-tasking → multi-programming
   C.) no software → resident monitors → multi-tasking → multi-programming
   D.) no software → resident monitors → multi-programming → multi-tasking

5. Users can create and destroy process by _____.
   A.) function invocation
   B.) macro instruction
   C.) system calls
   D.) procedure invocation

6. _____ is to keep multiple jobs in memory simultaneously in order to keep the CPU busy.
   A.) batch processing
   B.) real-time processing
   C.) multiprogramming
   D.) parallel execution

7. What is the purpose of system calls?
   A.) System calls allow us to write assembly language programs.
   B.) System calls are the standard interface between a user process and a kernel process.
   C.) System calls allow user-level processes to request services of the operating

      system.

    D.) There is no real purpose to system calls.

8. Which of the following statement is incorrect?
    A.) Monolithic OS is usually difficult to modify.
    B.) Micro-kernels allow some system services to be implemented just as user programs.
    C.) Layered OS is more efficient that monolithic OS.
    D.) Virtual machines improve OS development and testing process.

9. Which of the following activity needs no special hardware support?
    A.) Process scheduling
    B.) timer management
    C.) memory mapping
    D.) interrupt system

10. Which of the following statement about processes is incorrect?
    A.) A process is dynamic.
    B.) A process has a lifetime.
    C.) A process is a set of instructions.
    D.) Multiple processes may execute concurrently.

11. One difference between a process and a program is _____.
    A.) A process has states while a program has no states.
    B.) A process has no states while a program has states.
    C.) A process has resources while a program has no resources.
    D.) A process has no resources while a program has resources.

12. Which of the following item should not be in the PCB (Process Control Block)?
    A.) process state
    B.) CPU-scheduling information
    C.) memory-management information
    D.) complete text section

13. A process will change its state from running to ready state when _____.
    A.) it has been selected for execution by scheduler
    B.) its time slice is finished
    C.) it waits for some event
    D.) the event it has been waiting for has occurred

14. Which of the following process state transition can not happen?
    A.) from ready state to running state
    B.) from running state to ready state
    C.) from running state to waiting state

D.) from waiting state to running state

15. A waiting process will change to _____ if the waited event occurs.
    A.) running state
    B.) waiting state
    C.) waiting state and inside memory
    D.) ready state

16. An operating system manages processes by _____.
    A.) file control block
    B.) process control block
    C.) process priority
    D.) process text section

17. A message-passing system for an OS is _____.
    A.) A kind of direct communication
    B.) A kind of low-level communication
    C.) A kind of inter-process communication
    D.) A kind of symmetrical communication

18. We will have a rendezvous between the sender and the receiver if _____.
    A.) The sender is non-blocking and the receiver is non-blocking.
    B.) The sender is non-blocking and the receiver is blocking.
    C.) The sender is blocking and the receiver is non-blocking.
    D.) The sender is blocking and the receiver is blocking.

19. The threads of a single process can not share _____.
    A.) code
    B.) files
    C.) stacks
    D.) priority

20. Which of the following is incorrect?
    A.) The system call fork may just duplicate the thread that invoked it.
    B.) The system call fork may duplicate all the threads of a process.
    C.) The system call exec may just replace the thread that invoked it.
    D.) The system call exec may replace the entire process.

21. For many-to-one model, if one thread within a single process is blocking, then
    _____.
    A.) The rest threads of this process can still keep running.
    B.) The whole process will be blocked.
    C.) The blocking thread will be cancelled.
    D.) The blocking thread will be always blocked.

22. Which of the following is incorrect for the CPU long-term scheduler?
    A.) It controls the degree of multi-programming.
    B.) It runs as often as short-term scheduler.
    C.) It selects a good process mix of I/O-bound and CPU-bound processes.
    D.) It can be a user rather than a program.

