

國立屏東教育大學 97 學年度研究所碩士班
入學考試

計算機概論 試題

(資訊科學系碩士班)

- ※請注意：1.本試題共四頁。
2.答案須寫在答案卷，否則不予計分。

一、選擇題

(①單選 25 題，每題 2 分，共 50 分)

(②答錯倒扣壹分，最高扣 50 分，不答不倒扣)

1. In which of the following addition problems (using two's complement notation) does an overflow error occur?
A.
$$\begin{array}{r} 0011 \\ + 1010 \\ \hline \end{array}$$
 B.
$$\begin{array}{r} 0100 \\ + 0100 \\ \hline \end{array}$$
 C.
$$\begin{array}{r} 1100 \\ + 1100 \\ \hline \end{array}$$
2. Which of the following mass storage system does not require physical motion?
A. Magnetic tape B. Magnetic disk C. DVDs D. Flash drives
3. Which of the following systems is least efficient when encoding numeric values?
A. Two's complement notation B. Excess notation C. ASCII
D. Floating-point notation
4. Which of the following is not contained in a CPU?
A. Instruction register B. Program counter C. General-purpose register
D. Memory cell
5. Which of the following is not an activity performed entirely within a CPU?
A. Fetch instructions B. Perform Boolean operations

- C. Perform arithmetic operations D. Move data between registers
6. Which of the following is not a role of a typical operating system?
A. Control the allocation of the machine's resources
B. Control access to the machine
C. Maintain records regarding files stored in mass storage
D. Assist the computer user in the task of processing digital photographs
7. Which of the following is not a means of obtaining a form of multitasking?
A. Pipeling B. Time sharing C. Virtual memory D. Multiple processors
8. Which of the following statements is true?
A. Allowing several processes to share time in a multitasking system is less efficient than executing each of them to completion one after the other.
B. The use of passwords provides an impenetrable safeguard.
C. Both A and B
D. Neither A nor B
9. Which of the following is not a means of connecting networks?
A. Switch B. Server C. Router D. Bridge
10. Which layer of the TCP/IP hierarchy presents incoming messages to the computer user?
A. Application B. Transport C. Network D. Link
11. Which layer of the TCP/IP hierarchy is responsible for obtaining the correct address for a message's destination?
A. Application B. Transport C. Network D. Link
12. 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 sequential search algorithm?
A. Lewis B. Pat C. Tom
13. Under the assumption that X takes on only integer values, which of the following is the termination condition for the following loop?
repeat (. . .)
until (X < 5)

A. $X < 5$ B. $X > 4$ C. $X > 5$

14. Which of the following is an example of a language that is based on the object-oriented paradigm?

A. LISP B. PROLOG C. C D. C++

15. Which of the following is the scope of a variable?

- A. The number of characters in the variable's name
- B. The portion of the program in which the variable can be accessed
- C. The type associated with the variable
- D. The structure associated with the variable

16. Which of the following is a means of controlling the complexity of a software system?

A. CRC cards B. Modularity C. Specifications D. Beta testing

17. If a class diagram indicates a one-to-one relationship between class X and class Y, then

- A. there will be only one object in the system of "type" X.
- B. each object of "type" X will be associated with only one object of "type" Y.
- C. there will be exactly one object of "type" X and exactly one object of "type" Y.
- D. an object of "type" Y cannot occur without first constructing an object of "type" X.

18. If the two-dimensional array X were stored in row-major order, then in the block of main memory containing X, which of the following would be true?

- A. The entry $X[1,2]$ would appear before $X[2,1]$.
- B. The entry $X[1,2]$ would appear after $X[2,1]$.
- C. The entry $X[1,2]$ would be in the same location as $X[2,1]$.
- D. None of the above

19. If a stack contained the entries w, x, y, z (from top to bottom), which of the following would be the contents after two entries were removed and the entry r was inserted?

A. w, x, r B. y, z, r C. r, y, z D. r, w, x

20. The table below represents a portion of a computer's main memory containing a binary tree stored row by row in a contiguous block as described in the chapter. What is the parent of the node Z?

| Address | Contents |
|---------|----------|
| 50 | T |
| 51 | U |
| 52 | V |
| 53 | W |
| 54 | X |
| 55 | Y |
| 56 | Z |

A. T B. U C. V D. Y

21. Given the relation X below

| X: | <u>A</u> | <u>B</u> | <u>C</u> |
|----|----------|----------|----------|
| | 2 | 5 | 7 |
| | 3 | 3 | 3 |
| | 4 | 3 | 2 |
| | 5 | 2 | 8 |

what value will be extracted by the following query?

TEMP ← SELECT from X where B > C

RESULT ← PROJECT A from TEMP

A. 2 B. 3 C. 4 D. 5

22. In an artificial neural network, which of the Boolean operations AND, OR, and XOR can a single processing unit with two inputs be programmed to compute?

