OSG202 TL4, OSG202 TL6, OSG202 version 4, OSG202 version 3, OSG202 version 2, OSG202 version 1

1. **d** Which strategy is a simplest design for speeding up Paging?
   Page table is loaded into registers
   Page table is loaded into main memory
   Page table is loaded into disk
   Page table is loaded into TLB

2. **c** The ___ policy is based on the theory that the best page to remove is the one that has been in memory the longest
   NRU
   LRU
   FIFO
   LIFO

3. **a** The page table for each process maintains:
   The page frame location for each page of the process
   The page location for each frame of the process
   The physical memory location of the process
   None of the other choices

4. **d** Assume that process A-D make up the set of runnable processes on memory as
   B1 B2 B3 A1 A2 A5 A7 D3 D4 D6 C1 C6 C5.
   Suppose D gets a page fault.
   Which page is replaced using the local policy? Assume that the replaced page is always a last page.
   D6
   B3
   C5
   None of the others

5. **a** Which of the following information bits in the entry of page table is used to indicate what kinds of access are permitted?
   Present/absent bit
   Caching disabled
   Protection bit
   Modified bit

6. **d** Which of the following is appropriate to determine program size and create page table?
   Process creation
   Process execution
   Page fault time
   Process termination time

7. **d** One of the most important innovations of demand paging was that it made ___ feasible
   Memory demand
   Virtual demand
   Virtual paging
   Virtual memory.

8. **c** Which of the following statements is incorrect about Translation Look-aside Buffer (TLB)?
   TLB only maintains a subset of the entries stored in the full memory-based page table
   When there is a TLB miss the system needs to access the page table
   The use of TLB eliminates the need for keeping a page table in memory
   None of the other choices

9. **a** Page replacement algorithms determine
   When the system should update page table entries
   How many pages should be added to main memory
   Which pages should be brought into memory because a process is likely to reference them soon
   Which page to remove to provide space for an incoming page

10. **b** When a virtual memory system manages memory in fixed length units, which of the following terms correctly represents its unit?
Frame
Page
Block
Segment

11. **a** Which of these statements about the algorithm "Worst fit" is true?
Memory Manager scans along the list of segments until it finds a hole that is big enough.
Memory Manager starting searching the list of segments from the place where it left off last time.
Memory Manager searches the entire list of segments from beginning to end and take smallest hole that is adequate.
None of the other choices

12. **d** Which of following statements about the memory hierarchy is false?
Small amount of fast expensive memory - cache
Some medium-speed medium price main memory
Gigabytes of slow cheap disk storage
None of the other choices

13. **c** Which of these statements about the algorithm "Best fit" is true?
Memory Manager scans along the list of segments until it finds a hole that is big enough.
Memory Manager starting searching the list of segments from the place where it left off last time.
Memory Manager searches the entire list of segments from beginning to end and take smallest hole that is adequate.
None of the other choices

14. **a** Which is not true about "Backing up pages dynamically"?
Pages do not have fixed swap area on the disk
Requires a disk map in memory
When a page is swapped out, an empty disk page is chosen on the fly and disk map is updated accordingly
Needs less main memory than the method "Paging to a static swap area"

15. **c** The task of subdividing memory between the OS and processes is performed automatically by the OS and is called:
Protection
Relocation
Memory Management
All of the other choices

16. **b** Working set model is used for:
Finding the minimum number of frames necessary for a job so that jobs can be run without "thrashing"
Finding the average number of frames a job will need to run smoothly
Determining whether page replacement is needed
All of the other choices

17. **c** The actual location in main memory is called a(n):
Relative address
Logical address
Absolute address
None of the other choices

18. **b** In terms of storage utilization the best method of Dynamic Storage Allocation is:
Next fit
First fit
Best fit
Worst fit

19. **b** The page size that is too small will generate ___
Excessive internal fragmentation
Very long Page tables
More difficult to calculate actual position
Excessive external fragmentation

20. **â** The second-chance page-replacement algorithm
Moves pages found at the head of a FIFO queue with the referenced bit turned on back to the tail of the queue to avoid replacing them
Searches through a circular list of pages and replaces the first page it encounters that has the referenced bit turned off
Relies on a modified bit to determine which page to replace
None of the other choices

21. **b** What is not the technique of implementation for Virtual Memory?
Segmentation
Partition
Paging
All of the other choices

22. **b** In terms of speed the best method of Dynamic Storage-Allocation is:
Next fit
First fit
Best fit
Worst fit

23. **a** Which of the following information bits in the entry of page table is used to indicate Page Fault?
Present/absent bit
Status bit
Referenced bit
Modified bit

24. **d** Five batch jobs A through E, arrive at a computer center at almost the same time. They have estimated running times of 8, 6, 2, 10, and 4 minutes. . Determine the average waiting time for FCFS scheduling. Ignore process switching overhead.
17 minutes
18 minutes
18.8 minutes
12,8 minutes

25. **a** Five batch jobs A through E, arrive at a computer center at almost the same time. They have estimated running times of 8, 6, 2, 10, and 4 minutes. Their (externally determined) priorities are 3, 5, 2, 1, and 4, respectively, with 5 being the highest priority. Determine the average waiting time for Priority scheduling. Ignore process switching overhead.
10,8 minutes
12,8 minutes
16,8 minutes
54 minutes

26. **c** Which of the following statements is incorrect about Translation Look-aside Buffer (TLB)?
A TLB is sometimes known as an associative memory
Each entry of a TLB contains the information about one page, including the virtual page number and the corresponding page frame
A TLB miss implies a disk operation will follow
None of the other choices

27. **c** Consider a swapping system in which the memory consists of the following hole sizes: 10K, 4K, 20K, 15K, 9K. Assume best fit algorithm is used. Which holes are taken for successive segment requests of 8K, 12K, 10K?
20K, 15K, 10K
10K, 15K, 20K
9K, 15K, 10K
10K, 20K, 15K

28. **b** Which of these statements about the algorithm "Next fit" is true?
Memory Manager scans along the list of segments until it finds a hole that is big enough.
Memory Manager starting searching the list of segments from the place where it left off last time.
Memory Manager searches the entire list of segments from beginning to end and take smallest hole that is adequate.
None of the other choices

29. **c** When there is an excessive amount of page swapping between main memory and secondary storage, the operation becomes inefficient, which is called ___.
excessive demand paging
hot swapping
thrashing
Over swapping

30. **c** Suppose a virtual address space of 2^24 words and the page size is 2^12 words. If the virtual address is 123456 in Hexadecimal, what would be the page number in Hexadecimal?
123
1234
12345
123456

31. **a** In "No Memory Abstraction", the static relocation technique is ___
When the program is loaded at address n, the constant n was added to every program address
When the program is compiled, the address of program is added with the constant value where the program will be loaded
After the program is loaded at address n, the constant n is stored at a particular register.
None of the other choices

32. **c** The modified/dirty bit is used for the purpose of:
Implementing FIFO page replacement algorithm
Dynamic allocation of memory used by one process to another
Reduce the average time required to service page faults
None of the other choices

33. **b** LRU replaces the page that has spent the
longest time in memory
longest time in memory without being referenced
shortest time in memory
shortest time in memory without being referenced

34. **c** A system with 32 bit virtual address. If the page size is 16 KB and each table entry occupies 4 bytes, what is the size of the page table?
1 MB
2 MB
4 MB
8 MB

35. **a** The methods determine where page is on the disk when it is paged out is
Paging to a static swap area
Backing up pages dynamically
Both Paging to a static swap area and Backing up pages dynamically
None of the other choices

36. **b** Five batch jobs A through E, arrive at a computer center at almost the same time. They have estimated running times of 8, 6, 2, 10, and 4 minutes. Determine the average waiting time for SJF (Shortest job first) scheduling. Ignore process switching overhead.
14 minutes
8 minutes
6 minutes
18.8 minutes

37. **a** There are ___ entries per page in the Page table.
1
2
3
4

38. **d** Which of following is true about main memory in the memory hierarchy?
Small amount of fast expensive memory
Some medium-speed medium price
Gigabytes of slow cheap memory
None of the other choices

39. **c** Which of the following is a method to keep track of memory usages?
Memory Management with Bit Maps
Memory Management with Linked Lists
Both Memory Management with Bit Maps and Memory Management with Linked Lists
None of the other choices

40. **d** Which of following is true about disk storage in the memory hierarchy?
Small amount of fast expensive memory
Some medium-speed medium price
Gigabytes of slow cheap memory
None of the other choices

41. **d** A page fault means that we referenced a page
That was outside the memory boundaries
With an incorrect I/O request
That was not in secondary storage
That was not in main memory

42. **b** In a system employing a paging scheme for memory management, wasted space is due to:
External fragmentation
Internal fragmentation
Pages and frames of different specified sizes
None of the other choices

43. **d** ___ gives users the appearance that their programs are being completely loaded in main memory during their entire processing time.
Segmenting
Virtual memory
Shared memory
Multithreading

44. **b** With paging, when is the internal fragmentation possible?
Page does not fit the frame
The last page of the job is less than the maximum page size
The virtual memory assigned to the program is less than the physical memory assigned to it
Such thing cannot happen

45. **c** Which is not true about the method of backing store: "Paging to a static swap area"?
The swap area on the disk is as large as the process virtual address space
Calculating the address in swap area requires knowing only where the process' paging area begins
Requires a disk map in memory
A page that is in memory always have shadow copy on disk

46. **a** Which of these statements about the Inverted Page Table are true?
An entry contains the pair (process, virtual page) mapped into the corresponding page frame
An entry contains the pair (process, offset) mapped into the corresponding page frame
An entry contains the pair (segment, virtual page) mapped into the corresponding page frame
An entry contains the pair (segment, offset) mapped into the corresponding page frame

47. **d** A computer with a 32-bit address uses a two-level page table. Virtual addresses are split into a 9-bit top-level page table field, an 11-bit second-level page table field, and an offset. How many pages are there in the address space?
2^20 pages
2^21 pages
2^22 pages
2^23 pages

48. **c** Which solutions are used to solve the shared libraries?
Relocation on the fly and position-independent code
Position-independent code
Static reallocation and position-independent code
None of the other choices

49. **b** Assume the Memory Manager receives a request for a block of 200. When the first-fit algorithm is used, ___ is the beginning address of the block granted by the Memory Manager.
Beginning Address Memory Block Size
4075 105
5225 5
6785 600
7560 20
7600 205
10250 4050
7600
10250
6785
4075

50. **d** If there are 64 pages and the page size is 2048 words, what is the length of logical address?
14 bits
15 bits
16 bits
17 bits

51. **A** Question #1 (1 point)
The Linking technique that allows the file to appear in more than one directory are:
Hard link
Symbolic link
Both hard link and symbolic link
Soft link

52. **D** Question #2 (1 point)
Which of the following statements is not correct about the device controller of I/O devices?
Is electronic component of device
Is also called adapter
Can handle two, four, or even eight identical devices
Is software component of device

53. **c** Question #3 (1 point)
Which of the following is not correct about hard links?
Hard links can point to files in the network
Hard links do not require extra disk space
Hard links can only point to files on the same machines
Hard links require to increase the link count in the i-node for each linking

54. **c** Question #4 (1 point)
What is incorrect about contiguous allocation of files?
It is simple to implement
It leads to excellent read performance
It does not cause disk fragmentation
It is widely used on CD-ROMs

55. **a** Question #5 (1 point)
Which of a system call is to allow the system to specify from where to take the data in file?
OPEN
SEEK
CREATE
LINK

56. **D** Question #6 (1 point)
An example of the key differences that can exist across (and even in) types of I/O devices is:
Data rate
Data representation
Error conditions
All of the other choices

57. **a** Question #7 (1 point)
Which of the following is not correct about the main classes of I/O devices?
Stream devices
Block devices
Character devices
Block devices and Character devices

58. **b** Question #8 (1 point)
A table in main memory storing linked list of allocation of disk blocks is called:
Disk allocation table
Linked list table
File list table
File allocation table

