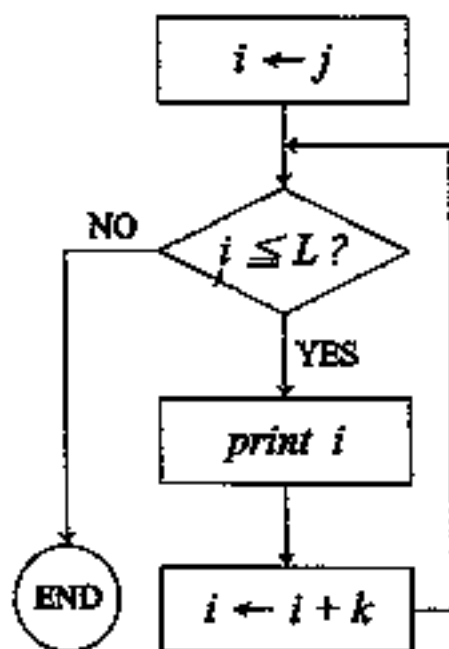1. (10%) If A[2,3] is in location 1756_{10} and A[3,3] is in location 1760_{10},

    (1a) In what manner (i.e., by rows or by columns) is the array stored?

    (1b) Where is the location of A[4,4]?

2. (15%) Consider the following program:

    (2a) If, initially, $k = 1$ and $L \geq j$ are positive, how many numbers are printed?

    (2b) How many numbers are printed if $L \geq j$ and $k > 0$?

    (2c) How many numbers are printed if $k \neq 0$?

3. (10%) What is the purpose of the following program segment? What results will be generated after executing this program?

```
A = 3
For B = 5 to 9
    For C = 0 to 9
        X = 100 * A + 10 * B + C
        Y = A^3 + B^3 + C^3
        IF X = Y   THEN   PRINT X
    Next C
  Next B
End
```

4. (10%) Convert the following numbers according to the requirements:
   (4a) 2713_8 to Hexadecimal (16-based)
   (4b) 3126_7 (7-based) to Octal

5. (10%) Describe what the below program is trying to do. Will the program work as intended? If not, please correct all the errors.

```
void   main()
   {
   int   i,j,m, A[100], n=100;
   m=n;
   for   (j=0; j <m; j++)
      {
      for   (i=0; i < n; i++)
         {
          if (A[i] < A[i+1] ) SWAP(A[i], A[i+i] );
         }
      }
   }
void SWAP(int x, int y)
   {
   int temp;
   temp = x;
   x = y;
   y = temp;
   }
```

6. (15%) 解釋名詞
   (6a) internet, intranet, extranet 之意義和區別
   (6b) Electronic commerce and Electronic Business 之意義和區別
   (6c) Client 和 server 之關係與意義

7. (10%) 以下 C 程式片段執行時列印的結果為何？

```c
#include <stdio.h>
void main (void)
    {
    double a[4][4]={ {1, 2, 3, 4},
                     {0, 1, 2, 3},
                     {0, 0, 1, 2},
                     {0, 0, 0, 1}, };
    double b[4]= {10, 7, 3, 2};
    int n=4;
    int i, j;
    for (j = n-1; j >= 0; j--)
        {
        for (i=j+1; i<n; i++)
        b[ j ] -= a[ j ][ i ] * b[ i ];
        b[ j ] /= a[ j ][ j ];
        }
    for (j=0; j<n; j++)
        printf("%d, %f\n", j, b[ j ]);
    }
```

8. (20%) $f(0) = 0.0$, $f(1) = 1.0$, 當 $k \geq 2$ 時 $f(k) = f(k-1) + 2 \times f(k-2)$.

試用 C 語言設計三個完整程式分別計算 $f(100) = ?$

(8a) 設計程式一，其限制為：不可定義陣列(Array)，應用 recursive function 技巧。

(8b) 設計程式二，其限制為：不可用 recursive function，須定義一個陣列 (Array)。

(8c) 設計程式三，其限制為：不可定義陣列(Array)，不可用 recursive function，僅可定義少許變數去完成計算。

(8d) 以上三個程式那一個使用最少記憶體？那一個計算速度最慢？