23. Suppose the time quantum for RR scheduling is fixed, then _____, the longer
    the response time.
    A.) The less users
    B.) The more users
    C.) The less memory
    D.) The more memory

24. Which of the following Operating systems use preemptive scheduling?
    A.) Mac OS 8
    B.) Windows 3.x
    C.) Windows 2000
    D.) DOS 6.0

25. One of the problems with priority scheduling is _____.
    A.) aging
    B.) starvation
    C.) process death
    D.) average waiting time

26. Which of the following scheduling is most flexible?
    A.) Multilevel scheduling
    B.) Multilevel feedback queue scheduling
    C.) First-come, first-served scheduling
    D.) Round-robin scheduling

For the next five questions, consider the following set of processes, with the length
of the CPU-burst time given in milliseconds, a smaller priority number implying a
lower priority, the processes arriving in the order P1, P2, P3, P4, P5, all at time
0:

Process	Burst time	Priority
P1	8	3
P2	1	1
P3	2	4
P4	1	3
P5	4	2

27. Which is the closest average waiting time using FCFS scheduling?
    A.) 8.0 ms
    B.) 9.0 ms
    C.) 11.2 ms
    D.) 18.0 ms

28. Which is the closest average waiting time using SJF scheduling?
    A.) 10.0 ms
    B.) 4.5 ms
    C.) 3.0 ms
    D.) 4.0 ms

29. Which is the closest average waiting time using priority scheduling?
    A.) 12.5 ms
    B.) 3.5 ms
    C.) 7.6 ms
    D.) 11.5 ms

30. Which is the closest average waiting time using Round-robin scheduling with
    q=2ms ?
    A.) 10.1 ms
    B.) 5.2 ms
    C.) 3.6 ms
    D.) 4.5 ms

31. Which is the closest average waiting time using Round-robin scheduling with
    q=4ms ?
    A.) 6.4 ms
    B.) 7.8 ms
    C.) 9.8 ms
    D.) 10.5 ms

32. The four necessary deadlock conditions are mutual exclusion, _____, non
    preemption, and circular wait.
    A.) Block and wait
    B.) Hold and wait
    C.) Release and wait
    D.) Release and block

33. The banker's algorithm is for _____.
    A.) deadlock prevention
    B.) deadlock avoidance
    C.) deadlock detection
    D.) deadlock solving

For the following 4 questions, consider the following snapshot of a system:

	Allocation			Max			Available		
	A	B	C	A	B	C	A	B	C
P1	2	1	2	5	5	9	2	3	3
P2	4	0	2	5	3	6			
P3	4	0	5	4	0	11			
P4	2	0	4	4	2	5			
P5	3	1	4	4	2	4			

34. Which of the following statement is correct?
   A.) The system is unsafe.
   B.) The system is safe and one safe sequence is <P1, P2, P3, P4, P5>.
   C.) The system is safe and one safe sequence is <P2, P3, P4, P5, P1>.
   D.) The system is safe and one safe sequence is <P4, P5, P1, P2, P3>.

35. Which of the following statement is true if a request for process P5 arrives for (1, 1, 1)?
   A.) The request can be granted and one safe sequence is <P5, P4, P1, P2, P3>.
   B.) The request can be granted and one safe sequence is <P5, P1, P2, P3, P4>.
   C.) The request is larger than its maximum and should be denied.
   D.) The system is unsafe if the request is granted.

36. Which of the following statement is true if a request for process P1 arrives for (0, 3, 0)?
   A.) The request can be granted and one safe sequence is <P1, P2, P3, P4, P5>.
   B.) The request can be granted and one safe sequence is <P2, P3, P4, P5, P1>.
   C.) The request is larger than its maximum and should be denied.
   D.) The system is unsafe if the request is granted.

37. Which of the following statement is true if a request for process P4 arrives for (2, 2, 0)?
   A.) The request can be granted and one safe sequence is <P1, P2, P3, P4, P5>.
   B.) The request can be granted and one safe sequence is <P4, P5, P1, P2, P3>.
   C.) The request is larger than its maximum and should be denied.
   D.) The system is unsafe if the request is granted.