59. **d** Question #9 (1 point)
The Joliet Extensions provide _____
Long file name supported Unicode character
Directory nesting deeper than 8 levels
Directory names with extensions
All of the other choices

60. **2** Question #10 (1 point)
How many categories can be the I/O devices roughly divided?
1
2
3
4

61. **d** Question #11 (1 point)
A directory in UNIX/Linux consists of:
I-node number and file name
File name, file size, location of the file on disk
File name, file size, location of the file on disk, date created, owner ID
None of the other choices

62. **...** Question #12 (1 point)
Which of the following is true about the block size in disk space management
The larger the block size is the lower the data rate is
The larger the block size is the worse the disk space utilization is
The larger the block size is lesser the disk space is
None of the other choices

63. **b** Question #13 (1 point)
Which of the following is not correct about hard links and symbolic links?
Symbolic links need space to store the path name and considerable number of extra disk accesses
Hard links do not require extra disk space
Symbolic links can point to files in the network
Hard links can point to files on other machines

64. **d** Question #14 (1 point)
Increasing file system performance is implemented by ___
Buffer cache
Block Read Ahead
Defragmenting Disks
All of the other choices

65. **d** Question #15 (1 point)
Which of the following allocation methods, Operating system MS-DOS is implemented?
Contiguous allocation
Linked allocation
Indexed allocation
Linked allocation using FAT

66. **a** Question #16 (1 point)
One of the primary disadvantages of contiguous storage is that ___.
It is hard to implement and manage
It is difficult to find information in files
File can't be expanded unless there is empty space available immediately following it
It is an inefficient use of space

67. **c** Question #17 (1 point)
Which class of I/O devices that Scanner belongs to?
Stream devices
Block devices
Character devices
None of the other choices

68. **a** Question #18 (1 point)
Which method is used to implement files to keep each file as a linked list of disk blocks?
Linked List Allocation
Contiguous Allocation
File Allocation Table
i-node

69. **b** Question #19 (1 point)
Which of the following is true about the data rate for disk management?
The larger the block size is the faster the data rate is
The larger the block size is the lower the data rate is
The larger the block size is lesser the disk space is
None of the other choices

70. **a** Question #20 (1 point)
Which is the maximum partition size, if FAT type is FAT-12 and the block size is 2 KB?
8 MB
128 MB
256 MB
512 MB

71. **c** Question #21 (1 point)
Which ways are used to keep track of free block in disk space management?
A linked list method
A bitmap method
Both linked list method and bitmap method
None of the other choices

72. **b** Question #22 (1 point)
Which classes of I/O devices that Clock belong to?
Stream devices
Block devices
Character devices
None of the other choices

73. **D** Question #23 (1 point)
Which are allocation methods of disk blocks for files?
Contiguous allocation
Linked allocation
Indexed allocation
All of the other choices

74. **B** Question #24 (1 point)
The File Manager writes the volume name and other descriptive information on an easy-to-access place on each unit: ___ of the CD or DVD
The outermost part
The innermost part
Immediately following the master file directory
Stored at the beginning of the volume

75. **C** Question #25 (1 point)
Disk can be divided up into one or more partitions. The first block of every partition is called:
Free block
MBR
Boot block
Super blockv

76. **D** Question #26 (1 point)
Which of the following statements about the task of device controller of I/O devices is correct?
Convert serial bit stream to block of bytes
Perform error correction as necessary
Make available to main memory
All of the other choices

77. **D** Question #27 (1 point)
The disk block in a partition that includes a magic number, the number of blocks in the file system and other key administrative information is called:
Free block
MBR
Boot block
Superblock

78. **D** Question #28 (1 point)
The main classes of I/O devices are:
Stream devices
Block devices
Character devices
Block devices and Character devices

79. **A** Question #29 (1 point)
Which mechanism is implemented by writing to the log file with the purpose of file system management and optimization?
Journaling File Systems
Log-Structured File Systems
Virtual File Systems
None of the other choices

80. **C** Question #30 (1 point)
___ allocation allows files to use any storage space available on the disk.
Contiguous storage
Noncontiguous storage
Fragmented storage
Add-on storage

81. **C** Question #31 (1 point)
Strategy used for dumping a disk to tapes is:
Physical dump
Logical dump
Both physical dump and logical dump None of the other choices Both physical dump and logical dump
None of the other choices

82. **C** Question #32 (1 point)
The disk blocks in a partition that contains the top of the file system tree is called:
Free space management blocks
Root directory
Boot block
Superblock

83. **B** Question #33 (1 point)
Which method is used to implement files with file's size larger than 2 GB in UNIX V7?
i-node with single indirect block
i-node with triple indirect block
FAT 32
FAT 16

84. **D** Question #34 (1 point)
Which is not attribute of MS-DOS file?
Read-Only
Archived
Hidden, System
Lock

85. **C** Question #35 (1 point)
Which of the following information contain in the entry of the partition tables?
Starting and ending address of each partition
Marking a partition as active
Both starting and ending address of each partition and marking a partition as active
None of the other choices

86. **A** Question #36 (1 point)
If i-node contains 10 direct addresses and all disk blocks are 1024 KB, what is largest possible file
10 MB
10 GB
1 GB
None of the other choices

87. **C** Question #37 (1 point)
Which of the following allocation methods the i-nodes use?
Contiguous allocation
Linked allocation
Indexed allocation
Linked allocation using FAT

88. **B** Question #38 (1 point)
Which class of I/O devices that disks and tapes belong to?
Stream devices
Block devices
Character devices
None of the other choices

89. **C** Question #39 (1 point)
Which is the maximum number of partition that most disks can be divided up?
2
3
4
5

90. **D** Question #40 (1 point)
An example of a I/O character devices is
CD ROM
Disks
Modem
All of the other choices

91. **...** Question #41 (1 point)
Which is space efficiency, if 4KB-file using file system with 8KB-block?
50%
75%
25%
100%

92. **C** Question #42 (1 point)
Which of the following is correct about symbolic links?
Symbolic links need not space to store the path name
Symbolic links can only point to files on the same machines
Symbolic links can point to files in the network
None of the other choices

93. **C** Question #43 (1 point)
Which is the maximum partition size, if the FAT type is FAT-16 and the block size is 2 KB?
8 MB
128 MB
256 MB
512 MB

94. **D** Question #44 (1 point)
Which of a system call is to allow the file to appear in more than one directory?
OPEN
SEEK
CREATE
LINK

95. **...** Question #45 (1 point)
An example of a I/O block devices is
CD ROM
Printer
Modem
All of the other choices

96. **B** Question #46 (1 point)
Which part of a disk is used to boot the computer?
Free block
MBR
Root block
Super block

97. **B** Question #47 (1 point)
Which solution is used to solve the "missing block" problem for file system consistency?
The file system checker rebuilds the free list
The file system checker adds the missing blocks to the free list
The file system checker allocate the free block, then copy the duplicate block in used to there
None of the other choices

98. **B** Question #48 (1 point)
The File Manager writes the volume name and other descriptive information on an easy-to-access place on each unit: ___ of the magnetic disk
The outermost part
The innermost part
Immediately following the master file directory
Stored at the beginning of the volume

99. **C** Question #49 (1 point)
Which classes of I/O devices that keyboard belong to?
Stream devices
Block devices
Character devices
None of the other choices

100. **B** Question #50 (1 point)
Which of the following is not a well-known technique for organizing the physical storage blocks for a file?
Contiguous block allocation
Linked list block allocation
Sparse block allocation
Indexed block allocation

101. **b** 16. In the synchronization context, process creation and destruction tend to be quite costly operations because of the following, except
a. Creation/destruction require considerable manipulation of process descriptors
b. Parent processes have difficulty tracking concurrent creation and destruction of child processes
c. Protection mechanism are extensively executed
d. Memory management is heavily invoked

102. **c** 17. Which statement about test-and-set is incorrect?
a. It is the dominant way to accomplish semaphores in modern hardware
b. Test-and-set involves both a memory location and a register
c. Test-and-set executes as a sequence of machine instructions
d. Test-and-set can make semaphore implementation simple and efficient

103. **b** 18. The following statements about AND synchronization are true except
a. Simultaneous semaphore is a programming convenience
b. Simultaneous semaphore is an abstraction of a basic semaphore
c. Simultaneous semaphore is slightly more powerful than basic semaphore
d. Simultaneous semaphore uses basic semaphore in a particular pattern

104. **a** 19. Which statement about monitors is incorrect?
a. Monitors can solve just a proper subset of synchronization problems solvable with semaphores
b. Monitors provide a simplified paradigm for some synchronization problems
c. Monitors can solve synchronization problems too complex for semaphores
d. Monitors are based on abstract data types

105. **c** 20. Which statement about IPC is incorrect?
a. The OS explicitly copies information from a sending process's address space into a distinct receiving process's space
b. Sometimes, the OS can perform the copy by overriding the memory security mechanism
c. If the sender and receiver are on different machines, the OS must obtain additional cooperation of the two processes
d. IPC is rarely used between threads in a single process

106. **d** : An Operating System is?
a) A program that acts as an intermediary between computer processor and computer memory
b) A program that acts as an intermediary between a user of a computer and a user of another computer
c) A program that acts as an intermediary between computer software and computer hardware
d) A program that acts as an intermediary between a user of a computer and the computer hardware

107. **b** What is the main difference function between Operating Systems for Mainframe computer and Personal computer?
a) Multitask
b) Many I/O devices
c) Multi-user
d) Multiprogramming

108. **d** Which of the following is Operating System component?
a) Time Management
b) Space Management
c) Speed Management
d) File Management

109. **c** Which is the voluntary-condition which terminated process?
a) Job error
b) Killed by another process
c) Error exit
d) Killed by user

110. **b** : What is the correct approach with the Hold and Wait condition to prevent Deadlock?
a) Spool everything
b) Request all resources initially
c) Take resources away
d) Order resources numerically

111. **a** Which of the following actions generates an hardware interrupt?
a) An input/output operation is completed.
b) A page that does not exist in the main memory is accessed by the virtual storage management.
c) A system call instruction is executed.
d) Division by zero occurs.

112. **d** : Which command is used to change a file's name?
a) name
b) move
c) chage -n
d) mv

113. **b** Which command is used to jump on sub-directory?
a) jump
b) cd
c) chage -n
d) move

114. **...** Which command is used to display the absolute pathname for the directory that you are working in?
a) dir
b) whereami
c) pwd
d) ls

115. **b** Which command can be used to list all file (include hidden files) inside current directory?
a) ls *
b) ls -a
c) ls -l
d) show -a

116. **a** Which command would you use to create a sub-directory in your home directory?
a) mkdir
b) dir
c) cp
d) rm

117. **b** : Which command will display current day?
a) day
b) date
c) view date
d) calendar

118. **d** Which command can be used to display the contents of a file on the screen?
a) ls
b) grep
c) dog
d) cat

119. **c** ___ is the command that writes the bottom 10 lines of a file to the screen.
a) pr
b) split
c) tail
d) head

120. **d** : ___ is the command that writes the first 10 lines of a file to the screen.
a) pr
b) split
c) tail
d) head

121. **c** : The ___ command will list all working processes?
a) ls
b) jobs
c) ps
d) pwd

122. **d** A system has four processes and five allocated resources. The current allocation and maximum needs are as follows:
Allocated Maximum Available
Process A 10211 11213 00x11
Process B 20110 22210
Process C 11011 21311
Process D 11010 11121
What is the smallest value of x for which this is a safe state?
a) 0
b) 1
c) 2
d) 3

123. **c** Five batch jobs A through E, arrive at a computer center at almost the same time. They have estimated running times of 8, 6, 2, 10, and 4 minutes. Their (externally determined) priorities are 3, 5, 2, 1, and 4, respectively, with 5 being the highest priority. For each of the following scheduling algorithms: P-Priority scheduling; F- First-come, first-Server (run in order 8, 6, 2, 10, 4); S-Shortest job first, determine the mean process turnaround time. Ignore process switching overhead. Assume that only one job at a time runs, until it finishes. All jobs are completely CPU bound.
a) P-84, F-94, S-70
b) P-16, F-18, S-14
c) P-16.8, F-18.8, S-14

