

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

[page frame] for [each page]

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 : *khả thi*

Memory demand  
 Virtual demand  
 Virtual paging  
Virtual memory.

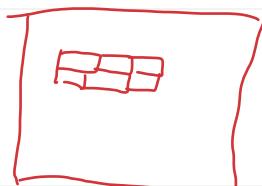
8. c Which of the following statements is incorrect about Translation Look-aside Buffer (TLB)?

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
- *Largest + hole.*
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
- *first fit.*  
 → *next fit.*  
 ↗ *best fit.*
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  
**chia nhé**  
 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** → *by enough!*  
 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. a 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 ; phân vùng

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

10.8 minutes

A	8	0
B	6	8
C	2	14
D	10	16
E	4	26

A	8	0
B	6	8
C	2	14
D	10	16
E	4	26

WT

$$0 + 8 + 14 + 16 + 26 = 68$$

$$= 13.6$$

Burst time

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

10.8 minutes

Process	BT	Priority
A	8	3
B	6	5
C	2	6
D	10	1
E	4	4

Priority

5

4

3

2

1

4

B	0
E	4
C	6
A	10
D	18

WT.

$$\rightarrow AWT = \frac{0+6+10+18}{5}$$

$$= 10.8$$

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

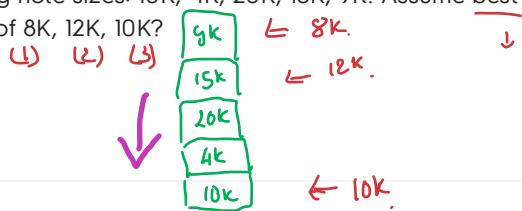
27. c Consider a swapping system in which the memory consists of the following hole sizes: 10K, 4K, 20K, 15K, 9K. Assume best fit algorithm is used. Which holes are taken for successive segment requests of 8K, 12K, 10K?

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.  $\rightarrow$  first

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

Largest  $\rightarrow$  worst!

$\hookrightarrow$  best fit.

extremely large  $\rightarrow$  quiet fit

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?

$$\begin{array}{l} \text{123 } vp = va \\ \text{1234 } (\text{virtual } \rightarrow \text{page size } s) \\ \text{12345 } \text{ page } p_a = (d + s) + d \rightarrow \text{page offset} \\ \text{123456 } \text{ physical address } p_a \text{ page frame.} \end{array}$$

$$\begin{aligned} va &= 1133046 \\ s &= 2^{12} \\ vp &= 2^{24} \\ d &=? \end{aligned}$$

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 without being referenced  
 :      LRU: Least recently used!

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	A: 8	C: 0	$\rightarrow$ <i>lên queuing FCFS nhung phai sorted la'</i>
8 minutes	B: 6	E: 2	
6 minutes	C: 2	D: 6	
18.8 minutes	D: 10	A: 8	
	F: 4	P: 10	

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

last page < maximum page size  $\Rightarrow$  internal fragmentation

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

a 7600

b 10250

c 6785

d 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 block

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 → cho phép file dùng các region lưu trữ có sẵn trên ổ đĩa.  
Add-on storage
81. C Question #31 (1 point)  
Strategy used for dumping a disk to tapes is:  
Physical dump  
Logical dump ↳ điểm vào bảng  
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

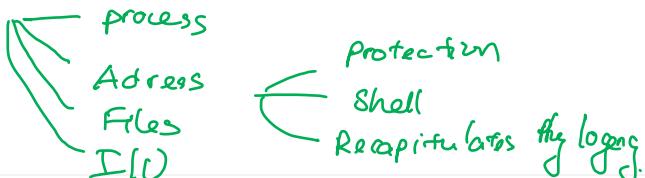
96. **B** Question #46 (1 point) *→ right*  
Which part of a disk is used to boot the computer?  
Free block  
**MBR**  
Root block  
Super block
97. **B** Question #47 (1 point)  
Which solution is used to solve the "missing block" problem for file system consistency?  
The file system checker rebuilds the free list  
The file system checker adds the missing blocks to the free list  
The file system checker allocates 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? OS:  
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 — print working directory.  
d) ls

115. b Which command can be used to list all file (include hidden files) inside current directory?

