

靜宜大學 97 學年度碩士班招生考試試題

系所：資訊工程系、資訊管理系 科目：計算機概論

共 4 頁

- 答案寫在答案卷，試卷含單選 20 題，填充 15 題，簡答 6 題，請先核對試卷是否完整。
- 考試不可以使用字典及計算器、手機等電子儀器。

A. 單選題：選出最恰當的答案，每一題 2 分，答錯不倒扣

1. The process of _____ arranges the disk surface into addressable areas and additionally sets up the basic directory tree structure of the disk.
(1) Partitioning (2) Time Slicing (3) Booting (4) Formatting
2. If a bit pattern represents an unsigned number, a _____ operation divides the number by two.
(1) NOT (2) XOR (3) Left-shift (4) Right-shift
3. Which of the following instructions could be allowed in user mode?
(1) Disable all interrupts (2) Change the memory map
(3) Read the time-of-day clock (4) Set the time-of-day clock.
4. Select correct one from the following statements:
(1) Nonvolatile storage loses its contents when the power to the device is removed.
(2) In a hierarchical storage structure, the same data can not appear in different levels of the storage system.
(3) The FCFS scheduling algorithm is nonpreemptive.
(4) The SJF scheduling algorithm is not provably optimal.
5. If LRU (Least Recently Used) page replacement is used with four page frame and eight pages, how many page faults will occur with the reference string 0173427102 if the four frames are initially empty?
(1) 6 (2) 7 (3) 8 (4) 9
6. Which of the following circuit types is used to create SRAM?
(1) Decoder (2) Flip-flop (3) LCD (4) ROM
7. How do you represent the number -57 in 8 bits using two's complement?
(1) 000111 (2) 11000111 (3) 00000110 (4) 11100000
8. For the following operations
A. $11000010 + 00111111$ B. $00000010 + 00111111$
C. $11000010 + 11111111$ D. $00000010 + 11111111$
Please choose the most suitable answer from the following selections that do not create overflow if the number and the result are represented in 8-bit two's complement notation.
(1) A, B (2) A, B, C (3) B, C, D (4) A, B, C, D
9. To flip all the bits of a bit pattern, make a mask of all 1s and then _____ (a logical operation) the bit pattern and the mask.
(1) AND (2) OR (3) XOR (4) NOT

10. If the memory address space is 16 MB and the word size is 8 bits, then how many bits are needed to access each word?
 (1) 8 (2) 16 (3) 24 (4) 32
11. The only language understood by computer hardware is a _____ language.
 (1) high-level (2) assembly (3) machine (4) natural
12. Which of the following standards is used in wireless networking?
 (1) Cat 5 (2) ISO/OSI (3) 802.11 (4) TCP
13. _____ uses glass and light to transmit signals.
 (1) Twisted pair (2) Coaxial cable (3) Fiber-optical cable (4) None of the above
14. In the OSI model, the _____ layer changes bits into electromagnetic signals.
 (1) physical (2) data link (3) transport (4) application
15. The _____ assembles precompiled units from different sources into an executable program.
 (1) preprocessor (2) linker (3) loader (4) text editor
16. An FILO list is a(n) _____.
 (1) queue (2) stack (3) list (4) pointer
17. In a binary tree, no node can have more than _____ children.
 (1) 1 (2) 2 (3) 3 (4) 4
18. Which of the following protocols makes the Web possible?
 (1) FTP (2) Telnet (3) O.S. (4) HTTP
19. Besides the SMTP (Simple Mail Transfer Protocol), to receive and keep emails, we need another protocol which is _____.
 (1) POP (2) FTP (3) HTTP (4) PPP
20. TCP/IP is the protocol of _____.
 (1) Ethernet (2) LAN (3) the Internet (4) browsers

