國立臺北科技大學九十九學年度碩士班招生考試

系所組別：1522 自動化科技研究所乙組

第二節　計算機概論　試題（選考）

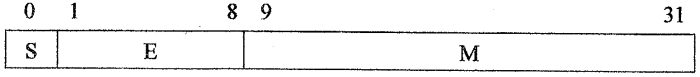
注意事項：

1. 本試題共七題，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。

1. Please briefly illustrate the following terms. (30pts, 3pts for each)
   (a)Turing machine
   (b)Moore's Law
   (c)Bus contention
   (d)Volatile variable
   (e)Static variable
   (f)Cache coherency
   (g)Pipeline stall
   (h)Network hub
   (i)Network switch
   (j)Network router

2. The format of IEEE 754 standard single-precision, floating-point number is represented as below. Please represent a signed decimal value 20.25 in IEEE 754 format. (5pts)

$$X=(-1)^{S}\cdot 2^{E-127}(1.M), \text{ where}$$



3. Write the pseudo codes to switch the values stored in two registers (e.g. reg1 and reg2) without using any additional memory. (10pts)

4. Observe the following sequence, and then use any programming language you are familiar with to calculate and print out X(10). (15pts)

X(1)=1, X(2)=11, X(3)=21, X(4)=1211, X(5)=111221, X(6)=312211, …

5. Write the pseudo codes using dynamic programming for the nth Fibonacci number. (10pts)

Fibonacci number: 0, 1, 1, 2, 3, 5, 8, 13, 21, 34, …

6. Given an array of characters which form a sentence of words, please write the pseudo codes to reverse the order of the words in it. (15pts)

7. A compiler designer is trying to decide between two code sequences for a particular machine. The hardware designers have supplied for the following facts:

Instruction class	CPI for this instruction class
A	1
B	2
C	3

For a particular high-level-language statement, the compiler writer is considering two code sequences that require the following instruction counts:

Code sequence	Instruction counts for this instruction class		
	A	B	C
1	2	1	2
2	4	1	1

(a)Which code sequence executes fewer instructions? (3pts)
(b)Which will be faster? (3pts)
(c)What are the clock cycles per instruction (CPI) for each sequence? (9pts)