124. **c** The Job Scheduler seeks to __, when scheduling jobs.
A) run all CPU intensive jobs first
B) run all I/O intensive jobs first
C) balance CPU and I/O intensive jobs
D) run the quickest jobs first

125. **...** __ uses the same underlying philosophy as shortest job next, where the shortest jobs are processed first and longer jobs are made to wait.
A) LOOK
B) FCFS
C) SSTF
D) SCAN

126. **b** The following,__, describes the first memory allocation scheme.
A) Each program to be processed was loaded into secondary storage, then swapped into memory in parts
B) Each program to be processed was partially loaded into memory, then granted more memory as needed
C) Each program to be processed was allocated a portion of memory and could negotiate with other programs to access more memory
D) Each program to be processed was loaded in its entirety into memory and allocated as much contiguous space in memory as it needed

127. **c** The __ contains the value that must be added to each address referenced in the program so it will be able to access the correct memory addresses after relocation.
A) busy list
B) compaction monitor
C) relocation register
D) bounds register

128. **b** The primary distinguishing characteristic of modern computers is __.
A) memory capacity
B) processor capacity
C) disk space
D) physical size

129. **...** Second-generation computers were developed to meet the needs of __.
A) home users
B) businesses
C) secondary education
D) online users

130. **d** __ means that several logical records are grouped within one physical record.
A) Grouping
B) Fixing
C) Combining
D) Blocking

131. **b** __ include(s) every peripheral unit in the system such as printers, disk drives, CD/DVD drives, flash memory, keyboards, and so on.
A) The CPU
B) I/O Devices
C) Processors
D) Secondary components

132. **c** The overwhelming demand for ___ capability in the mid-1990s sparked the proliferation of networking capability.
A) e-mail
B) processing
C) Internet
D) FTP

133. **a** The ___ is unique to each operating system.
A) User Interface
B) Process Manager
C) Memory Manager
D) File Manager

134. **b** The ___ is used to indicate that a program is permanently held in ROM (read only memory), as opposed to being held in secondary storage.
A) hardware
B) firmware
C) software
D) shareware

135. **b** Deadlock was a serious problem for early batch systems.
A) True
B) False

136. **b** Within the Memory Manager the Segment Link Table lists details about each segment (one for each job).
A) True
B) False

137. **a** Multiple-level queues isn't really a separate scheduling algorithm but works in conjunction with several other schemes.
A) True
B) False

138. **b** In general, when a job is allocated to the CPU its Page Map Table is loaded into main memory while the Segment Map Tables are loaded only as needed.
A) True
B) False

139. **b** The Processor Manager is a composite of two submanagers: one in charge of job scheduling and the other in charge of program scheduling.
A) True
B) False

140. **b** The first-in first-out (FIFO) page replacement policy will remove the pages that have been in memory the shortest
A) True
B) False

141. **b** In the dining philosophers problem there are five philosophers and four forks.
A) True
B) False

142. **b** 7/ Which of the following information bits in the entry of page table is used to indicate Page Fault?
A/ Status bit
B/ Present/ Absent bit
C/ Referenced bit
D/ Modified bit

143. **c** 8/ How many levels of Protection the Processor Pentium supports;
A. 8
B. 6
C. 4
D. 2

144. **c** 10/ The ways to keep track of memory usages:
A/ Memory Management with Bit Maps
B/ Memory Management with Linked Lists
C/ A vs B
D/ None of the above

145. **d** QN=5
(2300)
Which is the difference between personal computers and mainframe computers?
a. Personal computers are always interactive
b. Mainframe computers are mostly batch systems with many users
c. Protection is much more important on mainframe computers
d. All of the above

146. **b** QN=8
(2293)
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

147. **b** QN=9
(2291)
The general role of an operating system is to:
a. Act as an interface between various computers
b. Provide a set of services to system users
c. Manage files for application programs
d. None of the above

148. **a** QN=10
(2290)
The two basic types of processor registers are:
a. General and special registers
b. Control and Status registers
c. User-visible and user-invisible registers
d. None of the above

149. **d** QN=14
(2298)
Which of the following statements is incorrect about timesharing and multiprogramming systems?
a. In a timesharing system, multiple users can access the system simultaneously
b. In a multiprogramming system, one user can run several processes simultaneously
c. All timesharing systems are multiprogramming systems
d. All multiprogramming systems are timesharing systems

150. **b** QN=1
(2309)
Which of the following statements is correct about Shortest Job First
a. Avoid Starvation
b. Minimize average waiting time
c. Both a and b
d. None of the above

151. **b** QN=3
(2305)
Which of the following process state transitions are legal?
a. waiting -> running
b. running -> ready
c. waiting -> terminated
d. ready -> terminated

152. **c** N=4
(2316)
Which of the following is not correct about user-level threads ?
a. User-level threads are more efficient than kernel threads, in the sense that they do not need kernel calls to switch among threads
b. User-level threads cannot be preempted by clock interrupts unless the whole process' quantum has been used up
c. With user-level threads, customized scheduling algorithms cannot be implemented
d. If one user-level thread makes a blocking system call, the system will block the entire process (which contains that user-level thread)

153. **d** QN=5
(2313)
What is Software proposal in the solution of Mutual exclusion with Busy waiting
a. Lock Variables
b. Strict Alternation
c. Peterson's Solution
d. All of the above

154. **a** (2311)
Which is the correct description of transitions between process states below? (see picture)
a. 1: Process blocks for input; 2: Scheduler picks another process; 3: Scheduler picks this process; 4: Input becomes available
b. 1: Process blocks for input; 2: Scheduler picks this process; 3: Scheduler picks another process; 4: Input becomes available
c. 1: Process blocks for input; 2: Input becomes available; 3: Scheduler picks another process; 4: Scheduler picks this process
d. 1: Process blocks for input; 2: Input becomes available; 3: Scheduler picks this process; 4: Scheduler picks another process

155. **c** QN=12 In a single processor system, mutual exclusion can be guaranteed by:
(2314)
a. Overlapping processes
b. Interleaving processes
c. Disabling interrupts
d. All of the above

156. **d** QN=14
(2319)
Which is a wrong statement about the quantum used in Round Robin algorithm ?
a. If the quantum is very large, RR is essentially FCFS
b. If the quantum is very small, the CPU efficiency is reduced
c. A reasonable value of quantum is around 20-50 ms
d. None of the above

157. **d** QN=15
(2317)
Which of the following synchronization mechanisms does not rely on busy -waiting ?
a. Lock variables
b. Strict alternation
c. Peterson's algorithm
d. Semaphores

158. **b** is a specialized WRITE command for existing data files that allows for appending records or for rewriting selected records in their original place in the file.
[A]
UPDATE
[B]
REWRITE
[C]
MODIFY
[D]
APPEND

159. **d** Many computer users and some operating systems call subdirectories
[A]
Volumes
[B]
Databases
[C]
Folders
[D]
Files

160. **d** Which method is used to implement files to keep each file as a linked list of disk blocks?
[A]
Contiguous Allocation
[B]
i -node
[C]
File Allocation Table
[D]
Linked List Allocation

161. **a** Which of the following allocation methods, Operating system MS-DOS is implemented?
[A]
Linked allocation using FAT
[B]
Indexed allocation
[C]
Contiguous allocation
[D]
Linked allocation

162. **a** Which of a system call is to allow the system announce that the file is coming and set some of the attributes?
[A]
CREATE
[B]
RENAME
[C]
OPEN
[D]
CLOSE

163. **b** Which of a system call is to allow the file to appear in more than one directory?
[A]
CREATE
[B]
LINK
[C]
OPEN
[D]
SEEK

164. **c** Which of a system call is to allow the system free up internal table space?
[A]
SEEK
[B]
OPEN
[C]
Close
[D]
DELETE

165. **a** How much cylinder skew is needed for a 5400- RPM (rotate per minute) disk with the track-to-track seek time of 1 msec? The disk has 200 sectors of 512 bytes on each track.
[A]
18 sectors
[B]
12 sectors
[C]
24 sectors
[D]
36 sectors

166. **a** The aspect of disk performance that represents the time it takes to position the head a the desired track is known as
[A]
Rotational delay
[B]
Access time
[C]
Seek time
[D]
None of the other choices

167. **b** A operation concerning Stable Storage is:
[A]
Stable Reads
[B]
All of the other choices
[C]
Crash recovery
[D]
Stable writes

168. **d** Rearrange the layers in I/O software starting at the bottom
1. User-level I/O software
2. Device drivers
3. Interrupt handlers
4. Hardware
5. Device-independent OS software
[A]
12345
[B]
54321
[C]
15234
[D]
43251

169. **c** When an external device becomes ready to be serviced by the processor, the device sends this signal to the processor. This signal is called:
[A]
None of the other choices
[B]
Halt signal
[C]
Interrupt signal
[D]
Handler signal

170. **d** Assuming that it takes 10 nsec to copy a byte, how much time does it take to completely rewrite the
screen of a 1200 x 800 pixel graphics with 24- bit color?
[A]
288 msec
[B]
288 micro-sec
[C]
28.8 micro-sec
[D]
28.8 msec

171. **d** What is asynchronous transfer in principles of I/O software?
[A]
The user process makes system call and goes to sleep until other process it wakes up
[B]
None of the other choices
[C]
The user program starts system cal l to transfer and automatically suspended until the data are available in the buffer
[D]
The CPU starts the transfer and goes off to do something else until the interrupt arrives

172. **c** Assuming that it takes 10 nsec to copy a byte, how much time, does it take to completely rewrite the screen of a 200 character
x 20 line text mode memory- mapped screen?
[A]
10 micro-sec
[B]
30 micro-sec
[C]
40 micro-sec
[D]
20 micro-sec

173. **d** Which of the following statements is incorrect about I/O using DMA?
[A]
None of the other choices
[B]
DMA helps free up the CPU during the I/O to do other work
[C]
DMA helps reduce the number of interrupts
[D]
DMA is software solution to speed up data transfer between I/O device and memory

174. **c** In a directed graph used to model deadlock, resources are represented using
[A]
Rectangle
[B]
Circular
[C]
Squares.
[D]
Ellipse

175. **b** Which deadlock condition does "Ordering resources numerically" attack?
[A]
No preemption
[B]
Circular-wait condition
[C]
Hold and wait
[D]
Mutual exclusion

176. **b** Which deadlock condition does "Take resources away" attack?
[A]
Circular-wait condition
B
No preemption
C
Hold and wait
[D]
Mutual exclusion

177. **b** Which method is used to prevent the communication deadlock?
[A]
All of the other choices
[B]
Time outs
[C]
Handling alarm
[D]
Acknowledge signa

178. **d** _____is the act of allowing only one process to have access to a dedicated resource
[A]
Hold and wait condition
[B]
No preemption condition
[C]
Circular-wait condition
[D]
Mutual-exclusion condition

179. **d** What is the correct approach of the driver of dedicated devices with requesting device that is busy to
solve deadlock using Ostrich algorithm?
[A]
The device driver stops the current jobs and releases the devices
[B]
The device driver kills those requesting processes
[C]
All of the other choices
[D]
The device driver decides blocking and returning an error code

180. **c** What is true about non-preemptable resources? (non preemptable)
[A]
Can be taken away from a process with no ill effects
[B]
None of the other choices
[C]
Will cause the process to fail if taken away
[D]
Can share among processes

181. **a** Which of the following is not a step in the boot process?
[A]
The antivirus program checks all files for viruses.
[B]
Configuration and customization settings are checked
[C]
The operating system is loaded into RAM.
[D]
The BIOS is activated by powering on the CPU.

