

國立臺北科技大學九十七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

填准考證號碼

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第一頁 共二頁

注意事項：

1. 本試題共 10 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、(10 分) Answer the following questions.

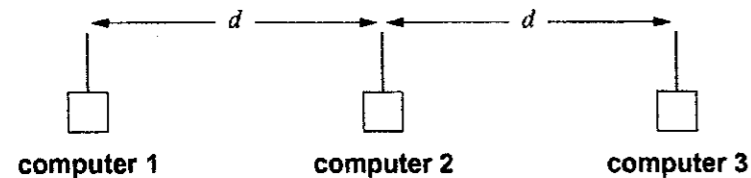
1. Explain why the average length of a time slice would be reduced if the processes in an operating system's process table perform lots of I/O operations.
2. Why does the time-sharing concept increase the overall efficiency of a machine.

二、(10 分) What code optimization could be performed by a code generator when building the machine code representing the statement.

```
if (X = 5) then (z ← X + 2)
           else (z ← X + 4)
```

三、(10 分) List the major events that take place when a process is interrupted.

四、(10 分) As shown in the following figure, if the maximum transmission distance is d . Please describe the reason why wireless LAN cannot use the CSMA/CD protocol. Please propose a protocol for this wireless networks.



五、(10 分) Please design an procedure to compute the largest integer whose square is no greater than N , where N is assumed to be a positive number.

六、(10 分) Explain some of the ways in which software engineering has benefited from the development of the object-oriented paradigm.

七、(10 分) Given the relation below

X:	A	B	C
2	5	7	7
3	3	6	6
4	4	2	2
5	2	2	2

what values will be retrieved by the following SQL statement?

```
select A, B
from X
where X.B = X.C
```

八、(10 分) Suppose the abstract data type StackType was defined as follows:

```
define type StackType to be
{int StackEntries[20];
 int StackPointer = 0;
 procedure push(Value)
 {StackEntries[StackPointer] ← Value;
  StackPointer ← StackPointer + 1;
 }
}
```

1. What would be the value of the variable StackPointer associated with Stack2 after executing the statements
StackType Stack1, Stack2;
Stack1.push(5);
Stack2.push(6);
Stack2.push(7);
2. What would be the value of StackEntries[0] associated with Stack1 after executing the statements in part 1?

九、(10 分) What answer would be given to equation: $1\frac{1}{2} + \frac{3}{16}$ 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 next three bits represent the exponent field in excess notation, and the last four bits represent the mantissa?

注意：背面尚有試題

十、(10分) Assume that the machine described in the following language description table use memory-mapped I/O and that the address B5 is the location within the printer port to which data be printed should be sent.

1. If register 7 contains the ASCII code for the letter A, what machine language instruction should be used to cause that letter to be printed at the printer?
2. If the machine executes a million instructions per second, how many times can this character be sent to the printer in one second.

“language description table”

Op-code	Operand	Description
1	RXY	LOAD the register R with the bit pattern found in the memory cell whose address is XY <i>Example:</i> 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. <i>Example:</i> 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. <i>Example:</i> 35B1 would cause the contents of register 5 to be placed in the memory cell whose address is B1.
4	ORS	MOVE the bit pattern found in register R to register S. <i>Example:</i> 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. <i>Example:</i> 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. <i>Example:</i> 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. <i>Example:</i> 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. <i>Example:</i> 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. <i>Example:</i> 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. <i>Example:</i> 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.) <i>Example:</i> 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	000	HALT execution. <i>Example:</i> C000 would cause program execution to stop.