國立高雄應用科技大學
101 學年度碩士班招生考試
資訊管理系

准考證號碼□□□□□□□□□□ （考生必須填寫）

計算機概論(乙組)

注意：a. 本試題共 19 題，共 100 分。
b. 作答時不必抄題。
c. 考生作答前請詳閱答案卷之考生注意事項。

（一）選擇題（複選，每題 2 分，共 24 分）

1. What are the levels of data abstraction?
(a) Physical level (b) Logical level (c) Interface level (d) View level
2. Which of the following is a problem of file management system?
(a) lack of data independence (b) data redundancy (c) program dependence (d) difficult to update
3. Which of the following IS NOT the feature of a DBMS?
(a) query language (b) data dictionary (c) data warehouse (d) utilities
4. Database management systems are intended to _____
(a) eliminate data redundancy (b) support decision making (c) manage file access (d) maintain data integrity
5. Which of the following is a file access method?
(a) Indexed sequential access method (b) random access method (c) direct access method (d) binary access method
6. In the DBMS approach, application programs perform the _____
(a) storage function (b) processing functions (c) access control (d) all of the above
7. Which of the following is the issue for a database without normalization?
(a) multivalued dependency (b) relationship dependency (c) functional dependency (d) attribute dependency

8. Which of the following statement is true?
   (a) in an indexed field you may or may not enter duplicate value (b) you can enter duplicate value in primary key field (c) foreign key fields don't allow duplicate values (d) all statements are true
9. In a relational database, each column _____
   (a) has a primary key (b) has a unique name and each row has a primary key
   (c) has a unique name (d) has a primary key
10. Entity-relationship diagram is used in _____
    (a) data mining (b) system design (c) relational database
    (d) database design
11. What are the advantages of recursive programming?
    (a) easy to design (b) easy to write (c) easy to analyze its complexity
    (d) having better performance
12. What are the main features of object-oriented programming?
    (a) weak typing (b) event-driven programming (c) encapsulation (d) inheritance

(二) 問答題

1. 試說明網路協定(Protocol)分層的好處, 並簡述 OSI 網路七層協定的功能。(5%)

2. 試說明 NFC (Near Field Communication) 通信技術標準及各種現有與潛在應用。(10%)

3. 試簡述雲端運算技術與國內相關資訊產業之發展趨勢。(10%)

4. 考慮以下一組行程，其中CPU分割時間長度是以豪秒為單位:

行程	分割時間	優先權
*P*1	9	3
*P*2	2	1
*P*3	2	3
*P*4	3	4
*P*5	5	2

假設這些行程都是在時間0的時候到達，到達順序是 *P*1, *P*2, *P*3, *P*4, *P*5,

a. 畫出這些行程以先到先作、最短工作先作、不可搶先的優先權排班（優先權數字越小表示優先權越高）、依序循環（時間量=1）等CPU排班演算法執行的甘特圖（Gantt charts）。(8%)

b.上述的各排班演算法的平均等待時間（waiting time）是多少? (8%)

5. 在純需求分頁(pure demand-paging)的記憶體管理系統中，每一個頁框(frame)的大小為 10byte，我們追蹤某行程參考的記憶體位址(byte-addressable)串列如下

參考位址: 03, 17, 25, 01, 35, 05, 72, 45, 24, 36, 05, 33, 77, 15

請問在使用下列的分頁替換演算法(page replacement strategy)時，分頁錯誤(page fault)的次數為何？

a. 先進先出(FIFO) 頁替換演算法(3%)
b. 最佳(optimal)頁替換演算法(3%)
c. 近來最少使用(least-recently-used, LRU)頁替換演算法(3%)

6. 稀疏矩陣(Sparse Matrix)是其元素大部分為零的矩陣。
   a. 請舉一個例子說明，在設計資訊系統時會用到稀疏矩陣。(5%)
   b. 如何用二維陣列儲存稀疏矩陣? 請用 C++或 Java 寫一個程式說明。(6%)
   c. 用二維陣列儲存稀疏矩陣很浪費記憶體。請設計一個有效率的資料結構，可以用一維陣列儲存稀疏矩陣。請用 C++或 Java 程式表達該資料結構，並舉實例說明。(10%)

7. Consider the universal relation R = {A, B, C, D, E, F, G, H, I, J} and the set of functional dependencies F = {{A, B} → {C}, {A} →{D, E}, {B} → {F}, {F} → {G, H}, {D} → {I, J}}.

1. What is the key for R? (2%)
2. Decompose R into 2NF, then 3NF relations. (3%)