國 立 臺 北 科 技 大 學

九十九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

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：50%（共 20 題，每題 2.5 分）

1. In which of the following locations is information most readily available for manipulation by the CPU?

   (A) General-purpose registers　(B) Cache　(C) Main memory　(D) Mass storage

2. Which of the following instructions does **NOT** fall in the category of arithmetic/logic instructions?

   (A) ROTATE　　(B) ADD　　(C) OR　　(D) JUMP

3. Which of the following is a LIFO structure?

   (A) Array　　　(B) Stack　　　(C) Queue　　　(D) Tree

4. Which of the following is static in the sense that it does not change size or shape as information is stored and retrieved?

   (A) Array　　(B) Stack　　(C) Queue　　(D) Tree

5. 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

6. 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^{2n} nodes　　(C) 2^{n+1} - 1 nodes　　(D) 2^{n+2} nodes

7. 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.

8. Which of the following is an example of a language that is based on the functional paradigm?

   (A) LISP　　　　(B) PROLOG　　　　(C) C　　　(D) Java

9. Which of the following is **NOT** associated with object-oriented programming?

   (A) Inheritance　　(B) Resolution　　(C) Encapsulation　　(D) Polymorphism

10. 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

11. 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

12. The binary search algorithm is an example of an algorithm in which of the following classes?

(A) $\Theta(n \lg n)$ (B) $\Theta(n)$ (C) $\Theta(\lg n)$ (D) $\Theta(n^2)$

13. Which of the following is **NOT** correct IP address?

(A) 10.6.147.39   (B) 192.168.252.3   (C) 140.123.40256   (D) 7.7.22

14. Which of the following connects existing networks to form an internet?

(A) Bridge   (B) Repeater   (C) Switch   (D) Router

15. The primary purpose of which of the following is **NOT** the enhancement of security?

(A) ICANN   (B) Firewall   (C) Encryption   (D) CERT

16. 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

17. Which of the following is a technique for controlling access to a critical region?

(A) Spooling   (B) Time sharing   (C) Semaphore   (D) Booting

18. 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

19. Which of the following is **NOT** involved in a context switch?

(A) Interrupt   (B) Process table   (C) Shell   (D) Dispatcher

20. Which of the following statements is true?

(A) Allowing several processes to share time in a multiprogramming 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 not B

二、問答題：50%（共 4 題）

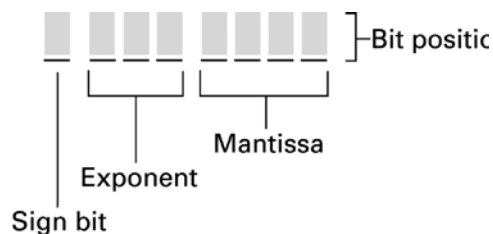1. (15%) What will the following C++ program output?

```cpp
#include <iostream>
using namespace std;
void fun(int, int, int);
int main()
{
    int a = 1, b = 2, c = 3;
    fun(a, b, c);
    cout << "The values of a, b, and c ";
    cout << "are: " << a << " " << b << " " << c << endl;
    return 0;
}
void fun(int c, int b, int a)
{
    cout << "The values of a, b, and c within the function ";
    cout << "are: " << a << " " << b << " " << c << endl;
    a=a+3;
    b=b+2;
    c++;
}
```

2. (10%) Convert the following decimal numbers into binary format
   (a) (5%) $(-3.6875)_{10}$
   (b) (5%) $(0.46875)_{10}$
   using the eight bit floating-point format presented as follows. The exponent is presented as 2's complement system. Identify these cases if truncation errors occur or not. Show your derivation in detail.

3. (15%) Derive a **recursive function** in C or C++ to compute and return n factorial defined as: $n! = n * (n-1) * (n-2) * \ldots * 2 * 1$

4. (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

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