182. **d** Which of a system call is to allow the system free up disk space?
[A]
OPEN
[B]
CLOSE
[C]
SEEK
[D]
DELETE

183. **c** Consider a swapping system in which the memory consists of the following hole sizes: 10K, 4K, 20K, 15K, 9K.
Assume best fit algorithm is used. Which holes are taken for successive segment requests of 8K, 12K, 10K?
[A]
10K, 15K, 20K
[B]
10K, 20K, 15K
[C]
9K, 15K, 10K
[D]
20K, 15K, 10K

184. **b** Assume the Memory Manager receives a request for a block of 200. When the best-fit algorithm is used, is the beginning address of the hole granted by the Memory Manager.
Beginning Address of Hole Hole Size
4075 105
5225 5
6785 600
7560 20
7600 205
10250 4050
[A]
6785
[B]
7600
[C]
10250

185. **b** A ___ is a portion of a process that can run independently.
[A]
subprocess
[B]
thread
[C]
program
[D]
Mini-process

186. **c** The term_____a specialized instruction set
[A]
None of the other choices
[B]
I/O device
[C]
DMA characterizes a system configuration that includes an I/O module that is a separate processor with
[D]
Programmed I/O

187. **b** Consider a swapping system in which the memory consists of the following hole sizes: 10 K, 4 K, 20 K, 15 K, 9 K. Assume first fit algorithm is used. Which holes are taken for successive segment requests of 8 K, 12 K, 10 K?
[A]
9 K, 15 K, 10 K
[B]
10 K, 20 K, 15 K
[C]
20 K, 15 K, 4 K
[D]
None of the other choices

188. **a** Which is the fastest bus in the IBM PC computer?
[A]
ISA (Industry Standard Architecture)
[B]
USB (Universal Serial BUS)
[C]
IDE (Integrated Drive Electronic)
[D]
PCI (Peripheral Component Interconnect)

189. **a** Assume the following events and actions take place. The following statement is true. Event Action
1 P1 requests and is allocated R1. P1 requests and is allocated R1
2 P2 requests and is allocated R2
3 P3 requests and is allocated R3
4 P1 requests R2.
5 P2 requests R3.
6 P3 requests R1.
[A]
There is no deadlock
[B]
Event 5 caused deadlock.
[C]
Event 4 caused deadlock
[D]
Event 6 caused deadlock.

190. **d** Operating system abstraction supports the ability to have operation even when there is only one CPU available
[A]
None of the other choices
[B]
parallel
[C]
multiple
[D]
pseudoparallelism

191. **c** The page size that is too small wil l generate
[A]
More difficult to calculate actual position
[B]
Excessive internal fragmentation
[C]
Very long Page tables
[D]
Excessive external fragmentation

192. **b** In a directed graph used to model deadlock, processes are represented using
[A]
Rectangle
[B]
Circular
[C]
Squares
[D]
Ellipse

193. **b** How many categories can be the I/O devices roughly divided?
[A]
3
[B]
2
(block devices and character devices)
[C]
4
[D]
1

194. **d** What is not the technique of implementation for Virtual Memory?
[A]
All of the other choices
[B]
Paging
[C]
Segmentation
[D]
Partition

195. **b** A CPU may have separate fetch, decode and execute units, so that can carry out three steps of the three instructions in the same time is called:
[A]
Multicore
[B]
Pipeline
[C]
None of the other choices
[D]
Superscalar

196. **c** Which of a system call is to allow the system fetch the attributes and list of disk addresses into main memory for rapid access on later call?
[A]
SEEK
[B]
OPEN
[C]
RENAME
[D]
CLOSE

197. **d** Which of the following statements is not correct about the device controller of I/O devices?
[A]
Is also called adapter
[B]
Can handle two, four, or even eight identical devices
[C]
Is electronic component of device
[D]
Is software component of device

198. **c** QN=5 (6907) Which of the following is not a task of I/O management of OS?
a. Manage main memory for the devices using caching, buffering, and spooling
b. Maintain and provide a general device-driver interfaces
c. Mapping files onto secondary storage
d. Drivers for specific hardware devices

199. **c** QN=7 (6916) ___ is the partitioning of a single server, each of which can support a different operating system.
a. Multiprocessing
b. Multithreading
c. Virtualization
d. Shared processing

200. **c** QN=1 (6837) A CPU may have two or more complete processors, so that can carry out multiple threads in the same time is called:
a. Pipeline
b. Superscalar
c. Multicore
d. None of the other choices

201. **a** QN=17 (6980) What happens when a thread calls Down (S) when it wants to enter its critical section, where S is a binary semaphore set to 1?
a. The thread is allowed to enter its critical section and S is decremented.
b. The thread is blocked and added to a queue of waiting threads.
c. The semaphore is set to 2.
d. None of the other choices

202. **b** QN=8 (7455) The File Manager writes the volume name and other descriptive information on an easy-to-access place on each unit: ___ of the magnetic disk
a. The outermost part
b. The innermost part
c. Immediately following the master file directory
d. Stored at the beginning of the volume

203. **d** QN=11 (7490) Which of the following statement is not true about separating I/O and memory space?
a. Device drivers must be written using assembly language
b. Programs must use 2 instructions to test whether the device is ready
c. There is special protection mechanism to keep user processes from performing I/O
d. Caching a device control register would be disastrous

204. **c** QN=50 (7523) Each device attached to your computer comes with a specia l program called a _____ that facilitates the communication between the device and the OS.
a. device configurator
b. translator
c. device driver
d. communication utility

205. **a** QN=19 (7547) Which concept is described as "disk sectors are just numbered consecutively starting at 0, without regard to the disk geometry"?
a. Logical block addressing
b. Physical block addressing
c. Virtual block addressing
d. None of the other choices

206. **c** What is the characteristic of the first generation of operating system?
[A] Personal computers, single user, multitasking
[B] Transistors, batch systems
[C] Vacuum tubes, plug boards
[D] ICs and multiprogramming

207. **d** Which is not an example of a resource that is commonly time-multiplexed?
a. Network interface
b. CPU
c. Graphics accelerator
d. Main memory

208. **a** Which of the following is an Operating System component?
[A] Process Management
[B] Speed Management
[C] Space Management
[D] Time Management

209. **a** Which of the following process state transitions is correct, when the scheduler picks a process from the ready queue to run?
[A]
Ready -> running
[B]
Running -> Blocked (waiting)
[C]
Blocked (waiting) -> ready
[D]
Running -> ready

210. **a** Which of the following process state transitions is illegal?
[A]
Ready -> Blocked (waiting)
[B]
Running -> Blocked (waiting)
[C]
Blocked (waiting) -> ready
[D]
Running -> ready

211. **a** Critical Region (Section) concept used in interprocess communication is:
[A]
A part of shared memory
[B]
A part of the program where the shared memory is accessed
[C]
None of the other choices
[D]
A part of shared data

212. **d** Which of the following operating systems is an example of monolithic system?
[A]
Windows XP
[B]
Mac OS
[C]
UNIX
[D]
MS-DOS

213. **b** A well-known Real-Time operating system is:
[A]
MS-DOS
[B]
e-COS
[C]
Tiny OS
[D]
Personal Operating System

214. **c** Which of the following instructions should be allowed only in kernel mode?
[A]
ADD of two numbers
[B]
Read the time-of-day clock
[C]
Disable all interrupts
[D]
AND of two numbers

215. **b** The _____is the essential component ofthe operating system that remains in RAM when your computer is powered on.
[A]
system file
[B]
kernel
[C]
registry

216. **a** Which is not a goal of a sheduling algorithm for all systems?
[A]
Balance
[B]
Response time
[C]
Policy enforcement
[D]
Fairness

217. **d** A entry of the Process table is called:
[A]
All of the other choices
[B]
Process check block
[C]
Process management block
[D]
process control block.

218. **b** One of the most important innovations of demand paging was that it made feasible
[A]
Virtual paging
[B]
Virtual memory.
[C]
Memory demand
[D]
Virtual demand

219. **a** When a virtual memory system manages memory in fixed length units, which of the following terms correctly represents its unit?
[A]
Page
[B]
Frame
[C]
Block
[D]
Segment

220. **d** Which of the following is not special file?
[A]
None of the other choices
[B]
Block special file
[C]
Character special file
[D]
Stream special file

221. **a** Device Driver is usually written by:
[A]
Device's Manufacturer
[B]
OS's Manufacturer
[C]
Computer's Manufacturer
[D]
All of the other choices

222. **a** Imagine that a certain modem can read 7,000 characters per second and that the time to read a character to the modem register is so short it can be ignored. If to run this modem using interrupt-driven I/O and each character read requires an interrupt that takes 10 usee all-in to service. How many percent of the CPU does the interrupt overhead cost?
[A]
4% of the CPU
[B]
7% of the CPU
[C]
96% of the CPU
[D]
93% of the CPU

223. **d** In a directed graph used to model deadlock, ____represents deadlock.
[A]
Dashed arrow
[B]
Solid arrow
[C]
Any path
[D]
Cycle

224. **b** Which is not a function of device drivers?
[A]
To manage its power requirements and log events
[B]
To accept abstract read and write request from device independent software above it and see that they are curried out
[C]
To receive system call
[D]
To initialize the device, if needed

225. **c** What is the correct approach with the "Mutual Exclusion condition" to prevent Deadlock?
[A]
Take resources away
[B]
Request all resources initially
[C]
Spool everything
[D]
Order resources numerically

226. **d** An example of preemptable resources is
[A]
DVD device
[B]
None of the other choices
[C]
CD-ROM device
[D]
Memory

227. **b** In the "dining philosophers" problem, a philosopher can pick up a fork when__.
A) there is one available
B) there are two available
C) no other philosopher is eating
D) it is his turn, going in numerical order from one philosopher to the next

228. **a** Consider the case of a home construction company with two application programs, purchasing (P1) and sales (P2), which are active at the same time. They each need to access two files, inventory (F1) and suppliers (F2), to update daily transactions. The following series of events will cause a deadlock. Fill in the missing event in the sequence.

1. Purchasing (P1) accesses the supplier file (F2).
2. Sales (P2) accesses the inventory file (F1).
3. Purchasing (P1) doesn't release the supplier file (F2) but requests the inventory file (F1), but P1 is blocked because F1 is being held by P2.
4. Meanwhile, ___
A) sales (P2) doesn't release the inventory file (F1) but requests the supplier file (F2)
B) sales (P2) does release the inventory file (F1) and then requests the supplier file (F2)
C) purchasing (P1) does release the supplier file (F2) which is then requested by sales (P2)
D) purchasing (P1) exits

229. **b** Fill in the missing step in the following deadlock situation. Two users from the local board of education are each running a program (P1 and P2), and both programs will eventually need two DVD drives to copy files from one disc to another. Only two DVD-R drives are available and they're allocated on an "as requested" basis. Soon the following sequence transpires:
1. P1 requests drive 1 and gets it
2. ___
3. P1 requests drive 2 but is blocked.
4. P2 requests drive 1 but is blocked.
A) P1 requests drive 2.
B) P2 requests drive 2 and gets it
C) P2 requests drive 1 but is blocked.
D) P1 releases drive 1.