B、填充題：每一格 2 分，共 30 分

1. Show the number, +7.1875 (in decimal), in 32-bit IEEE format. _____ (in hexadecimal)
2. High-speed _____ memory located between Registers and Main Memory is used to speed processing in a computer system to avoid having to retrieve instruction and data from the slower-speed system DRAM.
3. In which of the following situations does an overflow never occur? (答案請直接使用代號，否則不予計分)
 A. adding two positive integers.
 B. adding one positive integer to a negative integer.
 C. subtracting one positive integer from a negative integer.
 D. subtracting two negative integers.
4. A computer uses memory-mapped I/O addressing. The address bus uses 10 lines (10bits). If memory

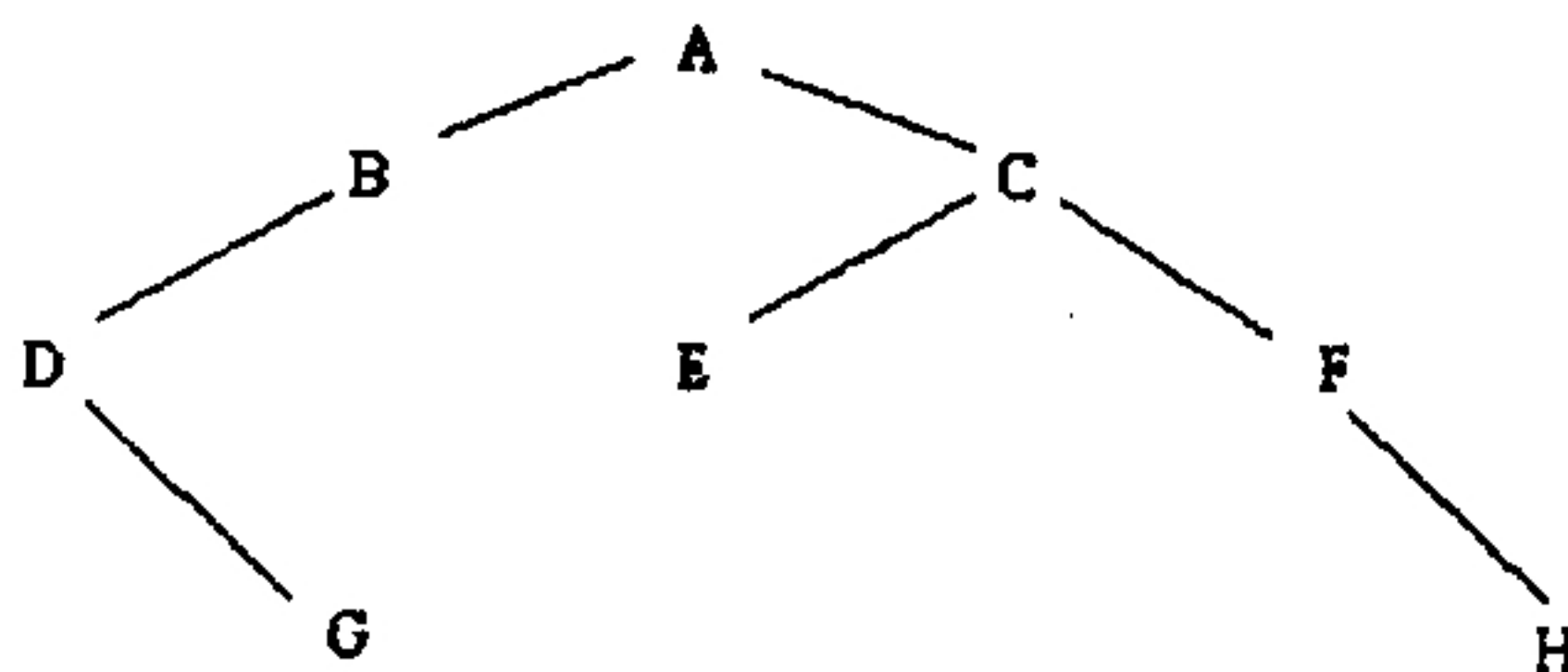
is made of 1000 words, how many four-register controllers can be accessed by this computer? _____

5. In the _____ method to synchronize the operation of the CPU with I/O device, a large block of data can be passed from an I/O device to memory directly.
6. The ASCII code of digit "1" is x31 (in hexadecimal), the ASCII code of digit "7" is _____ (in binary).
7. How many bits does the Unicode contain? _____
8. _____ (Hint: a kind of Operating Systems) is used in the Packet PC and other compatible PDAs.
9. The cycle time of Machine M1 is 4ns, we say that the clock rate of this machine is _____ HZ.
10. The MIPS of M1 is 20, then M1 can execute _____ instructions in 10 seconds.
11. The second layer of the OSI model organizes bits into logical data units called _____.

