| 科目名稱 | 計算機概論 | 類組代碼 | B30.D33 |
| | | 科目碼 | B3091 |

※本項考試依簡章規定所有考科均「不可」使用計算機。　　本科試題共計　1　頁

每題 10 分

1. Please explain the differences and usage of assembler, interpreter, and complier.
2. What is the difference among database, data warehouse, data mining, data structure, and big data.
3. Please explain the features of encapsulation, polymorphism and overloading in OOP.
4. The parameter passing ways, call-by-value, call-by-address, call-by-reference, and call-by-in-out, are the communication way between the called and calling subroutines. How and whether the results of the actual parameters are impacted after the called subroutine return?
5. For the following internet applications, please list which one protocol of TCP and UDP in the transportation layer adopted by them. A). E-mail; B). FTP; C). video conference; D). web searching (like Google search); E). online games; **F). voice on internet.**
6. For the following function mystery, calculate how many times the statement 6 will be executed, if the value of n is 5.

```
int mystery(n) {
1. int r = 0;
2. for (int i= 1, i<= n − 1; i++)
3.    for (int j = i + 1; j <= n; j++)
4.      for (int k = 1; k<= j; k++)
5.        for (int m = 1; m <= k; m++)
6.          r = r + 1;
7. return r;
8. }
```

7. Write the prefix form of the following expressions for the expression written in C-like language. Note the precedence of t && and || is the same (i.e., from left to right)
   A).   a && b || (c>d) || !(e>f) || a+b
   B).   !a && !(b<c) || x
8. The MyFibo numbers are defined as $f_0 = 1$, $f_1=2$, $f_2=3$, and $f_k = f_{k-1} + f_{k-2} + f_{k-2}$, for k>2. Write both a recursive and iterative programming code (in pseudo code, C, C#, or Java codes) to compute f_k.
9. For the list, (A (B (E (K, L), F, W), C (G), D)), please
   A). draw the corresponding multi-way tree for the list;
   B). transform the multi-way tree to a binary tree and draw this binary tree.
10. A Complex Number has the form, real part + imaginary part * i, like 5 + 4*i. In the following codes, the representation of a Complex Number is an instance of ComplexNuamber class with two floating numbers, one being its real part and the other being its image part, as follows:

```
class ComplexNumber {
   private float realpart; // real part of the number
   private float imaginarypart; //image part of the number
   .....}
```

   A). Please write the function, named CNAdd, for the addition operation to add two Complex Numbers with the two formal parameters, W and Y;
   B). Please write the function, named CNMult, for the multiplication operation to multiply two Complex Numbers with the two formal parameters, W and Y.