國立中央大學103學年度碩士班考試入學試題卷

所別：企業管理學系碩士班 企業電子化庚組(一般生)　科目：資料結構　共 1 頁 第 1 頁

本科考試禁用計算器　　＊請在試卷答案卷（卡）內作答

1. (20%) Convert the expression ((A + B) / C - (D - E) ^ (F + G)) to equivalent

   (a) prefix and (b) postfix notation.

2. (25%) How to find the middle element(s) of a linked list in one pass? For example, if the linked list has 21 elements, the 11-st element is the middle one in the list. If the linked list has 22 elements, then either the 11-st or the 12-nd ones can be returned as the middle one in this list. Please describe your concept, and write the program in C, C++, or Java.
3. (25%) Create the mirror image of a binary tree. The input to your program is the root note of the binary tree. Please describe your concept, and write the program in C, C++, or Java.
4. (30%) What is the time complexity for each of the following programs

(a)
```
long SumMN(int n, int m)
{     long sum = 0;
      for (int x=0; x<n; x++)
            for (int y=0; y<m; y++)
                  if (x==y)
                        for (int i=0; i<n; i++)
                              sum += i*x*y;
      return sum;
}
```

(b)
```
decimal Factorial(int n)
{     if (n==0)
            return 1;
      else
            return n * Factorial(n-1);
}
```

(c)
```
decimal Fibonacci(int n)
{     if (n == 0)
            return 1;
      else if (n == 1)
            return 1;
      else
            return Fibonacci(n-1) + Fibonacci(n-2);
}
```