■ (12-13 題) Given a two-dimensional array, $A[0..4][0..4]$, and column-major storage is used to represent this array. Each element occupies one memory location. Answer the following questions:

12. We assume that the memory location of element $A[0][0]$ is 800, the memory location of $A[3][2]$ is _____.
13. The memory location 823 represents element _____.

■ (14-15 題) Given the following binary tree



14. The in-order traversal of the tree is _____
15. The pre-order traversal of the tree is _____

C、簡答題：共 30 分

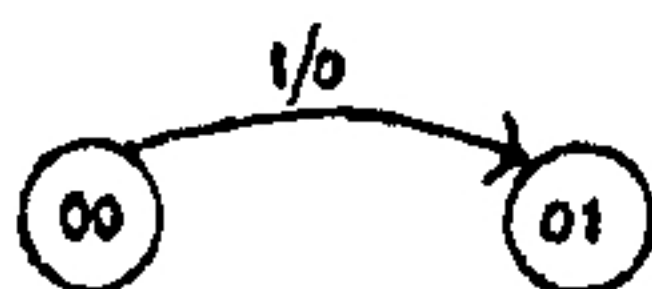
1. A gray scale picture is digitized using eight different gray levels. If the picture is composed of 100×100 pixels, how many bits are needed to represent the picture? (請書寫計算過程，否則不予計分)(2 分)
2. The advertised average seek time for a typical disk is 20ms, the transfer rate is 2 MB/second, the rotation speed is 6000 RPM (rotates per minute). (請書寫計算過程，否則不予計分)(每一小題 3 分，共 9 分)
 - (a) What is the average rotation latency for this typical disk?
 - (b) What is the average access time for this typical disk?
 - (c) What is the total time in average to read or write a 512-byte sector?

3. Show the result (represented in hexadecimal) of the following operations: (請書寫計算過程，否則不予計分) (每一小題 1 分，共 4 分)
- (a) $x99 \text{ OR } (\text{NOT } x00)$ (b) $(x99 \text{ OR } x33) \text{ AND } (x00 \text{ OR } xFF)$
(c) $\text{NOT } (x99 \text{ OR } x99)$ (d) $(x99 \text{ AND } x33) \text{ OR } (x00 \text{ AND } xFF)$
4. If A is an $m \times r$ matrix and B is $r \times n$ matrix, the number of scalar multiplications involved in computing the product AB is mnr . Count the minimum number of scalar multiplications of $A*B*C$, where A is a $20*20$ matrix, B is a $20*30$ matrix, and C is a $30*10$ matrix. (請書寫計算過程，否則不予計分) (5 分)
5. Given the old master file and the transaction file, find the new master file. If there is any error, create an error file too. (5 分)

Old Master File		
10	John	20.0
13	Wu	19.0
16	Tea	17.8
18	Chen	12.2
19	Lie	22.3
22	Lin	18.4
25	King	30.0
27	Queen	11.1

Transaction File			
Add	9	Tom	20.0
Delete	12		
Add	21	Kid	17.0
Update	27	Sue	

6. Given the following state table, draw its corresponding state diagram. (5 分)



Hint: represents "state 00 ($A=0, B=0$) to state 01 ($A=0, B=1$), with input $X=1$ and output $Y=0$ ".

Present state		Next state		Output	
		$X = 0$	$X = 1$	$X = 0$	$X = 1$
A	B	A	B	Y	Y
0	0	0	0	0	0
0	1	0	0	1	0
1	0	0	0	1	0
1	1	0	0	1	0