系級	資訊科學系碩士班	考試時間	100 分鐘
科目	計算機概論	本科總分	100 分

第一部分： 選擇題 （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 　　 E. None of the above.

2. Which of the following is not contained in a CPU?

   A. Instruction register 　　　 B. Program counter

   C. General-purpose register 　 D. Memory cell 　 E. None of the above.

3. Which of the following components of an operating system is not part of the kernel?

   A. Shell 　　　　　　 B. File manager 　　　　 C. Scheduler

   D. Memory manager 　 E. None of the above.

4. Ethernet is a means of implementing which of the following network topologies?

   A. Star 　　 B. Ring 　　 C. Bus 　　 D. Irregular 　 E. None of the above.

5. Which of the following describes only the portion of a database available to a particular user?

   A. Database model 　 B. Schema 　 C. Subschema

   D. DBMS 　　　　　 E. None of the above.

6. Which layer of the TCP/IP hierarchy decides the direction in which message segments are transferred across the Internet?

   　 A. Application 　　 B. Transport 　 C. Network 　 D. Link 　　 E. None of the above.

7. 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	E. None of the above.
Sylvia	Lois	Sylvia	Nancy	
Lois	Nancy	Nancy	Sylvia	
Alice	Sylvia	Lois	Alice	

背面尚有試題

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8. Most machine languages are based on the
   A. Imperative paradigm　　　B. Declarative paradigm
   C. Functional paradigm　　　D. Object-oriented paradigm
   E. None of the above.

9. Which of the following is not associated with object-oriented programming?
   A. Inheritance　　　B. Resolution　　　C. Encapsulation
   D. Polymorphism　　　E. None of the above.

10. 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[3,1] would appear before X[2,1].
    D. The entry X[1,2] would be in the same location as X[2,1].
    E. None of the above

11. Which of the following is not a true statement?
    A. Memory-mapped I/O refers the technique of communicating with peripheral devices as though they were memory cells.
    B. The part of a machine instruction that identifies the basic operation to be performed is op-code.
    C. The process of fetching and executing instructions that is repeated over and over by the CPU is machine cycle.
    D. Bandwidth refers to a communication path's maximum capacity for transferring data.
    E. All of the above statements are true.

12. Which of the following is not a true statement?
    A. Registers are cells in CPU for temporary storage of information.
    B. The register that contains the address of the next instruction to be executed is instruction register.
    C. ALU performs arithmetic and logical operations.
    D. A bit means a binary digit.
    E. All of the above statements are true.　　　~續下頁~

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13. Which of the following is the prefix form of the expression (A+B)*C-D/E

   A. *+ABC-/DE   B. *AB+CD/-E

   C. -+AB*C/DE   D. -*+ABC/DE   E. None of the above.

14. The following table represents a stack stored in a contiguous block of memory cells. If the base of the stack is at address 10 and the stack pointer contains the value 13. After two pop operations, what value is in the stack pointer?

Address	Contents
10	F
11	C
12	A
13	B
14	E

   A. 13   B. 14   C. 12   D. 11   E. None of the above.

15. What is the printout of the following program?

   A. 2   3   B. 2   4   C. 3   2   D. 3   3   E. None of the above.

```
void what(int *x, int y)
{
    if(*x > y)
        *x++;
    else y++;
}

void main()
{
  int a,b;
  a=2; b=3;
  what(&a, b);
  printf("%d %d\n", a,b);
}
```
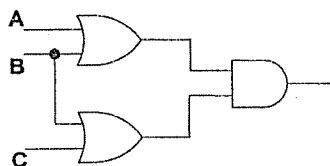
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背面尚有試題

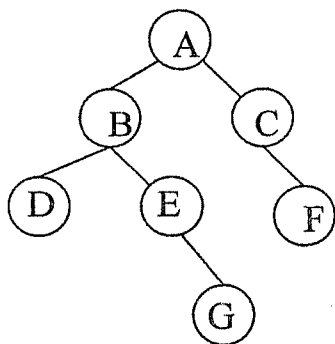| 系級	資訊科學系碩士班	考試時間	100 分鐘
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第二部分：簡答題

1. Show the behavior of the following circuit with a truth table. (10 分)

2. Decode the bit pattern 11001000 as   (10 分)

   a)   Two's complement notation.

   b)   A 8 bits floating-point format as following:

   bit 7--Sign bit

   bit 4-6 --- Exponent(hint: excess notation, e.g.100_2 represents 0_{10})

   bit 0-3 --- Mantissa

3. Write the preorder, inorder and postorder traversal sequence of the following binary tree. (9分)

4. Write a complete program (in Java or C) to input a number x and output the result of the function as following: (20 分)

$$f(x) = 1 + \frac{x}{1!} + \frac{x^2}{2!} + \frac{x^3}{3!} + \frac{x^4}{4!} + \cdots + \frac{x^k}{k!} \qquad until\ \frac{x^k}{k!} < 10^{-5}$$

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5. For the following two C functions test1( ) and test2( ), suppose we apply both the input value 1. What is the difference in the printed output of the two routines? （6分）

```c
void test1(int count)
{
    if(count < 5){
        printf(" %d\n", count);
        test1(count+1);
        }
}

void test2(int count)
{
    if(count <5){
        test2(count+1);
        printf(" %d\n", count);
        }
}
```