38. Which of the following methods is to prevent the deadlock from the beginning?
   A.) Banker's algorithm
   B.) Deadlock detection
   C.) Resource allocation in an increasing order of enumeration
   D.) Simplification of resource allocation graph

39. A system has 3 concurrent processes, each of which requires 4 items of resource R. What is the minimum number of resource R in order to avoid the deadlock?
   A.) 9
   B.) 10
   C.) 11
   D.) 12

40. The relationship among concurrent processes _____.
    A.) is independent of each other
    B.) is synchronized
    C.) is mutual exclusive
    D.) may require synchronization and/or mutual exclusion.

41. Which of the following is correct?
    A.) The semaphore is more powerful than the monitor.
    B.) The monitor is more powerful than the semaphore.
    C.) The critical region is more powerful than the semaphore.
    D.) The semaphore, the monitor, and the critical region are all powerful and
        equivalent to each other.

42. The critical section for process synchronization is _____.
    A.) a buffer
    B.) a data section
    C.) a synchronization mechanism
    D.) a segment of code

43. The semaphores can be used to solve _____ mutual exclusive problem(s).
    A.) one
    B.) some
    C.) all the
    D.) None of the above

44. One semaphore variable *mutex* is used by two concurrent processes for mutual
    exclusion access to one common variable. If *mutex = 0,* then it indicates that
    A.) no process is in the critical section.
    B.) One process is in the critical section and the other is waiting for entering
        the critical section.
    C.) One process is in the critical section and the other is not waiting for
        entering the critical section.
    D.) Two processes are in the critical section.

45. One common data can allow at most 3 processes sharing it simultaneously. Now
    assume that 5 processes try to access it. Please choose the initial value for
    a semaphore for protecting this data.
    A.) 5
    B.) 3
    C.) 1
    D.) 0

46. 9 producers and 6 consumers share one common buffer with 8 items of capacity.
    Please choose the initial value for a semaphore to ensure mutual exclusion.
    A.) 1
    B.) 6
    C.) 8
    D.) 9

For the following questions, consider a set of processes executing concurrently.
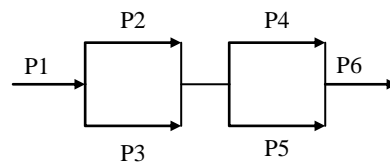
Here is the incomplete solution for solving this synchronization problem:
    Semaphore a = _(1)_, b = _(2)_, c = 0, d = 0;
    Semaphore e = 0,   f = 0,   g = 0, h = 0;

    Process P1: { ···;   _(3)_;   _(4)_;   }
    Process P2: { _(5)_;   ···;   signal(c); signal(d); }
    Process P3: { _(6)_;   ···;   signal(e); signal(f); }
    Process P4: { wait(c);   wait(e);   ···;   _(7)_;   }
    Process P5: { wait(d);   wait(f);   ···;   _(8)_;   }
    Process P6: { _(9)_;   _(10)_;   ···;   }

47. Which is suitable for blank (1)?
    A.) 0
    B.) 1
    C.) 3
    D.) 6

48. Which is suitable for blank (2)?
    A.) 0
    B.) 1
    C.) 3
    D.) 6

49. Which is suitable for blank (3)?
    A.) signal(a)
    B.) signal(c)
    C.) wait(a)
    D.) wait(c)

50. Which is suitable for blank (4)?
    A.) signal(b)
    B.) signal(e)
    C.) wait(b)
    D.) wait(e)

51. Which is suitable for blank (5)?
    A.) signal(a)
    B.) signal(c)
    C.) wait(a)
    D.) wait(c)

52. Which is suitable for blank (6)?
    A.) signal(b)
    B.) signal(e)
    C.) wait(b)
    D.) wait(e)

53. Which is suitable for blank (7)?
    A.) signal(e)
    B.) signal(g)
    C.) wait(e)
    D.) wait(g)

54. Which is suitable for blank (8)?
    A.) signal(f)
    B.) signal(h)
    C.) wait(f)
    D.) wait(h)

55. Which is suitable for blank (9)?
    A.) signal(e)
    B.) signal(g)
    C.) wait(e)
    D.) wait(g)

56. Which is suitable for blank (10)?
    A.) signal(f)
    B.) signal(h)
    C.) wait(f)
    D.) wait(h)

57. Dynamic relocation relies on _____.
    A.) a relocation register
    B.) object code
    C.) relocation program
    D.) None of the above

