系級：＿＿＿＿＿＿＿學號：＿＿＿＿＿＿＿姓名：＿＿＿＿＿＿＿＿＿

一、 選擇題 (每題 4 分，答案不一定只有一個; 如果全錯，則請寫"全錯")

(　　　) 1. ＿＿＿＿＿＿＿is a step-by-step method for solving a problem or doing a task.

(A) A construct 　　　 (B) A recursion 　　　 (C) An algorithm 　　　 (D) An iteration

(　　　) 2. The ＿＿＿＿＿＿＿ construct tests a condition.

(A) decision 　　　 (B) sequence 　　　 (C) repetition 　　　 (D) logical

(　　　) 3.下列流程圖(flowchart)符號中，何者爲輸入輸出符號？

(A) 　　　　　 (B) 　　　　　 (C) 　　　　　 (D)

(　　　) 4. You must use ＿＿＿＿＿＿＿ search for an unordered list of data elements.

(A) binary 　　　 (B) sequence 　　　 (C) sequential 　　　 (D) blind

(　　　) 5. ＿＿＿＿＿＿＿ is a process in which an algorithm calls itself.

(A) Recursion 　　　 (B) Iteration 　　　 (C) Searching 　　　 (D) Repetition

(　　　) 6. 在設計程式之前，必須先擬定演算法，再來寫程式。關於演算法的概念，下列何者是錯的？ (A)演算法的表示方式有很多種，像虛擬碼或流程圖都可以表示 (B)演算法可以描述解決問題的步驟　　　 (C)演算法要能在有限的步驟內解決 (D)每一種問題只存在一種演算法。

(　　　) 7. Each element in a record is called ＿＿＿＿＿＿＿.

(B) a variable 　　　 (B) an index 　　　 (C) a field 　　　 (D) a node

(　　　) 8. Which pointer can be used to mark the end of a linked list?

(A) head pointer 　　　 (B) NIL pointer 　　　 (C) link pointer 　　　 (D) new pointer

(　　　) 9. 請問下圖在做甚麼動作？
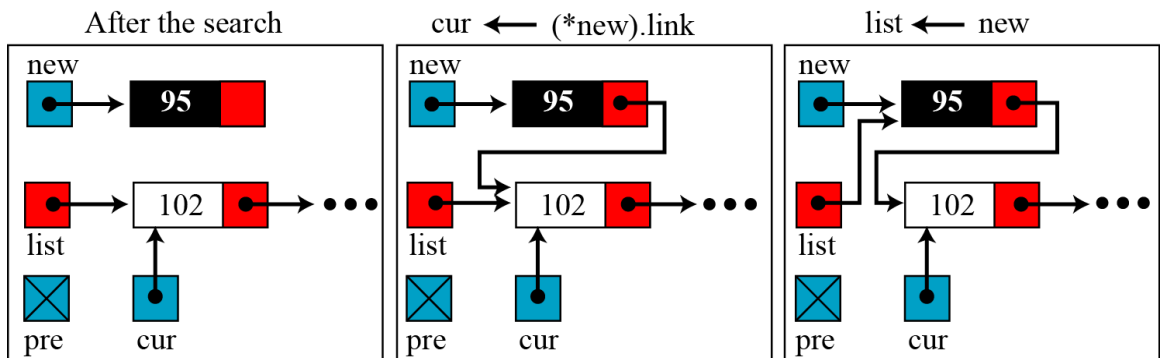
(A) Deleting the first node.

(B) Inserting a node in the middle of a linked list.

(C) Inserting a node at the beginning of a linked list.

(D) Inserting a node at the end of a linked list.

(　　　)10. 請問上題中 cur 的意思為何？

(A) current 　　　 (B) cure 　　　 (C) currency 　　　 (D) curve

(   ) 11. _____ is a declarative language used on relational databases.

      (A) DBMS   (B) SQL   (C) ERM   (D) IMS

(   ) 12. The _____ level of a three-level DBMS architecture defines the logical view of the data.

      (A) external   (B) conceptual   (C) internal   (D) physical

二、 填空題 (每格 5 分)

1. Using the insertion sort algorithm, manually sort the following list and draw a picture to show your work in each pass: 14, 7, 13, 3.

_____

2. Bubble sort 在 sort n 個資料時，必定會做_____ 次的比較元素的動作。

3. 有 2,000 筆已排序好的資料，採用二元搜尋法最多比較多少筆資料可以完成？_____

4. 在二元搜尋法(binary search method)中，我們用了一個公式 $mid \leftarrow \left\lfloor \frac{first+last}{2} \right\rfloor$，如果將此公式改為 $mid \leftarrow \left\lfloor \frac{first+last}{3} \right\rfloor$，請問二元搜尋法還可以正確地搜尋嗎? *為甚麼?*

_____

5. Given the inputs X=420 and Y=770, the output of the following algorithm **magic** is_____ .

```
Input 2 integers (X and Y)
    If X < Y
        Return magic(Y, X)
    Else if Y equals 0
        Return X
    Else
        Return magic(Y, X %Y )
    End if
End
```

