

國立臺北科技大學

一百學年第二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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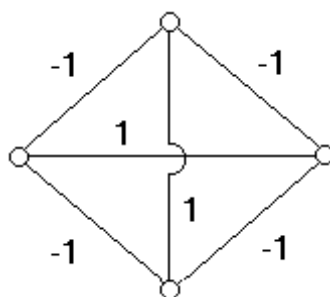
注意事項：

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. How many different symbols can be encoded using Unicode?
(A) 256 (B) 4,096 (C) 65,536 (D) 1,046,476
2. Which of the following data storage systems provides the most efficient random access to individual data items?
(A) Main memory (B) Magnetic disk (C) Optical CDs (D) Tape
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 items of information would **NOT** be contained in an operating system's process table?
(A) The location of the memory area assigned to the process
(B) The priority of each process
(C) Whether the process is ready or waiting
(D) The machine language instructions being executed by the process
5. 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 society.

- (D) to allow ideas to be traced back to their origins.
6. 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 be in the same location as $X[2,1]$.
 - (B) The entry $X[1,2]$ would appear after $X[2,1]$.
 - (C) The entry $X[1,2]$ would appear before $X[2,1]$.
 - (D) None of the above
 7. What is the time complexity of the problem of sorting a list?
 - (A) $\Theta(\lg n)$ (B) $\Theta(n)$ (C) $\Theta(n \lg n)$ (D) $\Theta(n^2)$
 8. Which of the following algorithms represents an optimal solution (in terms of time complexity) for sorting a list?
 - (A) Insertion sort (B) Bubble sort (C) Selection sort (D) Merge sort
 9. Which of the following statements is false?
 - (A) If a problem can be solved by a Bare Bones program, then it can be solved by a Turing machine.
 - (B) If a problem can be solved by a Turing machine, then it can be solved by a Bare Bones program.
 - (C) The halting problem cannot be solved by a Bare Bones program.
 - (D) The halting problem can be solved only by using a universal programming language.
 10. A memory system that is able to provide related information is called
 - (A) Read-only memory (ROM) (B) Associative memory
 - (C) An artificial neural network (D) Main memory
 11. The diagram below represents an associative memory. If each unit has a threshold value of 0.5, what stable state will the system reach if it is initiated with the top and bottom units excited and the others inhibited?



- (A) All units excited (B) Only the side units excited
 - (C) No units excited (D) Only the top and bottom units excited
12. Which of the following programming methodologies seeks to develop software by a “trial and error” approach?
 - (A) Object-oriented programming (B) Structured programming
 - (C) Evolutionary programming (D) Declarative programming

13. Which of the following connects existing networks to form an internet?
 (A) Bridge (B) Repeater (C) Switch (D) Router
14. The primary purpose of which of the following is **NOT** the enhancement of security?
 (A) ICANN (B) Firewall (C) Encryption (D) CERT
15. Which layer of the TCP/IP hierarchy chops messages into units whose size is compatible with the Internet?
 (A) Application (B) Transport (C) Network (D) Link
16. Given the two relations X and Y below

X:	<u>A</u>	<u>B</u>	Y:	<u>C</u>	<u>D</u>
	7	s		t	3
	2	z		r	2

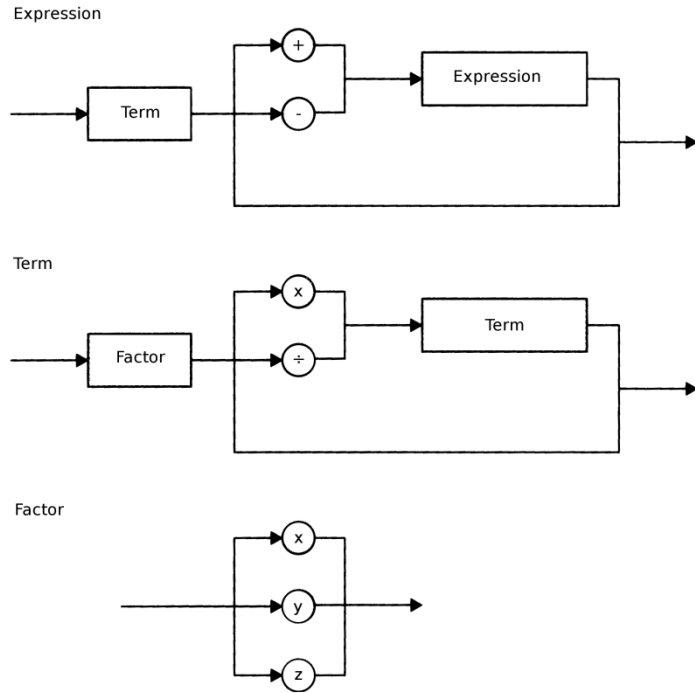
what value would be retrieved by executing the following SQL statement?

```
select Y.C
from X, Y
where X.A < Y.D
```

- (A) s (B) z (C) t (D) r
17. Which of the following is not a potential problem caused by multiple transactions manipulating a database at the same time?
 (A) Lost update problem (B) Clustering (C) Deadlock (D) Incorrect summary problem
18. 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
19. Which of the following is a technique for controlling access to a critical region?
 (A) Spooling (B) Time sharing (C) Semaphore (D) Booting
20. Suppose you were going to retrieve items of data that you would later need to process in the opposite order from that in which they were retrieved. Which of the following would be the best structure in which to store the items?
 (A) Traditional linked list (B) Stack (C) Queue (D) Tree

二、問答題：40%（共4題，每題10分）

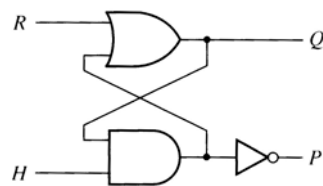
1. (10%) Draw a parse tree for the expression $x \div y - z$ based on the following syntax diagrams.



2. (10%) Draw a circle the portion of the following URL below that identifies the directory containing the file being addressed. Underline the portion that identifies the protocol that should be used when accessing the file. Draw a rectangle around the portion that identifies the file name itself. Identify the domain name of the web server.

<http://www.ee.ntut.edu.tw/rule/index.php>

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%) A latch can be constructed from an OR gate, an AND gate, and an inverter connected as follows:



Construct a next-state table and derive the characteristic (next-state) equation for the latch.

(本試題結束)