

系所組別： 工程科學系在職專班甲組

考試科目： 計算機概論（專班）

考試日期：0307，節次：3

※ 考生請注意：本試題 可 不可 使用計算機**I. Answer True (o) or False (x) for each of the following statements (30%)**

Note: You will get 2 points for each correct answer, but -1 (minus one) point for each incorrect answer. No answer and get no point.

1. The medium access control method used in Ethernet is CSMA/CD.
2. The unit of information transferred across a data link is called a frame.
3. Error rate is the ratio of the average number of bits that will be corrupted to the total number of bits that are transmitted for a data link of system.
4. Control token is an example of MAC procedure.
5. A language about language is called grammar.
6. A RAM is a memory device that a user can't alter its content.
7. A prefix computation can be defined in terms of any binary operator.
8. Kruskal's algorithm for finding a minimum spanning tree of a weighted, undirected graph is an example of a dynamic programming algorithm.
9. The binary search tree on n integer keys in the range from 1 to n^2 can be constructed in $O(n)$ worst-case time.
10. The $(\log_2 n)$ th smallest number of an unsorted numbers can be determined in $O(n)$ worst-case time.
11. By solving the sorting problem with $n - element$ via building a heap and then extracting n elements takes time $\Omega(n \log_2 n)$ in the worst case.
12. LRU policy is the best page-replacement policy as compared with LFU and FIFO.
13. RSA is a symmetric key encryption technology used to encrypt data transmitted over the Internet.
14. For the C program

```
#include <stdio.h>
main() { int  a=2, b=3, c=4; printf("%d\n", a & b | c)}
```

The output is 3.
15. The following program segment is correctly designed to compute the product of two nonnegative integers X and Y by accumulating the sum of X copies of Y .

```
Product ← Y;
Count ← 1;
while (Count < X) do
    Product ← Product + Y;
    Count ← Count + 1
```

(背面仍有題目,請繼續作答)

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1. The name given to the equipment provided by the network authority for the attachment of user devices to the network.
2. The number of line signal variations per second.
3. A particular operating mode of a transmission line: each binary digit in a message is converted into one of two voltage levels.
4. A device used to link two sub-networks utilizing the same physical and medium access control method.
5. The application protocol used in TCP/IP suite for mapping the host name into its corresponding IP address.
6. The application protocol used in TCP/IP suite that provides access to a networked file server.
7. A FIFO storage structure.
8. A pictorial representation of the grammatical structure of a string.
9. A popular database model used structural unit with rows and columns.
10. When a computer turned on it is the first program to be executed.

Answers pool: (a) DNS (b) queue (c) bootstrap (d) parse tree (e) router (f) stack (g) broad band (h) relation (i) DTE (j) FTP (k) IP (l) gateway (m) bridge (n) base band (o) baud (p) DCE (q) synchronization (r) SQL (s) handshaking (t) loader (u) record (v) string graph (w) NAS

III. Select "all" of the correct answers for each of the following problems. (30%)*Note: You will get 2 points if "all" of the correct answers chosen, otherwise you will get -1 (minus one) point. No answer and get no point.*

1. Multitasking in a computer with only one CPU is executed by a technique called (a) overlapping; (b) spooling; (c) time sharing; (d) batch processing; (e) bootstrapping.
2. Which of the following is not associated with object-oriented programming? (a) polymorphism; (b) encapsulation; (c) inheritance; (d) resolution; (e) none of the above.
3. In 1's complement representation, the integer value 0 (base on 10) can be represented as (a) 11111111; (b) 10000000; (c) 00000000; (d) 11000000; (e) all of the above.
4. Which of the following is in the CPU of a computer? (a) program counter; (b) instruction register; (c) L1 cache memory; (d) arithmetic and logic unit; (e) all of the above.
5. What are the properties of an AVL tree? (a) binary search tree; (b) all leaves are located at the same level; (c) binary tree; (d) the insertion complexity is $O(\log_2 n)$; (e) none of the above.

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6. Which is the way for solving collision in hashing operation? (a) separate chaining; (b) double hashing; (c) rearrange the items in an existing hash table; (d) put the inserted item at a random location of the hash table; (e) none of the above.
7. Which of the following operation is true for a queue? (a) can be accessed random and sequential; (b) FIFO; (c) can be implemented by linked list; (d) used in call/return of functions; (e) all of the above.
8. Which one is not the control structure used in a structured program? (a) sequence; (b) repetition; (c) selection; (d) jump; (e) loop.
9. Which one is not a function of operating system? (a) process scheduling; (b) spooling; (c) time and date management; (d) compiling program; (e) none of the above.
10. Collection of links, content, and services presented on a Web page, designed to guide users to information. (a) POS; (b) portal; (c) AUP; (d) portable; (e) POP.
11. The type of information exchange strategy between two communicating devices whereby information can be exchanged in both directions alternatively is called (a) full-duplex; (b) half-duplex; (c) simplex; (d) duplex; (e) all of the above.
12. The layer 5 of the ISO reference model for open system interconnection is (a) physical layer; (b) presentation layer; (c) session layer; (d) application layer; (e) transport layer.
13. The connectionless transport layer protocol in the TCP/IP suite is called (a) PDU; (b) PTT; (c) PSTN; (d) UDP; (e) TCP.
14. The application protocol in a TCP/IP suite used to send and retrieve management-related information across a TCP/IP network is called (a) SPF; (b) SMTP; (c) SNMP; (d) QoS; (e) SAP.
15. Which one is not used for the detection of errors when data is being transmitted? (a) parity check; (b) CRC; (c) FCS; (d) FDM; (e) checksum.

IV. Answer each of the following problems briefly. (20%)

1. What is the difference between system requirements and system specification? (5%)
2. What is a relocatable module, and how does its relocatable feature simplify the task of a loader? (5%)
3. The AND, OR, and NOT gates are used to form universal gates. Verify that the NAND and NOR gates are also universal gates. (5%)
4. A binary tree with its inorder list and postorder list are GBIFDEHALJKC and GIFBHELKJCAD, respectively. Show the binary tree. (5%)