淡江大學 106 學年度碩士班招生考試試題 18-1

系別：資訊工程學系(A 組、B 組、資網碩)　　科目：計算機概論

考試日期：3 月 4 日(星期六) 第 1 節　　本試題共 8 大題，1 頁

1. (10%) Perform the subtraction with the following binary numbers.
   10110 – 0101 (5 digits)
   (a) using 1's complement. (5%)
   (b) using 2's complement. (5%)

2. (20%) Adder Design.
   (a) Design a Half Adder. (5%)
   (b) According to the result of (a), design a Full Adder. (7%)
   (c) According to the result of (b), design an *n*-bit adder/subtractor. (8%)

3. (20%) MAC (Media Access Control) Protocols.
   (a) Describe the functions performed in the MAC sublayer. (10%)
   (b) Compare the differences of CSMA/CD with CSMA/CA. (10%)

4. (10%) Use **Dijkstra's** algorithm to find the shortest path from vertex v_1 to all other vertices for the graph represented by the following array. Show the actions step by step.

	1	2	3	4	5	6	7
1	0	74	78	∞	∞	∞	∞
2	74	0	76	72	85	∞	∞
3	78	76	0	73	∞	82	∞
4	∞	72	73	0	77	74	∞
5	∞	85	∞	77	0	72	78
6	∞	∞	82	74	72	0	82
7	∞	∞	∞	∞	78	82	0

5. (10%) Consider the program right. What number would be printed by the program using each of the following methods of parameter passing?
   (a) call-by-value (2%)
   (b) call-by-reference (2%)
   (c) call-by-name (3%)
   (d) call-by-value-result (3%)

```
program P ;
   ...
   procedure A(x, y, z);
   begin
      y := y+1 ;
      z := z+x ;
   end
begin
   a := 5 ;
   b := 2 ;
   A(a+b, a, a) ;
   writeln(a)
end
```

6. (10%) Let *T* be a binary tree. Given that the **inorder** sequence of *T*= *BAFHLMJDCEKIG* and the **postorder** sequence of *T*= *BMLJHFDKIGECA*. What is the **preorder** sequence of *T*?

7. (10%) Explain three types of services in cloud computing. (10%)

8. (10%) Big data are characterized by 3*V*s: *volume*, *velocity*, and *variety*. Explain the meanings of 3*V*s.