國立臺北科技大學 100 學年度碩士班招生考試

系所組別：2150 電機工程系碩士班戊組

第一節　計算機概論　試題

注意事項：

1.本試題分二部份，共 16 題，配分共 100 分。
2.請標明大題、子題編號作答，不必抄題。
3.全部答案均須在答案卷之答案欄內作答，否則不予計分。

一、選擇題 (40%)

1. (4%) Which of the following components of an operating system is executed as the result of an interrupt signal?
   (A) File manager (B) Device driver (C) Scheduler (D) Memory manager (E) Dispatcher
2. (4%) If a computer with 512MB memory needs to run a 1024MB program, which one of the following technique will be required?
   (A) Boot Strapping (B) Scaling (C) Time-sharing (D) Paging (E) Forking
3. (4%) Which of the following broadcast all received messages to connected bus network?
   (A) Bridge (B) Router (C) Switch (D) Repeater
4. (4%) Which of the following option is **NOT** the advantage of **Interactive processing** over **Batch processing**?
   (A) Real-time processing (B) Less total execution time (C) Time-sharing (D) Multiprogramming (E) Multitasking
5. (4%) Most machine languages are based on the
   (A) Imperative paradigm (B) Declarative paradigm (C) Functional paradigm (D) Object-oriented paradigm
6. (4%) Which of the following is **NOT** correct IP address?
   (A) 10.6.147.39 (B) 192.168.256.3 (C) 140.123.40.56 (D) 7.7.2.2
7. (4%) Which of the following identifies the application to which a message arriving from the Internet should be given?
   (A) Protocol (B) Port number (C) Domain (D) Hop count
8. (4%) 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) *r, y, z* (C) *y, z, r* (D) *r, w, x*
9. (4%) If a computer can only connect to its LAN(Local Area Network), which of the following configuration we need to check?
   (A) IP address (B) DNS server (C) Network mask (D) Secondary DNS server (E) Default gateway
10. (4%) 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) *Z* (D) *Y*

二、簡答題 (60%)

1. Draw a circle the portion of the URL below that identifies the directory containing the file being addressed. (5%) Underline the portion that the domain name of the web server. (5%)

   http://batcave.metropolis.com/heroes/superheroes/batpage.html

2. (10%) Please print down the output of the following C++ program.

```
#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++;
}
```

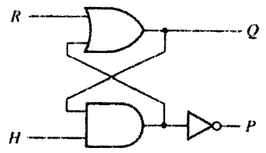
3. (10%) Derive a recursive function in C or C++ to compute and return *n* factorial defined as: $n! = n * (n-1) * (n-2) * \ldots * 2 * 1$

注意：背面尚有試題

4. (10%) What answer would be given to the following equation by a machine using a floating-point system in which each value is encoded by a byte whose most significant bit is the sign bit, the following three bits represent the exponent field in 2's complement, and the last four bits represent the mantissa? Show your derivation in detail.

$$(1\frac{1}{2})_{10} - (\frac{3}{16})_{10}$$

5. (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.

6. (10%) Suppose the memory cells at address F0 through FD in the machine described in the following language table contain the following (hexadecimal) bit patterns. If we start the machine with its program counter containing F0, what is the value in register 0 when the machine finally executes the halt instruction at location FC?

Address	Contents
F0	20
F1	00
F2	21
F3	01
F4	23
F5	05
F6	B3
F7	FC
F8	50
F9	01
FA	B0
FB	F6
FC	C0
FD	00

Op-code	Operand	Description
1	RXY	LOAD the register R with the bit pattern found in the memory cell whose address is XY. *Example:* 14A3 would cause the contents of the memory cell located at address A3 to be placed in register 4.
2	RXY	LOAD the register R with the bit pattern XY. *Example:* 20A3 would cause the value A3 to be placed in register 0.
3	RXY	STORE the bit pattern found in register R in the memory cell whose address is XY. *Example:* 35B1 would cause the contents of register 5 to be placed in the memory cell whose address is B1.
4	0RS	MOVE the bit pattern found in register R to register S. *Example:* 40A4 would cause the contents of register A to be copied into register 4.
5	RST	ADD the bit patterns in registers S and T as though they were two's complement representations and leave the result in register R. *Example:* 5726 would cause the binary values in registers 2 and 6 to be added and the sum placed in register 7.
6	RST	ADD the bit patterns in registers S and T as though they represented values in floating-point notation and leave the floating-point result in register R. *Example:* 634E would cause the values in registers 4 and E to be added as floating-point values and the result to be placed in register 3.
7	RST	OR the bit patterns in registers S and T and place the result in register R. *Example:* 7CB4 would cause the result of ORing the contents of registers B and 4 to be placed in register C.
8	RST	AND the bit patterns in register S and T and place the result in register R. *Example:* 8045 would cause the result of ANDing the contents of registers 4 and 5 to be placed in register 0.
9	RST	EXCLUSIVE OR the bit patterns in registers S and T and place the result in register R. *Example:* 95F3 would cause the result of EXCLUSIVE ORing the contents of registers F and 3 to be placed in register 5.
A	R0X	ROTATE the bit pattern in register R one bit to the right X times. Each time place the bit that started at the low-order end at the high-order end. *Example:* A403 would cause the contents of register 4 to be rotated 3 bits to the right in a circular fashion.
B	RXY	JUMP to the instruction located in the memory cell at address XY if the bit pattern in register R is equal to the bit pattern in register number 0. Otherwise, continue with the normal sequence of execution. (The jump is implemented by copying XY into the program counter during the execute phase.) *Example:* B43C would first compare the contents of register 4 with the contents of register 0. If the two were equal, the pattern 3C would be placed in the program counter so that the next instruction executed would be the one located at that memory address. Otherwise, nothing would be done and program execution would continue in its normal sequence.
C	0	HALT execution. *Example:* C000 would cause program execution to stop.