- a) ls \*
- b) ls -a *list all : 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~~ *making*
- b) dir
- c) cp *directory*
- 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~~ *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~~ *head!*

121. c : The \_\_\_ command will list all working processes?

- a) ls
- b) jobs
- c) ps *: processing states*
- 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 → waiting
- b. running → ready → ready → running
- 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 at 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

hardware



Interrupt handlers



Device drivers

Device - independent OS software

User-level I/O Software

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 call 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 signal
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] *chọn nh? th?i!*
- 10K, 15K, 20K
- [B] 10K, 20K, 15K
- [C] 9K, 15K, 10K
- [D] 20K, 15K, 10K
- 8K → chọn 8K  
12K → chọn 15K. (vì 15 < 20)  
10K → chọn 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.

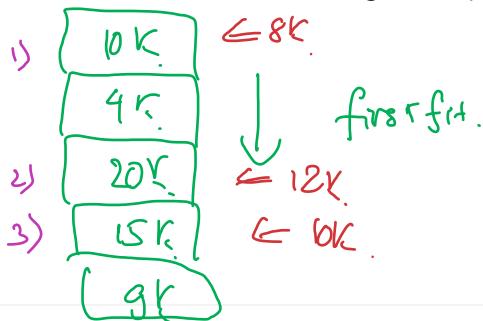
- [A] subprocess
- [B] ~~thread~~
- [C] program
- [D] Mini-process

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?

~ enough .



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 will 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 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
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) *→ running → 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 of the 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 scheduling 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] OSs 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 usec 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 carried 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 involve 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 The 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 If 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

274. a Operations on semaphores 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 referenced

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

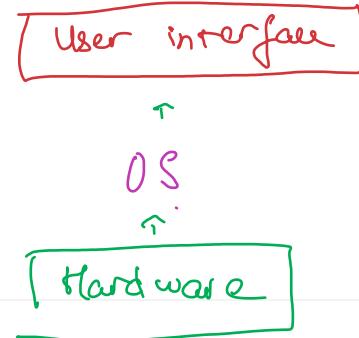
B) redirection

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      *-> first generation*  
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) kernel
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 of the 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 book has 1000 pages, each with 50 lines of 80 characters each. How long it will take to electronically scan the text for 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

[D]

1 msec. 10 msec. 5 sec

317. d The basic idea behind the microkernel design is:

[A]

All of the other choices

[B]

All other modules run as relatively powerless ordinary user processes

[C]

Only one module runs in kernel mode

[D]

To achieve high reliability by splitting operating system up into small well-defined modules

318. b Which of the following conditions 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

"Micro kernel design"  
split. ↗  
Operating System

↓  
Kernel

cpu scheduling

320. d How many percent of the CPU time is wasted, when a computer system has enough room to hold two programs 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:
- External fragmentation
  - Internal fragmentation
  - Pages and frames of different specified sizes
  - 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

- Protection
- Relocation
- Memory Management
- All of the above

330. a QN=14  
(2532)

Which of the following is appropriate to determine program size and create page table?

- Process creation
- Process execution
- Page fault time
- Process termination time

331. c 525)

What is the method to keep track of memory usages?

- Memory Management with Bit Maps
- Memory Management with Linked Lists
- a and b
- None of the above

332. d QN=1  
(2548)

The special files a

- character special
- block special file
- Neither a nor b
- Both a and b

333. c QN=3  
(2540)

A file is generally defined to be:

- A basic element of data
- A collection of related fields
- A collection of similar records
- All of the above

334. d QN=4 Which of the following is not a path name for the file /etc/passwd  
(2546)

- /etc/passwd
- /etc/..etc/passwd
- /etc/..etc/..etc/passwd
- 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 X
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 device  
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, 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 X  
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

*Eager.*      1  
                2  
                3      *middle - level.*

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 handles  
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 boundaries  
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 implementation 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 access 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 programs 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 *→ TSL*  
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 File - 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) APPEND 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 X  
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 → spoil everyone  
b. Hold and wait → request all resources initially  
c. No preemption → Take resources away  
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 CreateProcess, while OS Unix use system call fork to create a new process  
a. CreateProcess; fork  
b. fork, CreateProcess  
c. copy, CreateProcess  
d. CreateProcess; copy  
*CreateProcess*      *fork*
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 Pop-up.  
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

→ Page

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
- Back up < Swap
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 pusec 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
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