

國立臺北科技大學

105 學年第一學期電機系博士班資格考試

計算機概論(大學部)試題

第一頁 共四頁

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注意事項：

1. 本試題共【24】題，配分共 100 分。
2. 請按順序標明題號作答，不必抄題。
3. 全部答案均須答在試卷答案欄內，否則不予計分。
4. 考試時間：二小時。

一、選擇題：60% (共 20 題，每題 3 分)

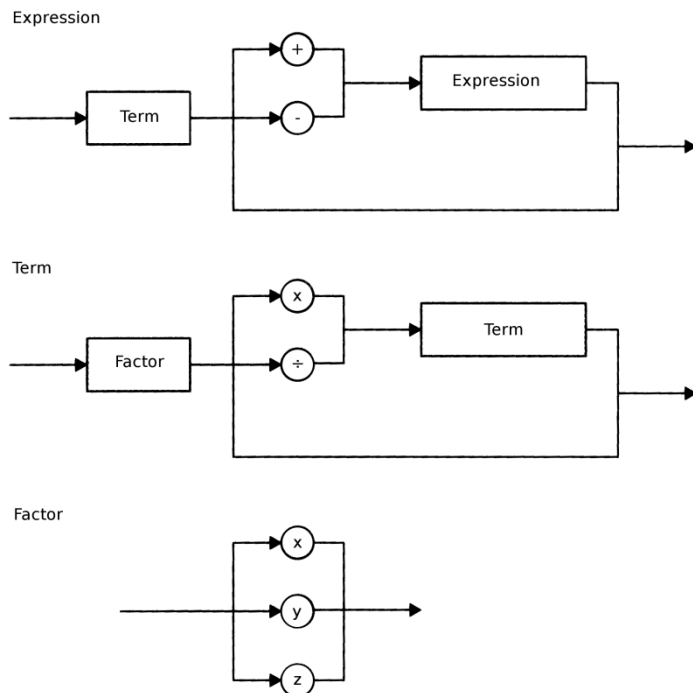
1. If the number of nodes in a binary tree is $2n$ (where n is a positive integer), then the entire tree would contain at least
(A) 2^{n+1} nodes (B) $2^{n+1} - 1$ nodes (C) 2^{2n} nodes (D) 2^{n+2} nodes
2. Which of the following is a LIFO structure?
(A) Tree (B) Queue (C) Array (D) Stack
3. Which of the following is **NOT** associated with object-oriented programming?
(A) Polymorphism (B) Inheritance (C) Resolution (D) Encapsulation
4. In which of the following locations is information most readily available for manipulation by the CPU?
(A) Cache (B) Mass storage (C) General-purpose registers (D) Main memory
5. Which of the following is a means of defining similar yet different classes in an object-oriented program?
(A) Code optimization (B) Parsing (C) Coercion (D) Inheritance
6. Which of the following instructions does **NOT** fall in the category of arithmetic/logic instructions?
(A) JUMP (B) OR (C) ROTATE (D) ADD
7. Most machine languages are based on the

- (A) Declarative paradigm (B) Functional paradigm (C) Object-oriented paradigm
(D) Imperative paradigm
8. When searching within the list
Lewis, Maurice, Nathan, Oliver, Pat, Quincy, Roger, Stan, Tom
which of the following entries will be found most quickly using the binary search algorithm?
(A) Lewis (B) Pat (C) Tom (D) Nathan (E) Roger
9. Which of the following lists would **NOT** be obtained at some point when applying the insertion sort algorithm to the list below?
Sylvia
Nancy
Lois
Alice
(A) Nancy (B) Alice (C) Alice (D) Lois
Sylvia Lois Sylvia Nancy
Lois Nancy Nancy Sylvia
Alice Sylvia Lois Alice
10. Suppose a binary tree contained the nodes W , X , Y , and Z . If W and X were children of Y , and Z had no children, which node would be the root?
(A) W (B) X (C) Y (D) Z
11. Which of the following is **NOT** a means of locating an entry in a linked storage structure?
(A) Root pointer (B) NIL pointer (C) Child pointer (D) Head pointer
12. Which layer of the TCP/IP hierarchy chops messages into units whose size is compatible with the Internet?
(A) Link (B) Network (C) Application (D) Transport
13. The primary purpose of which of the following is **NOT** the enhancement of security?
(A) Encryption (B) ICANN (C) CERT (D) Firewall
14. Which of the following is used to translate domain name to IP address?
(A) File server (B) Mail server (C) Name server (D) FTP server
15. Which of the following is **NOT** a way of classifying networks?
(A) Router versus bridge (B) Star versus bus
(C) Closed versus open (D) WAN versus LAN
16. Which of the following function is **NOT** contained in BIOS(basic input/output system)?
(A) Load kernel from mass storage
(B) Detect hardware error
(C) Keep computer time accurately
(D) Manage memory usage
17. Which of the following is **NOT** a role of a typical operating system?

- (A) Assist the computer user in the task of processing digital photographs
 - (B) Maintain records regarding files stored in mass storage
 - (C) Control the allocation of the machine's resources
 - (D) Control access to the machine
18. Copyright laws were established
- (A) to allow authors to distribute their work while maintaining certain ownership rights.
 - (B) to allow authors to maintain ownership of their ideas.
 - (C) to restrict access to publications to certain groups within societies.
 - (D) to allow ideas to be traced back to their origins.
19. In order to locate and receive documents on the world wide web, each document is given a unique address called
- (A) HTML (B) URL (C) IP address (D) HTTP
20. Which of the following components of an operating system is **NOT** part of the kernel?
- (A) Scheduler (B) Memory manager (C) Shell (D) Dispatcher (E) Device driver

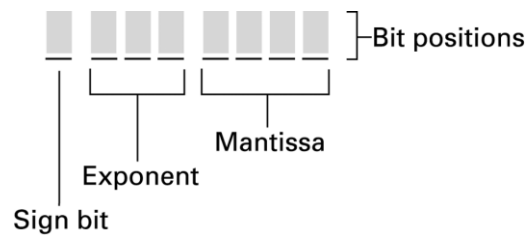
二、問答題：40%（共4題）

1. (10%) Draw a parse tree for the expression $x + y \times z$ based on the following syntax diagrams.



2. (10%) The eight-bit floating-point format is described as follows. The leftmost bit is the sign bit. The next three bits are the exponent field and the remaining four bits are the mantissa field. Both are encoded in BCD code and the negative numbers are represented in two's complement.

- (a) The square root of 2 is 1.41421356. What is the best approximation to the square root of 2 that can be expressed in the eight-bit floating-point format? What value is actually obtained if this approximation is squared by a machine using this floating-point format? (5%)
- (b) Perform the addition on 11110101 and 11101100 and give the result in base-ten representation. (5%)



3. (10%) Design a C/C++ **recursive** function for printing a linked list backwards. Indicate a case as an example to explain your function.
4. (10%) When software is divided into manageable units, generally called modules, the design of modules should consider coupling, cohesion, and information hiding. Define coupling, cohesion, and information hiding.

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