6. 有位同學在練習寫遞迴程式時，寫了以下的程式來計算 Fibonacci 數列。

```
F(n) {
        if( n <= 2) return 1;
          else return F(n-1) + F(n-2);
}
```

執行後發現這程式出奇的慢，經過仔細分析後，這才驚覺原來這程式做了很多重複的計算。請問這程式在算第 10 個 Fibonacci 數 F(10)時，總共做了幾次加法計算才算出答案？

_____

7. Assume that we have stored the two-dimensional array **students[1..100][1..5]** in memory. The array is 100 × 5 (100 rows and 5 columns). Assume that the element student[1][1] is stored in the memory location with address 1023 and each element occupies four memory locations. The computer uses row-major storage. What is the address of the element students[5][3]?

   _____

8. Draw a diagram to show a linked list in which the data part is a student record with three fields: id, name, and grade.

   _____

9. What would happen if we apply the following statements to the following linked list?

   cur ←(*cur).link;   pre ←(*pre).link;

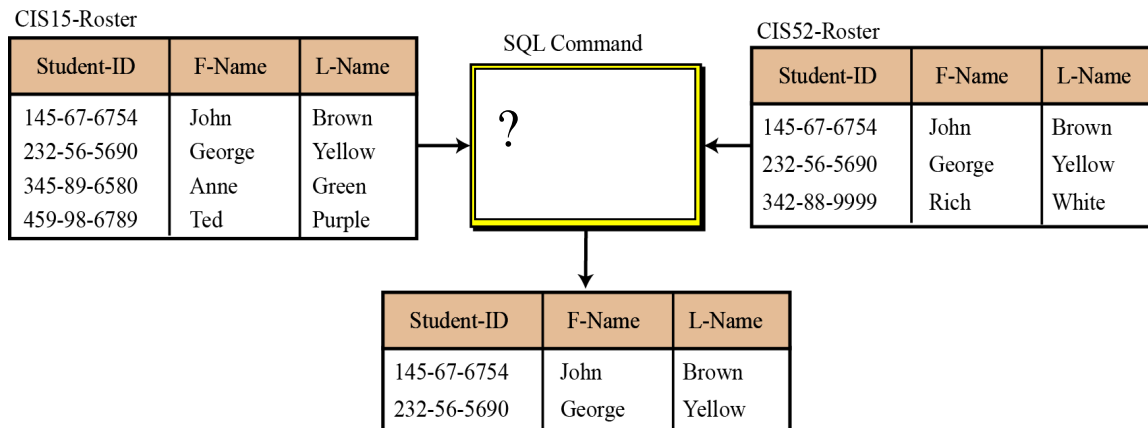

   _____ 。
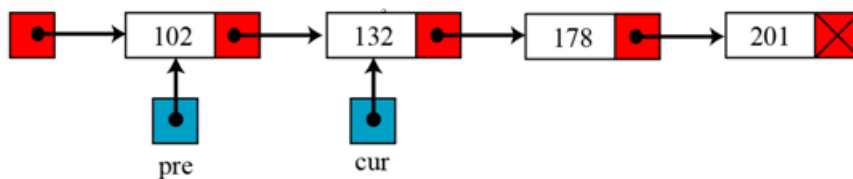
10. 何謂traversing a linked list？

   _____

11. Of the various database models, the _____ model is the most popular today.

12. The following relation is not in First Normal Form(1NF). Please change the table to make it pass 1NF criteria.

PNO	Pname	Available colors	City	Weight
1	Nut	Red, blue, green	Paris	5
2	Bolt	Orange	NYC	6

   _____

13. You have two relations CIS15-Roster and CIS52-Roster as shown in follows. If you apply the following SQL statements:

_____,
you will get the resulting relation as shown in follows.

CIS15-Roster

Student-ID	F-Name	L-Name
145-67-6754	John	Brown
232-56-5690	George	Yellow
345-89-6580	Anne	Green
459-98-6789	Ted	Purple

SQL Command

?

CIS52-Roster

Student-ID	F-Name	L-Name
145-67-6754	John	Brown
232-56-5690	George	Yellow
342-88-9999	Rich	White

Student-ID	F-Name	L-Name
145-67-6754	John	Brown
232-56-5690	George	Yellow

14. Please write a sequence of SQL statements to answer each of the following questions about parts and their manufacturers in terms of the following database:

PART relation

PartName	Weight
Bolt2X	1
Bolt2Z	0.5
NutV5	0.5

MANUFACTURER relation

CompanyName	PartName	Cost
Company X	Bolt2Z	.03
Company X	NutV5	.01
Company Y	Bolt2X	.02
Company Y	NutV5	.01
Company Y	Bolt2Z	.04
Company Z	NutV5	.01

(a) Obtain a list of the parts (PartName) with weight 0.5.

_____

(b) Obtain a list of the parts (PartName, Cost) which are made by Company Y and with cost less than 0.03.

_____

(c) Change the name of "Company Y" to "Company W".

_____