58. Which method will solve thrashing problem?
    A.) Add fast disks
    B.) Add more disks
    C.) Add fast memory
    D.) Add more memory

59. Which method solves the problem of external fragmentation?
    A.) Paging
    B.) Segmentation
    C.) Contiguous memory allocation
    D.) Swapping

60. After a page fault handled, _____ should be executed.
    A.) the instruction just before interruption
    B.) the instruction caused interruption
    C.) the instruction just after interruption.
    D.) The first instruction of this process

61. The fundamental basis for virtual memory management is _____.
    A.) virtuality
    B.) locality
    C.) globality
    D.) dynamics

62. Which of the following page replacement algorithms may produce Belady's phenomena?
    A.) FIFO
    B.) LRU
    C.) OPT
    D.) Second-chance algorithm

63. Which of the following factors prefer smaller page size?
    A.) internal fragmentation
    B.) page table size
    C.) total I/O time
    D.) page fault frequency

64. With the demand paging, _____ has best system performance.
A.) stacks
B.) lists
C.) hashed tables
D.) arrays

65. With paging memory management, paging is usually done by _____.
A.) Programmer
B.) User
C.) Compiler
D.) hardware

66. With the demand paging, _____ has worst system performance.
A.) stacks
B.) hashed tables
C.) one dimensional arrays
D.) two dimensional arrays

67. For a system with a 64-bit logical address space, which page table structure is inappropriate?
A.) 6-level page table
B.) 3-level page table
C.) hashed page table
D.) inverted page table

68. For contiguous memory allocation, which strategy gives the best performance in terms of time and space?
A.) First fit
B.) Best fit
C.) Worst fit
D.) Fixed equal-sized partitions

69. Which of the following is NOT associated with segments?
A.) Two dimensional view of memory
B.) Fixed size
C.) Easy sharing of data or code
D.) External fragmentation

For the next 3 questions, consider the following segment table:

Segment	Base	Length
0	210	600
1	2300	14
2	90	100
3	1327	580
4	1950	90

70. What is the physical address for the logical address (0,430)?
   A.) illegal address
   B.) 430
   C.) 640
   D.) 1030

71. What is the physical address for the logical address (2,110)?
   A.) illegal address
   B.) 110
   C.) 200
   D.) 210

72. What is the physical address for the logical address (4, 10)?
   A.) illegal address
   B.) 10
   C.) 1960
   D.) 100

For the next 3 questions, assume that
   1> the page reference string as 2, 3, 2, 1, 5, 2, 4, 5, 3, 2, 5, 2;
   2> the system has 3 frames and
   3> all 3 frames are initially empty.

73. FIFO replacement will have _____ page faults.
   A.) 7
   B.) 8
   C.) 9
   D.) 10

74. LRU replacement will have _____ page faults.
   A.) 6
   B.) 7
   C.) 8
   D.) 9

75. Optimal page replacement will have _____ page faults.
   A.) 5
   B.) 6

C.) 7

D.) 8

For the next 2 questions, consider a system with a memory-access time of 100 nanoseconds and an average page-fault service time of 25 milliseconds.

76. If one access out of 1000 causes a page fault, the effective access time will be _____ nanoseconds.

A.) 25000

B.) 250000

C.) 125000

D.) 100000

77. If the effective access time is 105 nanoseconds, then we can allow only less than one memory access out of _____ to page fault.