A. AND only B. OR only C. XOR only D. AND and OR only

23. At what "stage" of analysis is the meaning of the word ball in the following sentence determined?

A. Syntactic analysis B. Semantic analysis C. Contextual analysis

24. Turing machines represent

A. an effort to define the limits of algorithmic systems.

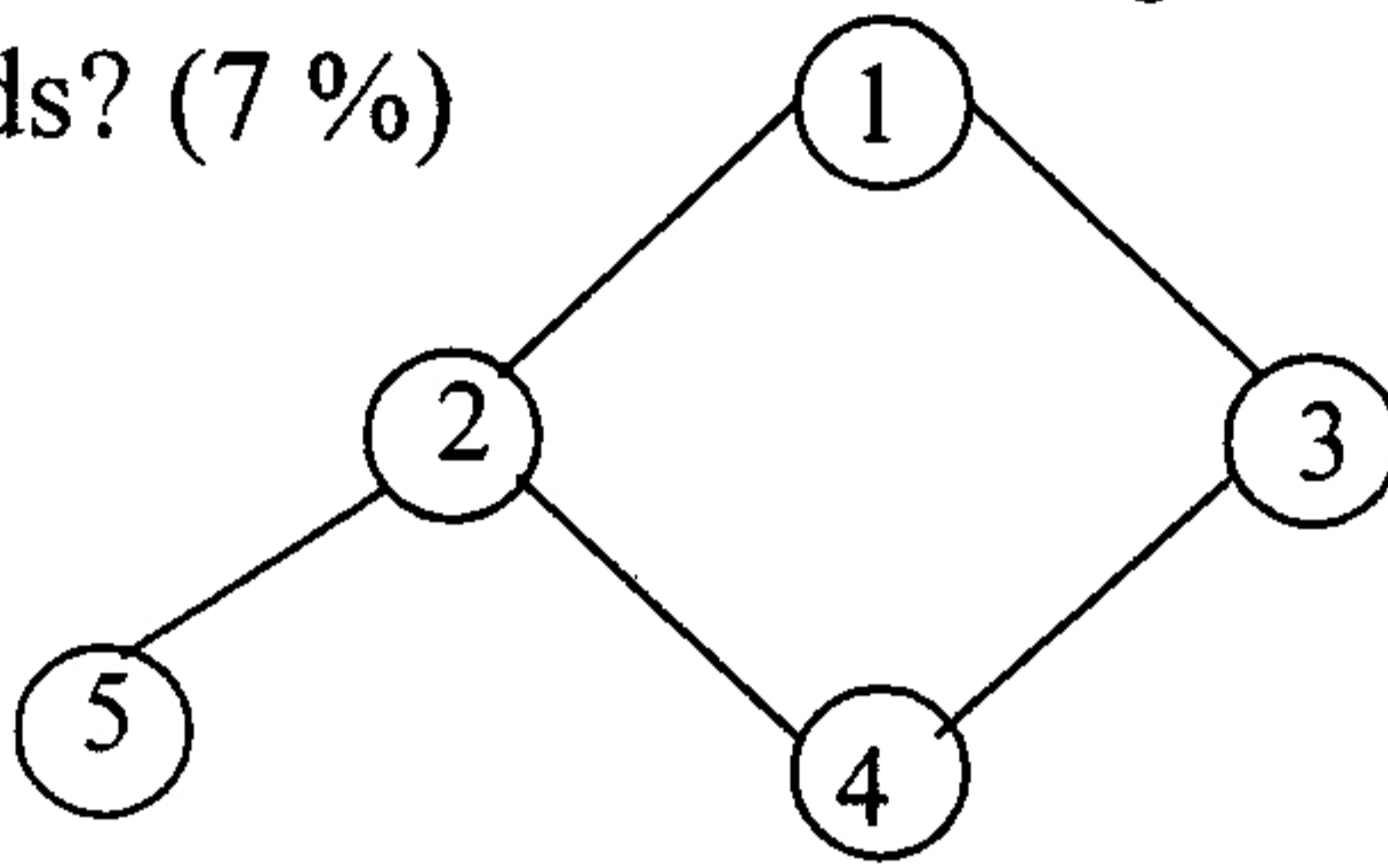
- B. a class of machines that can compute very little.
 - C. a class of machines that are now out of date and no longer important.
 - D. a class of machines that can compute all functions.
25. The precise time complexity of which of the following problems has not yet been established by researchers?
- A. Sorting a list
 - B. Searching through a list for a particular entry
 - C. The traveling salesman problem
 - D. Listing all possible subcommittees within a given committee

二、問答題（共 50 分）

1. Given the following graph,

(1) How to represent the graph by an adjacency matrix and by adjacency lists? (8%)

(2) What are the advantages and disadvantages of using these two representation methods? (7 %)



2. Explain how to implement two stacks in one array $A[n]$ in such a way that neither stack overflows unless the total number of elements in both stacks together is n . The PUSH and POP operations should run in $O(1)$ time. (20%)

3. A binary tree has 6 nodes. The inorder and preorder traversals of the tree are CEBDAF and ABCEDF respectively. Draw the binary tree. (15%)