230. **a** With demand paging, jobs are divided into equally sized ___ that initially reside in secondary storage.
A) pages
B) blocks
C) frames
D) sets

231. **c** If a particular demand paging configuration has 9 page interrupts out of 11 page requests, failure rate is ___.
A) 18%
B) 52%
C) 82%
D) 95%

232. **c** The cache hit ratio is ___, if the total number of requests is 10 and 6 of those are found in cache memory.
A) 6%
B) 10%
C) 60%
D) 100%

233. **d** The ___ policy is based on the theory that the best page to remove is the one that has been in memory the longest.
A) TRU
B) LRU
C) LIFO
D) FIFO

234. **d** What are the allocation methods of disk blocks for files:
a. Contiguous allocation
b. Linked allocation
c. Indexed allocation
d. All of the above

235. **d** The following requirement must be met by any facility or capability that is to provide support for mutual exclusion:
a. Only one process at a time can be allowed into a critical code section
b. A process remains in its critical region for a finite time only
c. No assumption can be made about relative process speeds
d. All of the above

236. **d** Which of the following is appropriate to release page table and pages?
a. Process creation
b. Process execution
c. Page fault time
d. Process termination time

237. **c** Which of the following information bits used by the various page replacement policies indicates if the page has been called lately?
a. Locality bit
b. Status bit
c. Referenced bit
d. Modified bit

238. **a** The system is said to be in an unsafe state if
a. The operating system cannot guarantee that all current processes can complete their work
b. The system is deadlocked
c. A process is indefinitely postponed
d. None of the above

239. **c** QN=42 (7487) In the memory-mapped I/O system, in order that CPU communicates with the control registers in the devices, the control register is assigned :
a. Index
b. I/O address
c. Unique memory address
d. None of the other choices

240. **b** QN=60 (7637) A system has four processes and five allocated resources. The current allocation and maximum needs are as follows:

Process Allocated Maximum Available

A 10211 11212 00x11
B 20110 22210
C 11011 21311
D 11010 11121

What is the smallest value of x for which this is a safe state?
a. 0
b. 1
c. 2
d. 3

241. **c** 1. The operating system does each of the following except
a. Allocates the computer's components to different programs
b. Synchronizes individual programs' activities
c. Ensures that programs terminate their execution
d. Provides the general mechanisms that are needed so that the programs execute in perfect harmony

242. **a** 2. The process is the computational environment that includes each of the following except
a. Operating system
b. Data
c. Program
d. Files

243. **d** 3. Threads can be implemented in each of the following ways except
a. Run-time libraries
b. Operating system
c. Java Virtual Machine
d. Parent/child processes

244. **a** 4. Files are distinguished from other resources except that
a. The interface is exceptionally complex as compared with most other resources.
b. They are the prevalent form of storing information
c. Operating systems often use the file as a primitive for modeling other resource abstractions
d. UNIX pipes can be modeled as files

245. **c** 5. A UNIX process contains each of the following except
a. Text segment
b. Data segment
c. Thread segment
d. Stack segment

246. **d** 6. The process manager deals with the following except
a. Thread management
b. Resource management
c. Process management
d. Window management

247. **a** 7. The process manager commonly interacts with other components except
a. Device controller
b. Device manager
c. Memory manager
d. File manager

248. **d** 8. A trap instruction doesn't cause this CPU hardware step to occur:
a. Switch the CPU to supervisor mode
b. Consult the trap table
c. Load the PC with an address found in the trap table
d. Return control to the user code which invoked the trap instruction

249. **c** 10. On a magnetic disk, which is not a critical timing characteristic?
a. Rotational latency
b. Track seek time
c. Sector header erasure time
d. Data transfer latency

250. **b** 11. Which is not a characteristic of a thread?
a. Thread identifier
b. Thread parent identifier
c. Thread-specific data
d. Process environment

251. **b** 12. Basic process states include the following except
a. blocked
b. done
c. running
d. ready

252. **d** 13. Which is the least common reason that a running thread might cease using the CPU?
a. Thread completes execution
b. Thread requests resource, and blocks
c. Thread voluntarily releases CPU
d. Thread involuntarily releases CPU

253. **c** 14. How many context switches occur whenever application processes are multiplexed?
a. 1
b. 2
c. 4
d. 8

254. **b** 15. The OS implementation of a scheduler normally does not include
a. Context switcher code
b. Procedure call handler code
c. System call handler code
d. Interrupt handler code

255. **a** QN=50 (7546) Which RAID level duplicates all the disks?
a. 1
b. 2
c. 3
d. 4

256. **a** QN=51 (7551) How much cylinder skew is needed for a 7200- RPM (rotate per minute) disk with the track-to-track seek time of 1 msec? The disk has 200 sectors of 512 bytes on each track.
a. 24 sectors
b. 12 sectors
c. 36 sectors
d. 18 sectors

257. **a** QN=52 (7560) A computer uses a programmable clock in square-wave mode. If 500 MHz crystal is used, what should be the value of the holding register to achieve a clock resolution of 1 msec (Clock tick)?
a. 500,000
b. 50,000
c. 5,000,000
d. 50,000,000

258. **b** QN=53 (7578) What is true about preemptable resources?
a. Will cause the process to fail if taken away
b. Can be taken away from a process with no ill effects
c. Can share among processes
d. None of the other choices

259. **d** QN=54 (7583) __ allows a resource to be held by a process as long as it is needed.
a. Mutual-exclusion condition
b. Circular-wait condition
c. Hold and wait condition
d. No preemption condition

260. **b** QN=56 (7596) Which of the following statements does not apply to manual deadlock management?
a. Deadlock is relatively infrequent for some system resources
b. OS designers are normally very sensitive to deadlock when designing resource managers
c. Recovery may involves rebooting the system
d. None of the other choices

261. **b** Movable-head magnetic disks, such as the computer hard drive, have __ read/write head(s).
A) zero
B) one
C) two
D) four

262. **b** he data-transfer rate for an optical disc is measured in __ per second and refers to the speed at which massive amounts of data can be read from the disc.
A) kilobytes
B) megabytes
C) gigabytes
D) terabytes

263. **c** f the transport speed for a magnetic tape is 200 inches per second and the density is 1600 bpi, a total of __ bytes can be transferred in one second.
A) 3,200
B) 32,000
C) 320,000
D) 3,200,000

264. **a** __ is a way to optimize search times by ordering the requests once the read/write heads have been positioned.
A) Rotational ordering
B) SSTF
C) C-SCAN
D) LOOK and SCAN

265. **a** To put data on an optical disc requires a high -intensity laser beam, which burns indentations, called pits, and flat areas, called __.
A) lands
B) valleys
C) hills
D) lakes

266. **b** Data recorded on fixed- head DASDs may or may not be blocked at the discretion of the __.
A) end user
B) application programmer
C) operator
D) database administrator

267. **b** The need for algorithms to resolve conflicts between processors is called process ___.
A) communication
B) synchronization
C) reduction
D) transformation

268. **b** In a symmetric configuration, processor scheduling is ___.
A) centralized
B) decentralized
C) multifaceted
D) balanced

269. **b** Parallel processing is also called ___.
A) uniprocessing
B) multiprocessing
C) shared processing
D) divided processing

270. **a** ___ proposed a solution to the readers and writers problem that did not result in starvation for readers or writers.
A) Hoare
B) Courtois
C) Heymans
D) Parnas

271. **b** Most current operating systems support the implementation of threads, or ___, which have become part of numerous application packages.
A) parallel processes
B) lightweight processes
C) heavyweight processes
D) semaphores

272. **c** Each active thread in a process shares the ___ and the resources allocated to its process.
A) processor registers
B) program counter
C) data area
D) status

273. **d** Automatic detection by the compiler of instructions that can be performed in parallel is called ___.
A) automatic parallelism
B) array parallelism
C) explicit parallelism
D) implicit parallelism
implicit parallelism

274. **a** Operations on semaphore s enforce the concept of ___, which is necessary to avoid having two operations attempt to execute at the same time.
A) mutual execution
B) mutex execution
C) signal exclusion
D) mutual exclusion

275. **c** A ___ of processing must be handled as a unit
A) line
B) segment
C) critical region
D) semaphore

276. **b** In the "dining philosophers" problem, a philosopher can pick up a fork when___.
A) there is one available
B) there are two available
C) no other philosopher is eating
D) it is his turn, going in numerical order from one philosopher to the next

277. **a** is necessary in any computer system because some resources such as memory, CPU, and dedicated devices must be exclusively allocated to one user at a time.
A) Mutual exclusion
B) Resource holding
C) No preemption
D) Circular wait

278. **c** ___ is when, in modern printing systems, a disk accepts output from several users and acts as a temporary storage area for all output until the printer is ready to accept it
A) Phishing
B) Lagging
C) Spooling
D) Spoofing

279. **c** ___ occurs when two processes do not release control of resources they are using.
A) No preemption
B) Circular wait
C) Resource holding
D) Mutual exclusion

280. **c** For ___ systems, deadlocks quickly become critical situations.
A) batch
B) interactive
C) real-time
D) general purpose

281. **b** Failure to lock database records before updating them may result in a ___ between processes.
A) struggle
B) race
C) timeout
D) livelock

282. **c** ___ developed the Banker's Algorithm.
A) Havender
B) Holt
C) Dijkstra
D) Lane & Mooney

283. **b** A network that's congested or has filled a large percentage of its I/O buffer space can become deadlocked if it doesn't have ___ to control the flow of messages through the network.
A) procedures
B) protocols
C) policies
D) rules

284. **a** ___ is necessary in any computer system because some resources such as memory, CPU, and dedicated devices must be exclusively allocated to one user at a time.
A) Mutual exclusion
B) Resource holding
C) No preemption
D) Circular wait

285. **c** Interactive systems generally improve the use of resources through ___ resource sharing, but this resource sharing capability also increases the possibility of deadlocks.
A) interspersed
B) group
C) dynamic
D) static

286. **b** When using the clock page replacement policy, a page with a reference bit of ___ is replaced.
A) -1
B) 0
C) 1
D) 5

287. **b** ___ gives users the appearance that their programs are being completely loaded in main memory during their entire processing time.
A) Segmenting
B) Virtual memory
C) Shared memory
D) Multithreading

288. **a** Studies have shown that having any ___, even a small one, can substantially improve the performance of the computer system.
A) cache
B) memory block
C) page block
D) block

289. **d** To access a location in memory when using segmented memory management, the address is composed of two entries: ___.
A) the segment number and the line number
B) the segment number and the displacement
C) the line number and the displacement
D) the segment number, the line number, and the displacement

290. **c** If a particular demand paging configuration has 9 page interrupts out of 11 page requests, failure rate is ___.
A) 18%
B) 52%
C) 82%
D) 95%

291. **b** There are ___ entries per page in the PMT.
A) 0
B) 1
C) 2
D) 5

292. **c** The cache hit ratio is ___, if the total number of requests is 10 and 6 of those are found in cache memory.
A) 6%
B) 10%
C) 60%
D) 100%

293. **d** Assume that the Page Map Table below is in effect. The number of lines per page is 400. The actual memory location for line 433 is ___.
Job Page Number Page Frame Number
0 8
1 10
2 5
3 11
A) 1
B) 33
C) 4000
D) 4033

294. **d** Consider the following four cases. The LRU policy,___, will be least likely to swap.
Modified Referenced Meaning
Case 1 0 0 Not modified AND not referenced
Case 2 0 1 Not modified BUT was referenced
Case 3 1 0 Was modified BUT not referenced
Case 4 1 1 Was modified AND was refe renced
A) Case 1
B) Case 2
C) Case 3
D) Case 4

295. **d** One of the most important innovations of demand paging was that it made ___ feasible.
A) memory demand
B) virtual demand
C) virtual paging
D) virtual memory

296. **a** In a single -user system, jobs are processed ___.
A) sequentially
B) intermittently
C) randomly
D) in order of longest job to shortest job

297. **a** 3 Put job in waiting queue
4 Go fetch next job
A) first-fit memory allocation
B) best-fit memory allocation
C) least-fit memory allocation
D) fixed partition memory allocation

298. **a** The operating system can tell the ___ of each group of digits by its location in the line and the operation code.
A) function
B) value
C) order
D) assignment

299. **c** The ___ of memory, sometimes referred to as garbage collection or defragmentation, is performed by the operating system to reclaim fragmented sections of the memory space.
A) deallocation
B) redirection
C) compaction
D) reallocation

300. **d** By compacting and relocating, the Memory Manager optimizes the use of memory and thus improves throughput, but an unfortunate side effect is more ___.
A) null entries
B) segmentation
C) errors
D) overhead

301. **a** The fixed partition scheme works well ___.
A) when jobs have the same size
B) when jobs have different sizes
C) when job sizes are not known in advance
D) when all jobs are under 100K

302. **c** A supercomputer can perform ___ floating-point operations per second.
A) 240 million
B) 2.4 billion
C) 2.4 trillion

303. **a** In second-generation computers, to reduce the discrepancy in speed between the I/O and the CPU, an interface called the ___ was placed between them to act as a buffer.
A) control unit
B) scheduler
C) holder
D) buffer manager