A.) 250000

B.) 2500000

C.) 5000000

D.) 10000000

78. The files on a tape can be read/written _____.

A.) in bytes

B.) in words

C.) via direct access

D.) via sequential access

79. The files on a hard disk can be _____.

A.) accessed sequentially only

B.) accessed randomly only

C.) accessed both sequentially and randomly

D.) accessed in terms of words.

80. In order to solve name collision, the file system normally adopts _____.

B

A.) pathnames

B.) tree-like directory structures

C.) indexing

D.) conventional naming methods

81. A file should be _____ before it is accessed.

A.) named

B.) opened

C.) established

D.) backed up

82. Which file allocation does not allow direct access efficiently?
    A.) Contiguous allocation
    B.) Linked allocation
    C.) Indexed allocation
    D.) Hashed allocation

83. In order to protect file access, the _____ can be used.
    A.) FCB
    B.) ACL
    C.) JCB
    D.) PCB

84. Which allows supporting multiple file systems?
    A.) Ext2
    B.) Ext3
    C.) VFS
    D.) NTFS

85. The cache for hard disks is usually implemented by _____.
    A.) registers
    B.) primary memory
    C.) secondary memory
    D.) tertiary storage

86. One purpose of the buffering technique is used to _____.
    A.) save memory
    B.) improve CPU utilization
    C.) improve the speed of I/O devices
    D.) cope with a speed mismatch between the producer and consumer of a data stream.

For the next 6 questions, suppose that a disk drive has 50 cylinders, numbered 0 to 49. The drive is currently serving a request at cylinder 14, and the previous request was at a cylinder smaller than 14. The queue of pending requests is: 8, 15, 9, 35, 25, 30, 40, 5. Please select the closest answer.

87. What is the total distance (in cylinders) that the disk arm moves to satisfy all the pending requests for FCFS?
    A.) 50
    B.) 105
    C.) 120
    D.) 130

88. What is the total distance (in cylinders) that the disk arm moves to satisfy all the pending requests for SSTF?

    A.) 46
    B.) 47
    C.) 48
    D.) 49

89. What is the closest total distance (in cylinders) that the disk arm moves to satisfy all the pending requests for SCAN?

    A.) 51
    B.) 54
    C.) 79
    D.) 40

90. What is the closest total distance (in cylinders) that the disk arm moves to satisfy all the pending requests for C-SCAN?

    A.) 10
    B.) 20
    C.) 34
    D.) 44

91. What is the closest total distance (in cylinders) that the disk arm moves to satisfy all the pending requests for LOOK?

    A.) 40
    B.) 50
    C.) 61
    D.) 68

92. What is the closest total distance (in cylinders) that the disk arm moves to satisfy all the pending requests for C--LOOK?

    A.) 10
    B.) 20
    C.) 29
    D.) 30

93. _____ can provide random access.

    A.) A tape
    B.) A terminal
    C.) A hard disk
    D.) A printer

94. Which kind of swap space is fastest?

    A.) A swap file on FAT
    B.) A swap file on ext3

C.) A partition with sophisticated file system functions

D.) A raw partition

95. Which disk space allocation method supports direct access without external fragmentation?
    A.) Linear allocation
    B.) Contiguous allocation
    C.) Linked allocation
    D.) Indexed allocation

96. UNIX treats I/O devices as _____.
    A.) regular files
    B.) directory files
    C.) indexed files
    D.) special files

97. For operating systems, deadlock means _____.
    A.) A program is looping forever
    B.) hardware malfunctions
    C.) system halts
    D.) processes block and wait for each other to finish

98. Which provides high reliability inexpensively?
    A.) RAID 0
    B.) RAID 1
    C.) RAID 4
    D.) RAID 5

99. Which of the following storage device is not tertiary storage structure?
    A.) CD-ROM
    B.) DVD
    C.) Hard disks
    D.) Tapes

100. The UNIX system call for creating a file is _____.
    A.) creat
    B.) open
    C.) create
    D.) new