國立臺中教育大學98學年度大學日間部轉學招生考試

計算機概論

適用學系:資訊科學系與數位內容科技學系二、三年級

一、選擇題（50%）每題5分

1. 布林代數基本定理中，A+B = B+A 稱為哪一種定律。
   (A)單一律 (B)結合律 (C)交換律 (D)分配律
2. 電腦內之 ALU 功能為何?
   (A)計算及邏輯判斷 (B)記憶資料 (C)列印資料 (D)讀入資料
3. 在 n 筆資料的鏈結串列(linked list)中搜尋一筆資料，若以平均所花的時間考量，其時間複雜度為:
   (A)O(n) (B)O(log n) (C)O(1) (D)O(n^2)
4. 寄送電子郵件(E-mail)的傳輸協定為
   (A) POP3
   (B) SMTP
   (C) SNMP
   (D) ICMP
   (E) SSH
5. 下列何者可以將網路名稱轉換成 IP 位置
   (A) NII
   (B) NFS
   (C) NIS
   (D) DNS
   (E) FAT
6. 在物件導向程式設計中，一個抽象類別(Abstract Class)是
   (A) 一個僅擁有被覆寫方法(overridden method)的類別
   (B) 一個沒有方法(method)的類別
   (C) 一個僅擁有抽象方法(abstract method)的類別
   (D) 一個不能被實體化(instantiated)的類別
   (E) 一個不能被繼承(inherit)的類別
7. 下列何種區域網路 (Local Area Network) 的佈線方式適合集線器？
   (A) 星狀拓樸 (B) 環狀拓樸 (C) 網狀拓樸 (D) 匯流排拓樸
8. 使用下列何種通道之安全性最高？
   (A)雙絞線 (B)同軸電纜 (C)光纖 (D)以上相同

【背面尚有試題】

9.在號碼可攜性的探討議題下,小明原本是A電信公司的客戶申請轉至B電信公司，而其使用的號碼並沒有改變，這是屬於
(A)位置可攜性 (B)服務可攜性 (C)服務提供者的可攜性 (D)以上皆是。

10.執行 WAP 協定與 HTTP 協定的轉換，並且對文件內容加以編碼/解碼的是
(A)WML script (B)WTP (C)WAP gateway (D)WDP。

二、問答題(50%)

1. 試比較 TCP 和 UDP 之優缺點(10%)

2. 假設 $M=475_{(10)}$，$N=5A2_{(16)}$ (20%)
(a) 以1的補數，計算 M-N
(b) 以2的補數，計算 N-M

3. 請將十進位數字 56.625 轉為二進位數值。(10%)

4. 請問在C程式語言中,傳遞參考(call by reference)和傳遞值(call by value)的差異為何？(10%)

國立臺中教育大學 98 學年度大學日間部轉學招生考試

離散數學試題

適用學系：資訊科學學系二、三年級

※問答題（100%，每題 10%）

1. For proving implications $p \rightarrow q$, we may use one of the following methods:

   a. Prove $\neg p$ by itself.
   b. Assume $\neg q$, and prove $\neg p$.
   c. Prove q by itself.
   d. Assume p is true, and prove q.
   e. Proceed by exhausting all possibilities.

   (1) Which one is the trivial proof? (2%)
   (2) Which one is the direct proof? (2%)
   (3) Which one is the indirect proof? (2%)
   (4) Which one is the exhaustive proof? (2%)
   (5) Which one is the vacuous proof? (2%)

2. Let $A = \{a, b\}$ and $B = \{c, d, e\}$. Find the power set of the Cartesian product $B \times A$.

   (1) Show the Cartesian product $A \times B$. (5%)

   (2) Show the number of elements within the power set of the Cartesian product $A \times B$. (5%)

3. Let **R** be the set of real numbers. Determine whether the function $f(x) = x^2$ from **R** to **R** is onto? Justify your answer.

4. Suppose that a cake shop has 5 different kinds of cakes, and there are 10 pieces of each kind of cakes. How many different ways can 4 cakes be chosen from this cake shop?

5. Suppose that the 0-1 matrix of the relation R is

$$M_R = \begin{bmatrix} 0 & 0 & 1 \\ 1 & 1 & 0 \\ 1 & 0 & 1 \end{bmatrix}$$

(1) Find the 0-1 matrix of the reflexive closure of R. (3%)

(2) Find the 0-1 matrix of the symmetric closure of R. (3%)

(3) Find the 0-1 matrix of the transitive closure of R. (4%)

6. Given a weighted connected graph G1 (as shown in Figure 1), please write down one of its minimum cost spanning trees and its total cost.

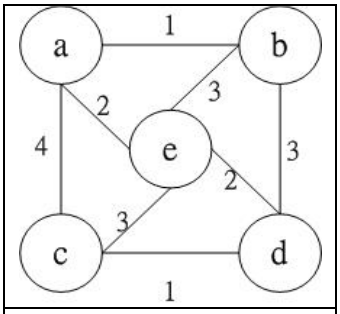

Figure 1: G1

7. Write down one of the circuit if any Eular circuit exists in G2 (as shown in Figure 2) and G3 (as shown in Figure 3). Also, please explain your reason.

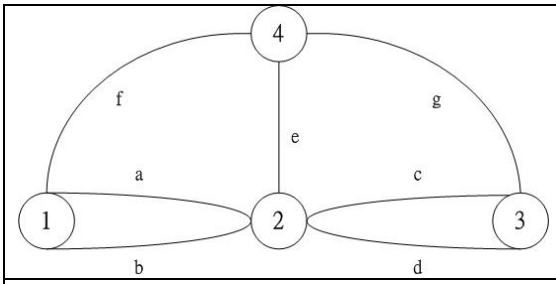

Figure 2: G2

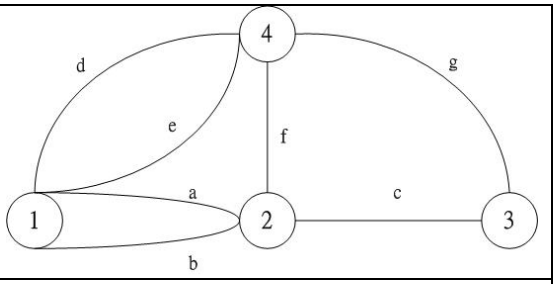

Figure 3: G3

8. Given a weighted connected graph G4 (as shown in Figure 4), please write down the shortest path between Vertex 1 and Vertex 5. Also, please write down the procedure that you find out the shortest path.

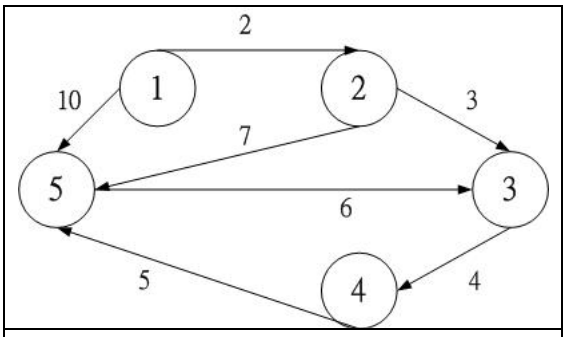

Figure 4: G4

9. Given a connected simple graph that has n vertices. (a) Please write down the minimal number of edges of this graph. (b) Please write down the number of edges of the minimal spanning tree of this graph.

10. Given a connected planar having 5 vertices whose degree is 3, 2, 2, 3, and 2 respectively. (a) Please write down the number of edges of this planar. (b) Please write down the number of regions of this planar.