304. **b** The primary distinguishing characteristic of modern computers is ___.
A) memory capacity
B) processor capacity
C) disk space
D) physical size

305. **a** A system with ___ divides programs into parts and keep them in secondary storage, bringing each part into memory only as it is needed.
A) virtual memory
B) shared memory
C) segmented processing
D) passive multiprogramming

306. **a** A hybrid system is a combination of the ___ systems.
A) batch and interactive
B) batch and real -time
C) interactive and real -time
D) real-time and general-purpose

307. **d** Powerful microcomputers developed for use by commercial, educational and government enterprises are called ___.
A) supercomputers
B) minicomputers
C) terminals
D) workstations

308. **c** Vacuum tube computers were used during the period of ___.
A) 1920s-1930s
B) 1935-1945
C) 1940-1955
D) 1945-1960

309. **a** ___ introduced the need for control cards, which defined the exact nature of each program and its requirements.
A) Job scheduling
B) Control scheduling
C) Job control
D) Structure control

310. **b** A typical ___ computer houses devices to perform audio, video, and graphic creation and editing.
A) multiprocessor
B) multimedia
C) networked
D) PDA

311. **d** The name for the nucleus of an operating system is the ___.
A) manager
B) center
C) core
D) kerneld

312. **a** Which of the following is an Operating System component?
[A]
Process Management
[B]
Speed Management
[C]
Space Management
[D]
Time Management

313. **c** What is an operating system structure in which the communication between requesting process and responding process is message passing?
[A]
Monolithic Systems
[B]
All of the other choices
[C]
MS-DOS
[D]
Client-Server Model

314. **c** The language of the CPU is known as its
[A]
Register set
[B]
Control unit set
[C]
Instruction set
[D]
None ofthe other choices

315. **d** Where is the position of the operating system in computer system:
[A]
Between the user interface program and the application Program
[B]
None of the other choices
[C]
In user space
[D]
Above the hardware and under the user interface program

316. **b** Consider a computer system that has cache memory, main memory (RAM) and disk, and OS uses virtual memory. It takes 2 nsec to access a byte from the cache. 20 nsec to access a byte from RAM. and 10 msec to
access a block of 1000 bytes from the disk. If a b ook has 1000 pages, each with 50 lines of 80 characters each. How long it will take to electronically scan the textfor the case of the master copy being in each of the level as
one proceeds down the memory hierarchy (from inboard memory to offline storage)?
[A]
1 msec. 10 msec. 10 sec
[B]
4 msec. 40 msec. 20 sec
[C]
2 msec. 20 msec. 10 sec
TO]
1 msec. 10 msec. 5 sec

317. **d** The basic idea behind the microkernel design is:
[A]
All ofthe other choices
[B]
All other modules run as relatively powerless o rdinary user processes
[C]
Only one module runs in kernel mode
[D]
To archive high reliability by splitting operating system up into small, well - defined modules

318. **b** Which of the following conditions that causes the processes to be terminated, when processes have
done their work?
[A]
Fatal error (involuntary)
[B]
Normal exit (voluntary)
[C]
Killed by another process (involuntary)
[D]
Error exit (voluntary)

319. **a** Which of the following is not a CPU scheduling criterion?
[A]
Burst time
[B]
CPU utilization
[C]
Throughput
[D]
Response time

320. **d** How many percent of the CPU time is wasted, when a computer system has enough room to hold two program and these programs are idle waiting for I/O 10% of the time?
[A]
90%
[B]
99%
[C]
None of the other choices
[D]
1 %

321. **c** To specify an address in this segmented memory, the form is used
[A]
<physical address, offset>
[B]
<process, offset>
[C]
<segment-number, offset>
[D]
<virtual address, offset>

322. **d** QN=3
(2537)
Page replacement algorithms determine
a. when the system should update page table entries
b. how many pages should be added to main memory
c. which pages should be brought into memory because a process is likely to reference them soon
d. which page to remove to provide space for an incoming page

323. **a** QN=4
(2530)
The page table for each process maintains:
a. The frame location for each page of the process
b. The page location for each frame of the process
c. The physical memory location of the process
d. None of the above

324. **a** QN=6
(2528)
The second-chance page -replacement algorithm
a. Moves pages found at the head of a FIFO queue with the referenced bit turned on back to the tail of the queue to avoid replacing them
b. Searches through a circular list of pages and replaces the first page it encounters that has the referenced bit turned off
c. Relies on a modified bit to determine which page to replace
d. None of the above

325. **b** QN=9
(2535)
In terms of speed the best method of Dynamic Storage -Allocation is:
a. Next fit
b. First fit
c. Best fit
d. Worst fit

326. **c** QN=10
(2538)
The actual location in main memory is called a(n):
a. Relative address
b. Logical address
c. Absolute address
d. None of the above

327. **a** QN=11
(2539)
LRU replaces the page that has spent the
a. longest time in memory
b. longest time in memory without being referenced
c. shortest time in memory

328. **b** QN=12
(2536)
In a system employing a paging scheme for memory management, wasted space is due to:
a. External fragmentation
b. Internal fragmentation
c. Pages and frames of different specified sizes
d. None of the above

329. **c** QN=13
(2527)
The task of subdividing memory between the OS and processes is performed automatically by the OS and is called
a. Protection
b. Relocation
c. Memory Management
d. All of the above

330. **a** QN=14
(2532)
Which of the following is appropriate to determine program size and create page table?
a. Process creation
b. Process execution
c. Page fault time
d. Process termination time

331. **c** 525)
What is the method to keep track of memory usages?
a. Memory Management with Bit Maps
b. Memory Management with Linked Lists
c. a and b
d. None of the above

332. **d** QN=1
(2548)
The special files a
a. character special
b. block special file
c. Neither a nor b
d. Both a and b

333. **c** QN=3
(2540)
A file is generally defined to be:
a. A basic element of data
b. A collection of related fields
c. A collection of similar records
d. All of the above

334. **d** QN=4 Which of the following is not a path name for the file /etc/passwd
(2546)
a. /etc/passwd
b. /etc/../etc/passwd
c. /etc/../etc/../etc/passwd
d. None of the above

335. **c** QN=7
(2544)
What is incorrect about contiguous allocation of files ?
a. It is simple to implement
b. It leads to excellent read performance
c. It does not cause disk fragmentation
d. It is widely used on CD-ROMs

336. **d** QN=10
(2545)
Which of the following is not correct about hard links and symbolic links?
a. Symbolic links need space to store the name and the file pointed to
b. Hard links do not require extra disk space
c. Symbolic links can point to files in the network
d. Hard links can point to files on other machines

337. **d** QN=2
(2578)
Which of the following I/O software device layers is done by user-level software?
a. Computing the track, sector, and head for a disk read
b. Writing commands to the device registers
c. Checking to see if the user is permitted to use the dev ice
d. Converting binary integers to ASCII for printing

338. **d** QN=3
(2581)
An example of the key differences that can exist across (and even in) classes of I/O devices is:
a. Data rate
b. Data representation
c. Error conditions
d. All of the above

339. **b** QN=6
(2580)
Which of the following is not correct about the reliability of different RAID levels?
a. There is no reliability support in RAID level 0
b. All RAID levels can survive one disk crash
c. In RAID level 2, a single bit error in a word can be detected AND corrected
d. In RAID levels 3, 4, 5 a single bit error in a word can be detected

340. **c** QN=7
(2577)
Which of the following statements is not correct about "device independence"?
a. Files and devices are accessed in the same way, ind ependent of their physical nature
b. A system has to maintain only one set of system calls for both writing on a file and writing on the console
c. Device independence requires all programmers to deal with different devices directly
d. Device independent interfaces should be given to programmers

341. **b** QN=8
(2579)
What kind of I/O devices that disks and tapes belong to?
a. Stream-oriented devices
b. Block-oriented devices
c. Character-oriented devices
d. None of the above

342. **c** QN=9
(2575)
Which of the following statements is incorrect?
a. The term data rate refers to the speed with which data moves to and from the individual I/O device
b. In the interrupt-driven I/O technique, the processor issues an I/O request, continues with other work and eventually receives notification that the request was fulfilled
c. A hard drive is an example of a character-oriented I/O device
d. None of the above

343. **a** QN=10
(2582)
The I/O technique where the processor busy waits for an I/O operation to complete is called:
a. Programmed I/O
b. Interrupt-driven I/O
c. Direct Memory Access (DMA)
d. None of the above

344. **a** QN=1
(2590)
The system is said to be in an unsafe state if
a. The operating system cannot guarantee that all current processes can complete their work
b. The system is deadlocked
c. A process is indefinitely postponed
d. None of the above

345. **a** QN=2
(2584)
If in a resource -allocation graph, each resource type has exactly one instance, which of the following indicate a deadlock situation?
a. The graph has at least one cycle.
b. The graph has no cycle.
c. The graph is connected.
d. The graph is not connected.

346. **a** QN=3
(2583)
All deadlocks involve conflicting needs for resources by
a. One or more processes
b. Two or more processes
c. Three or more processes
d. None of the above

347. **b** QN=4
(2588)
What is the characteristic of deadlocked systems
a. Starvation
b. Circular wait
c. Saturation

348. **b** QN=5
(2586)
A possibility of deadlock can occur:
a. If a system is in safe state
b. If a system is in unsafe state
c. If a system is in instable state
d. None of the above

349. **c** QN=6
(2592)
What is the weakness of the Banker's algorithm?
a. Allowing the population of processes to vary over time
b. Enabling processes to hold their resources indefinitely
c. Requiring that processes state their maximum needs in advance
d. Enabling the number of resources to fluctuate

350. **d** QN=8
(2589)
Which of the following is not a condition necessary for deadlock to exist?
a. mutual-exclusion condition
b. circular-wait condition
c. hold and wait condition
d. preemption condition

351. **d** QN=9
(2591)
Dijkstra's Banker's Algorithm require the system to maintain the resource information for each process, including:
a. A count of the system's total resources
b. The maximum resources that can be requested by the process
c. The number of resources currently acquired by the process
d. B and C

352. **d** N=10
(2585)
If a deadlocked system, the processes can
a. run
b. release resources
c. be awakened
d. do nothing

353. **a** First-come, first- served (FCFS) is a very simple algorithm to implement because it __.
A) uses a FIFO queue
B) uses a LIFO queue
C) uses a circular queue
D) uses a directed graph

354. **c** The Job Scheduler seeks to __, when scheduling jobs.
A) run all CPU intensive jobs first
B) run all I/O intensive jobs first
C) balance CPU and I/O intensive jobs
D) run the quickest jobs first

355. **d** The Process Scheduler assigns the CPU to execute the processes of those jobs placed on the __ queue by the Job Scheduler.
A) WAITING
B) NEXT
C) PROCESS
D) READY

356. **c** In a highly interactive environment there is a third layer of the Processor Manager called the __ scheduler.
A) Managing
B) Subprocess
C) middle- level
D) Program

357. **d** 3/ Which of the following is OS component?
A/ Space Management
B/ Speed Management
C/ Time Management
D/ Process Management

358. **b** 5/ What is interrupt vector?
A/ A signal an I/O devices sends to CPU
B/ Part of memory which contains the addresses of interrupt handlers
C/ None of the above

359. **b** 7/ Which of the following is NOT a correct explanation of UNIX which is one of the OS?
A/ Provides network functions that easily implement distributed processing.
B/ It is a single- user and multi-task OS
C/ Since its specifications have been released to the public and it has a high portability,
it has been adopted in a wide range of devices.
D/ Provides an interactive human interface that uses character- based commands.

360. **c** 9/ what is the value of mode bit in User Mode?
A/ 00
B/ 11
C/1
D/ 0

361. **b** 10/ What is the correct statement about the process of booting a computer?
A/ BIOS loads the operating system immediately into RAM
B/ BIOS detects the boot device, the boot sector determines the active partition, then the boot loader loads the operating system
C/ None of the above

362. **d** 11/ What is the correct about trap instructions and interrupts ?
A/ A trap instruction switch the execution mode of a CPU from the user mode to kernel
mode?
B/ A trap instruction is caused by a user program to invoke functions in the OS kernel
C/ An interrupt is caused by an external event
D/ All of the above

363. **b** 1/ Which of the following is a high-level synchronization primitive?
A/ Semaphores
B/ Monitors
C/ TSL
D/ Nonf of the above

364. **c** 2/ Which of the following is used in mutual exclusion (exclusive control)?
A/ Checkpoint
B/ Semaphore
C/ Contention
D/ Hash

365. **c** 4/ Which of the following preemptive scheduling algorithm?
A/ FCFS
B/ Shortest Job First
C/ Round Robin
D/ None of the above

366. **c** 6/ Which of the following state transitions are illegal?
A/ ready -> running
B/ running -> ready
C/ waiting -> runing
D/ running -> terminated

367. **d** 8/ Which of the following cannot be shared among different threads of a process?
A/ File handless
B/ Process data
C/ Process code
D/ Stack

368. **a** The maximum segment for Process Pentium if the Limit field of Segment Descriptor has Unit of Byte?
A/ 1MB
B/ 1 GB
C/ 4GB
D/ None of the above

369. **d** 4/ A page fault means that we referenced a page?
A/ With an incorrect I/O request
B/ outside the memory boudaries
C/ that was not in secondary storage
D/ that was not in main memory

370. **d** How many levels of Page Tables the Processor Pentium supports:
A/ 3
B/ 1
C/ 4
D/ 2

371. **c** 6/ What is not the technique of implemention for Virtual Memory?
A/ Demand segmentation
B/ Demand partition
C/ Demand paging
D/ All of the above

372. **b** QN=1 (6836) A CPU may have multiple execution units, so that can carry out multiple instructions in the same time is called:
a. Pipeline
b. Superscalar
c. Multicore
d. None of the other choices

373. **c** QN=2 (6843) The four main structural elements of a computer system are:
a. Processor, Registers, I/O Modules, Main Memory
b. Processor, Registers, Main Memory, System Bus
c. Processor, Main Memory, I/O Modules, System Bus
d. None of the other choices

374. **b** QN=3 (6849) Which of the following instructions should be allowed in user mode?
a. Disable all interrupts
b. Read the time-of-day clock
c. Set the time-of-day clock
d. Change the memory map

375. **a** QN=4 (6858) As one proceeds down the memory hierarchy(phân cấp bộ nhớ) (from inboard memory to offline storage), which of the following conditions is correct?
a. Increasing cost per bit
b. Decreasing capacity
c. Increasing access time
d. None of the other choices

376. **c** QN=7 (6883) What is the main characteristic of real-time operating system?
a. Multiple CPU
b. Time-sharing
c. Time is key parameter
d. Many I/O devices

377. **c** QN=8 (6898) What is not correct about system calls?
a. A system call allows a user process to assess and execute operating system functions inside the kernel.
b. User programs use system calls to invoke operating system services
c. In terms of performance, using system calls is better than using procedure calls
d. Every system call involves overhead due to context switch

378. **d** QN=9 (6903) Which of the following is a task of process management of OS?
a. Process creation and deletion.
b. Process suspension and resume
c. Provision of mechanisms for process synchronization, Interprocess communication, Prevent or avoid deadlock
d. All of the other choices

379. **d** QN=10 (6909) A simple structuring model for monolithic system includes:
a. A main program that invokes the requested service procedure
b. A set of service procedures that carry out the system calls
c. A set of utility procedures that help the service procedures
d. All of the other choices

380. **c** QN=11 (6925) What is the "sequential processes" concept?
a. There are both many CPU and many PC
b. All process is executed in concurrency
c. No concurrency inside a process; everything happens sequentially
d. None of the other choices

381. **c** QN=12 (6941) Which of the following process state transitions is correct, when the external event for which a process was waiting happens?
a. Running -> Blocked (waiting)
b. Running -> ready
c. Blocked (waiting) -> ready
d. Ready -> running

382. **b** QN=13 (6948) How many percent of the CPU time is wasted, when a computer system has enough room to hold two program and these programs are idle waiting for I/O half the time?
a. 50%
b. 25%
c. 75%
d. None of the other choices

383. **c** QN=14 (6956) How many ways is Thread implemented?
a. 1
b. 2
c. 3
d. None of the other choice

384. **a** QN=15 (6963) Critical Region (Section) concept used in interprocess communication is:
a. A part of the program where the shared memory is accessed
b. A part of shared data
c. A part of shared memory
d. None of the other choices

385. **a** QN=16 (6969) Which of the following statements is a hardware solution to the critical region problem?
a. TSL
b. Shared memory
c. Semaphore
d. None of the other choices

386. **d** QN=17 (6978) Which of the following is true about Atomic action on semaphores?
a. Checking the value
b. Changing the value
c. Possibly going to sleep
d. All of the other choices

387. **a** QN=18 (6987) Which of the following statements is true about hardware solution to the critical region problem?
a. Disable Interrupts
b. Monitors
c. Semaphore
d. None of the other choices

388. **a** QN=19 (6991) What is the purpose of CPU scheduling algorithms?
a. Pick one of the ready processes to run next
b. Put to sleep and wake up processes in an efficient manner
c. Allocate memory to the processes in a fair and efficient way
d. None of the other choices

389. **b** QN=20 (6999) The first-come, first-served (FCFS) algorithm is fine for most ___ systems
a. Interactive
b. Batch
c. Real time
d. Multiuser

390. **b** QN=21 (7007) Five batch jobs A through E, arrive at a computer center at almost the same time. They have estimated running times of 8, 6, 2, 10, and 4 minutes. Determine the average waiting time for SJF (Shortest job first) scheduling. Ignore process switching overhead.
a. 14 minutes
b. 8 minutes
c. 6 minutes
d. 18.8 minutes

391. **c** QN=22 (7015) Assume jobs A-D arrive in quick succession in the READY queue. Using round robin scheduling (quantum=4), the turnaround time for job D is ___.
Arrival time: 0 1 2 3
Job: A B C D
CPU cycle: 8 4 9 5
a. 7
b. 20
c. 22
d. 24

392. **a** QN=23 (7021) Which of following is true about cache in the memory hierarchy?
a. Small amount of fast expensive memory
b. Some medium-speed medium price
c. Gigabytes of slow cheap memory
d. None of the other choices

393. **c** QN=24 (7029) Which of the following is a method to keep track of memory usages?
a. Memory Management with Bit Maps
b. Memory Management with Linked Lists
c. Both Memory Management with Bit Maps and Memory Management with Linked Lists
d. None of the other choices

394. **d** QN=26 (7042) One of the most important innovations of demand paging was that it made ___ feasible
a. Memory demand
b. Virtual demand
c. Virtual paging
d. Virtual memory.

395. **d** QN=27 (7048) Which of these statements about the Inverted Page Table are true?
a. An entry contains the pair (process, virtual page) mapped into the corresponding page frame
b. An entry contains the pair (process, offset) mapped into the corresponding page frame
c. An entry contains the pair (segment, virtual page) mapped into the corresponding page frame
d. An entry contains the pair (segment, offset) mapped into the corresponding page frame

396. **d** QN=28 (7057) If there are 64 pages and the page size is 2048 words, what is the length of logical address?
a. 14 bits
b. 15 bits
c. 16 bits
d. 17 bits

397. **c** QN=29 (7065) A system with 32 bit virtual address. If the page size is 4 KB and each table entry occupies 4 bytes, what is the size of the page table?
a. 1 MB
b. 2 MB
c. 4 MB
d. 8 MB

398. **c** QN=30 (7072) Which of the following statements is incorrect about Translation Look-aside Buffer (TLB)?
a. A TLB is sometimes known as an associative memory
b. Each entry of a TLB contains the information about one page, including the virtual page number and the corresponding page frame
c. A TLB miss implies a disk operation will follow
d. None of the other choices

399. **b** QN=31 (7080) Working set model is used for:
a. Finding the minimum number of frames necessary for a job so that jobs can be run without "thrashing"
b. Finding the average number of frames a job will need to run smoothly
c. Determining whether page replacement is needed
d. All of the other choices

400. **c** QN=32 (7086) Which is not true about the method of backing store: "Paging to a static swap area"?
a. The swap area on the disk is as large as the process virtual address space
b. Calculating the address in swap area requires knowing only where the process' paging area begins
c. Requires a disk map in memory
d. A page that is in memory always have shadow copy on disk

401. **d** QN=33 (7092) Which of the following statements about segmentation is false?
a. There are several linear address spaces
b. The total address space can be more than the size of physical memory
c. Sharing of procedures between different users can be facilitated
d. None of the other choices

402. **c** QN=34 (7406) A ___ is a group of related records that contains information to be used by specific application programs to generate reports.
a. Field
b. Record group
c. File
d. Directory

403. **d** QN=35 (7413) File Structure can be:
a. Byte sequence
b. Record sequence
c. Tree
d. All of the other choices

404. **a** QN=36 (7421) ___ is a specialized WRITE command for existing data files that allows for adding records to end of the file.
a. APPEND
b. UPDATE
c. REWRITE
d. MODIFY

405. **d** QN=37 (7428) Which are allocation methods of disk blocks for files?
a. Contiguous allocation
b. Linked allocation
c. Indexed allocation
d. All of the other choices

406. **c** QN=38 (7437) Disk can be divided up into one or more partitions. The first block of every partition is called:
a. Free block
b. MBR
c. Boot block
d. Super block

407. **c** QN=39 (7442) The Linking technique that allows the file to appear in more than one directory are:
a. Hard link
b. Symbolic link
c. Both hard link and symbolic link
d. Soft link

408. **a** QN=40 (7449) Which mechanism is implemented by writing to the log file with the purpose of file system management and optimization?
a. Journaling File Systems
b. Log-Structured File Systems
c. Virtual File Systems
d. None of the other choices

409. **b** QN=41 (7454) The File Manager writes the volume name and other descriptive information on an easy-to-access place on each unit: ___ of the CD or DVD
a. The outermost part
b. The innermost part
c. Immediately following the master file directory
d. Stored at the beginning of the volume

410. **a** QN=42 (7464) Which is the maximum partition size, if the FAT type is FAT-32 and the block size is 4 KB?
a. 1 TB
b. 128 MB
c. 256 MB
d. 512 MB

411. **d** QN=43 (7475) The main classes of I/O devices are:
a. Stream devices
b. Block devices
c. Character devices
d. Block devices and Character devices

412. **d** QN=44 (7485) Which of the following statements about the task of device controller of I/O devices is correct?
a. Convert serial bit stream to block of bytes
b. Perform error correction as necessary
c. Make available to main memory
d. All of the other choices

413. **d** QN=45 (7489) Which approach is used in order to CPU communicate with the control registers of the I/O device?
a. Separating I/O and memory space
b. Memory-mapped I/O
c. Hybrid: separating I/O and memory space and memory-mapped I/O
d. All of the other choices

414. **c** QN=46 (7495) Which of the following statements is not correct about DMA?
a. DMA controller has access to the system bus independent of the CPU
b. DMA helps reduce the number of interrupts (in comparison with interrupt-driven I/O)
c. DMA controller is usually faster than CPU
d. The operating system can only use DMA if the hardware has a DMA controller

415. **a** QN=47 (7502) An interrupt that leaves the machine in well-defined state is called a(n) ____
a. Precise interrupt
b. Imprecise interrupt
c. Required interrupt
d. Disappointed interrupt

416. **c** QN=48 (7507) Which of the following statements is not correct about "device independence"?
a. Files and devices are accessed in the same way, independent of their physical nature
b. A system has to maintain only one set of system calls for both writing on a file and writing on the console
c. Device independence requires all programmers to deal with different devices directly
d. Device independent interfaces should be given to programmers

417. **d** QN=49 (7514) Which is the right order between the 4 I/O software layers?
a. User-level I/O software, Device drivers, Interrupt handlers, Device-independent OS software
b. User-level I/O software, Interrupt handlers, Device drivers, Device-independent OS software
c. Device-independent OS software, user-level I/O software, Device drivers, Interrupt handlers
d. User-level I/O software, Device-independent OS software, Device drivers, Interrupt handlers

418. **c** QN=50 (7523) Each device attached to your computer comes with a special program called a _____ that facilitates the communication between the device and the OS.
a. device configurator
b. translator
c. device driver
d. communication utility

419. **c** QN=51 (7528) In a fixed magnetic disk, each circle is called a ___.
a. sector
b. block
c. track
d. platter

420. **a** QN=52 (7541) What is a "stripping" in RAID?
a. Distributing data over multiple drives
b. Take away possessions from someone
c. Get undressed
d. All of the other choices

421. **d** QN=53 (7549) A operation concerning Stable Storage is:
a. Stable writes
b. Stable Reads
c. Crash recovery
d. All of the other choices

422. **d** QN=54 (7576) If a system is deadlocked, no processes can
a. run
b. release resources
c. be awakened
d. All of the other choices

423. **b** QN=55 (7581) ___ is when each process involved in the impasse is waiting for another to voluntarily release the resource so that at least one will be able to continue on.
a. Mutual-exclusion condition
b. Circular-wait condition
c. Hold and wait condition
d. No preemption condition

424. **b** QN=57 (7593) The permanent blocking of a set of processes that compete for system resources is called
a. Starvation
b. Deadlock
c. Prioritization
d. None of the other choices

425. **b** QN=59 (7619) Which deadlock condition does "Request all resources initially" attack?
a. Mutual exclusion
b. Hold and wait
c. No preemption
d. Circular-wait condition

426. **d** QN=60 (7624) What is the correct approach with the "No preemption condition" to prevent Deadlock?
a. Order resources numerically
b. Request all resources initially
c. Spool everything
d. Take resources away

427. **c** QN=1 (6840) Which of special register contains the Mode Bit (user or kernel)?
a. Instruction Register (IR)
b. Program Counter (PC)
c. Program Status Word (PSW)
d. None of the other choices

428. **b** QN=2 (6847) Which of main bus in the IBM PC computer, that can run at 66 MHz and transfer 8 bytes at a time?
a. ISA (Industry Standard Architecture)
b. PCI (Peripheral Component Interconnect)
c. ISA and PCI
d. None of the other choices

429. **d** QN=3 (6855) Booting a general purpose computer involves the following steps except
a. Execution of a ROM-based POST sequence
b. Loading one or more bootstrap loaders
c. Loading the OS
d. Loading the command interpreter

430. **b** QN=4 (6860) Which of the following statements about Random Access memory (RAM) is correct?
a. Is typically faster than cache memory
b. Is volatile
c. Can only be read sequentially
d. Stores all the files on the computer

431. **c** QN=5 (6867) Which of the following statements is incorrect about the CMOS?
a. Is volatile
b. To hold the current time and date
c. To contain BIOS
d. To hold the configuration parameters

432. **d** QN=6 (6873) Which is not an example of a resource that is commonly time-multiplexed?
a. Network interface
b. CPU
c. Graphics accelerator
d. Main memory

433. **b** QN=7 (6888) A well-known Embedded operating system is:
a. TinyOS
b. QNX and VxWork
c. Symbian OS and Palm OS
d. e-COS

434. **a** QN=8 (6899) A(n) _____ is provided to make system calls from some programming languages
a. procedure library
b. operator
c. pointer
d. None of the other choices

435. **d** QN=9 (6908) The major operating system services provide mechanisms for secure and efficient are:
a. Communication between processes
b. File manipulation
c. Execution of a program, I/O operations performed by it, and detecting and reporting errors caused by it
d. All of the other choices

436. **c** QN=10 (6912) Which of the following is correct about the advantages of layered system?
a. Easier to extend
b. Easier to debug from lower to upper layer
c. Easier to extend and Easier to debug from lower to upper layer
d. None of the other choices

437. **a** QN=11 (6931) OS Win32 use system call___, while OS Unix use system call____ to create a new process
a. CreateProcess; fork
b. fork, CreateProcess
c. copy, CreateProcess
d. CreateProcess; copy

438. **d** QN=12 (6944) Which of the following process state transitions is illegal?
a. Running -> Blocked (waiting)
b. Running -> ready
c. Blocked (waiting) -> ready
d. Ready -> Blocked (waiting)

439. **c** QN=13 (6951) How many percent is CPU utilization, when a computer system has enough room to hold two program and these programs are idle waiting for I/O half the time?
a. 50%
b. 25%
c. 75%

440. **a** QN=14 (6959) An arrival message causes the system to create a new thread to handle this message. This new thread is call____
a. Pop-up
b. Upcall
c. Activator
d. Distributed

441. **a** QN=15 (6966) Which conditions of mutual exclusion does the Lock Variables (Software proposal) violate?
a. No two processes simultaneously in critical region
b. No assumptions made about speeds or numbers of CPUs
c. No process running outside its critical region may block another process
d. No process must wait forever to enter its critical region

442. **a** QN=16 (6973) In order to implement mutual exclusion on a critical resource for competing processes, only one program at a time should be allowed:
a. In the critical region of the program
b. To perform message passing
c. To exhibit cooperation
d. None of the other choices

443. **a** QN=17 (6984) Semaphores that are initialized to 1 and used for two or more processes to ensure only one can enter its critical section at the same time are called:
a. Binary semaphores
b. Integer semaphores
c. Counter semaphores
d. None of the other choices

444. **c** QN=18 (6988) Which cannot be able to solve the race condition?
a. TSL
b. Shared memory
c. Semaphore
d. Monitor

445. **d** QN=19 (6994) Which is not a goal of a scheduling algorithm for batch systems?
a. CPU utilization
b. Throughput
c. Turnaround time
d. Response time

446. **c** QN=20 (7002) Some systems increase the priority of jobs that have been in the system for an unusually long time to expedite their exit, which is known as __.?
a. Lagging
b. Bumping
c. Aging
d. Accelerated priority

447. **d** QN=21 (7011) Five batch jobs A through E, arrive at a computer center at almost the same time. They have estimated running times of 8, 6, 2, 10, and 4 minutes. Their (externally determined) priorities are 3, 5, 2, 1, and 4, respectively, with 5 being the highest priority. Determine the average turnaround time for priority scheduling. Ignore process switching overhead.
a. 6 minutes
b. 12.8 minutes
c. 18.8 minutes
d. 16.8 minutes

448. **c** QN=22 (7017) Assume jobs A-D arrive at almost the same time in the READY queue. Determine the average turnaround time for SJF scheduling. Ignore process switching overhead

Job: A B C D
CPU cycle: 5 2 6 4
a. 5.5
b. 6.8
c. 9.0
d. 11.1

449. **b** QN=23 (7028) With paging, when is the internal fragmentation possible?
a. Page does not fit the frame
b. The last page of the job is less than the maximum page size
c. The virtual memory assigned to the program is less than the physical memory assigned to it
d. Such thing cannot happen

450. **b** QN=24 (7033) Which of these statements about the algorithm "Next fit" is true?
a. Memory Manager scans along the list of segments until it finds a hole that is big enough.
b. Memory Manager starting searching the list of segments from the place where it left off last time.
c. Memory Manager searches the entire list of segments from beginning to end and take smallest hole that is adequate.
d. None of the other choices

451. **b** QN=25 (7041) Assume the Memory Manager receives a request for a block of 200. When the worst-fit algorithm is used, ___ is the beginning address of the block granted by the Memory Manager.
Beginning Address Memory Block Size
4075 105
5225 5
6785 600
7560 20
7600 205
10250 4050
a. 7600
b. 10250
c. 6785
d. 4075

452. **b** QN=26 (7045) When a virtual memory system manages memory in fixed length units, which of the following terms correctly represents its unit?
a. Frame
b. Page
c. Block
d. Segment

453. **c** QN=28 (7061) Suppose a virtual address space of 2^32 words and the page size is 2^12 words. If the virtual address is 12345678 in Hexadecimal, what would be the page number in Hexadecimal?
a. 123
b. 1234
c. 12345
d. 123456

454. **c** QN=29 (7068) A computer with a 32-bit address uses a two-level page table. Virtual addresses are split into a 10-bit top-level page table field, an 12-bit second-level page table field, and an offset. How large are the pages?
a. 4-KB page
b. 2-KB page
c. 1-KB page
d. 512B page

455. **c** QN=30 (7077) The __ policy is based on the theory that the best page to remove is the one that has been in memory the longest
a. NRU
b. LRU
c. FIFO
d. LIFO

456. **c** QN=31 (7081) When there is an excessive amount of page swapping between main memory and secondary storage, the operation becomes inefficient, which is called __.
a. excessive demand paging
b. hot swapping
c. thrashing
d. Over swapping

457. **b** QN=32 (7089) In terms of main memory efficiency the method of "Backing up pages dynamically" in comparison with the method of "Paging to a static swap area" is
a. Better
b. Worse
c. Equal
d. Nearly equal

458. **b** QN=33 (7408) Which of the following is specified to indicate the directory where the file is located?
a. Extension
b. Path name
c. Root directory
d. Sub-directory

459. **d** QN=34 (7417) Which of the following file structure is widely used on large mainframe computers?
a. Byte sequence
b. Record sequence
c. Ring
d. Tree

460. **c** QN=36 (7430) Which of the following allocation methods the i-nodes use?
a. Contiguous allocation
b. Linked allocation
c. Indexed allocation
d. Linked allocation using FAT

461. **d** QN=37 (7438) The disk block in a partition that includes a magic number, the number of blocks in the file system and other key administrative information is called:
a. Free block
b. MBR
c. Boot block
d. Superblock

462. **b** QN=38 (7444) Which of the following is correct about symbolic links?
a. Symbolic links need not space to store the path name
b. Symbolic links can only point to files on the same machines
c. Symbolic links can point to files in the network
d. None of the other choices

463. **d** QN=39 (7450) Increasing file system performance is implemented by ___
a. Buffer cache
b. Block Read Ahead
c. Defragmenting Disks
d. All of the other choices

464. **b** QN=40 (7456) Which of the following is true about the block size in disk space management
a. The larger the block size is the lower the data rate is
b. The larger the block size is the worse the disk space utilization is
c. The larger the block size is lesser the disk space is
d. None of the other choices

465. **b** QN=41 (7477) Which class of I/O devices that disks and tapes belong to?
a. Stream devices
b. Block devices
c. Character devices
d. None of the other choices

466. **c** QN=43 (7493) In general, which is the best technique for I/O Data transfer?
a. Programmed I/O
b. Interrupt-Driven I/O
c. Direct Memory Access
d. None of the other choices

467. **d** QN=44 (7498) DMA operations require the following information from the processor
a. Address of I/O device
b. Starting memory location to read from and write to
c. Number of words to be read or written
d. All of the other choices

468. **a** QN=45 (7504) What is the table where its entry contains the memory address of Interrupt service routine
a. Interrupt vector table
b. Interrupt table
c. Address table
d. Address lines table

469. **a** QN=46 (7510) Imagine that a certain printer can print 400 characters per second and that the time to write a character to the printer's output register is so short it can be ignored. If to run this printer using interrupt-driven I/O and each character printed requires an interrupt that takes 50 μsec all-in to service. How many percent of the CPU does the interrupt overhead cost?
a. 2% of the CPU
b. 98% of the CPU
c. 4% of the CPU
d. 96% of the CPU

470. **b** QN=47 (7518) Which of the following I/O software do Device drivers do?
a. Converting binary integers to ASCII for printing
b. Writing commands to the device registers
c. Checking to see if the user is permitted to use the device
d. None of the other choices

471. **d** Which is not a component of general structure of device drivers?
a. Checking the input parameters to see if they are valid
b. Checking if the device is currently in use
c. Writing command sequence into controller's device registers
d. Checking to see if the user is permitted to use the device

472. **a** QN=49 (7531) Of the three components of access time in a disk, ___ is the longest
a. Seek time
b. Search time
c. Transfer time
d. Delay time