八十五學年度 ＿工算工程＿ 系（所）工程一般＿ 組碩士班研究生入學考試

科目 計算機專論 ＿ 科號 ＿ 共 ＿ 4 頁第 ＿ / 頁 *請在試卷【答案卷】內作答

(15%) 1. 請依下列計算機用語之解釋，找出最合適的名詞，將號碼填入各題：

(1.Algorithm　2.Bubble sort　3.Chip　4.Control code　5.Coprocessor
6.Device status word　7. Multichannel　8.Object program
9.Overflow　10.Pseudocode　11.Random access　12.Rounding
13.Source program　14.Structured programming　15.Subroutine
16.Time-sharing　17.Underflow　18.User-friendly　19.XOR
20.Warping　21.Windows　22.Workstation　)

(a). A stepwise procedure for solving a program.

(b). A computer that can function as a computer itself or that functions as a terminal to other computers throught a computer network.

(c). Another name for a multipass sort algorithm that generally requires more than one pass through the list in order to guarantee that the list sorted into the desired order.

(d). An unpackaged semiconductor device.

(e). A term used to describe a program or a software package that is easy to use.

(f). A program in machine-language form.

(g). A special-purpose processor chip that works in conjunction with a primary CPU to speed up time consuming operations.

(h). An error condition that occurs when the result of an arithmetic operation yields a result that is too large to be stored in the computer's memory.

(i). The English-like statements used to describe the steps in algorithm.

(j). A technique that approximates a value.

(k). Programming with a top-down flow that is easy to follow and modify because of its structure.

(l). A file-access technique in which records can be accessed in any order.

(m). A subprogram that may return many values, a single value, or no value to the main program.

(n). An error condition that occurs when the result of an arithmetic operation yields a result that is too small to be stored in the computer's memory.

(o). A method of interacting with the computer in which a number of programs are being executed at the same time although the user appears to have the complete attention of the computer.

(5%) 2. 在C語言中，若欲檢驗tmp的位址已經被指定給指標變數ptmp，則下列那些敘述是正確的？（單或多選）

(a) tmp == *ptmp

(b) tmp == &ptmp

(c) ptmp == *tmp

(d) ptmp == &tmp

(e) &tmp == *ptmp

(f) &ptmp == &tmp

(6%) 3. 假設 y>0，e 為極小正數，則下列程式片段的用意為何？

```
x = y;
do
{
    x1 = x;
    x = ((x+y)/x)/2;
    d = abs(x - x1);
}
while (d >= e);
```

(7%) 4. 若執行下列程式，請問do-while迴圈會執行幾次程式方會停止(也就是當程式停止時，counter值為何)？

```
main ()
{
    int counter = 0;
    float total = 0.0;
    do
        {
            total = total + 0.1;
            counter = counter + 1;
        }
    while (total != 1.0);
}
```

(7%) 5. 有一遞迴(recursive)程式如下所示，請問印出來之值為何 ？

```
void main(void)
{
    int f(int x, int n);
    printf("%d\n", f(3,4));
}
int    f(int x,   int n );
{
    if (n ==0 )
        return x;
    else
        return    x * f(x, n-1);
}
```

(15%) 6. 假設存在一個二維陣列A[1...u_1, 1...u_2]，而每個元素在記憶體中佔2 Bytes，已知A[6, 2]的存放位址為$(2040)_{10}$，A[3, 4] 的存放位址為$(2094)_{10}$；

(a) A 陣列在記憶體中的儲存是否為 column-major 方式 ？
(b) A[1,1] 之存放位址為何 ？
(c) u_1 = ?

(15%) 7. 插入排序(Insertion Sort)是眾多排序方法中極為簡單的一種(但並不是很有效率)，其基本步驟是將一元素插入到一串已排好序的n個資料群中，使得這n+1個資料又變成一串排好序之結果。假設現在有A(1), A(2), …, A(n-1), A(n)等n個完全未經排序的元素，請寫一簡單的程式(可使用任何語言)，利用插入排序的方法將這些元素由小到大重新排序，為了程式簡潔起見，指令盡量不多於10行。

(15%) 8. Write a function in C (preferable), PASCAL, or FORTRAN, which use three parameters *x*, *n*, and *p*, to generate the probability of ***Binomial Distribution***. The definition of a binomial distribution is as follows: A Bernoulli trial can result in a success with probability *p* and a failure with probability $q=1-p$. Then the probability distribution of the binomial random variable *X*, the number of successes in *n* independent trials, is

$$b(x;n,p)=\binom{n}{x}p^x q^{n-x}, \quad x = 0,1,2,....,n.$$

(15%) 9. The **Divided Differences** for a function $f(x)$ are defined as follows:

$$f[x_k] = f(x_k),$$

$$f[x_{k-1}, x_k] = \frac{f[x_k] - f[x_{k-1}]}{x_k - x_{k-1}},$$

$$f[x_{k-2}, x_{k-1}, x_k] = \frac{f[x_{k-1}, x_k] - f[x_{k-2}, x_{k-1}]}{x_k - x_{k-2}},$$

$$f[x_{k-3}, x_{k-2}, x_{k-1}, x_k] = \frac{f[x_{k-2}, x_{k-1}, x_k] - f[x_{k-3}, x_{k-2}, x_{k-1}]}{x_k - x_{k-3}},$$

the recursive rule for constructing higher-order (general) divided differences is

$$f[x_{k-j}, x_{k-j+1}, ..., x_k] = \frac{f[x_{k-j+1}, ..., x_k] - f[x_{k-j}, ..., x_{k-1}]}{x_k - x_{k-j}}.$$

Assume x_k, $k = 0,1,2,...,n$, and $f(x_k)$, $k = 0,1,2,...,n$ are known parameters and are stored in two already defined array X and F, respectively. For example in C, the array definition look like:

float $X[n+1]$, $F[n+1]$;

You may assume these array are defined as global variables and their values have been read in. Write a portion of program to compute $f[x_0, x_1, ..., x_n]$ in C (preferable), or PASCAL by using the following two programming styles:

(1) Use a recursive function.

(2) Use loop structure (iteration). However, you should define no more array and may use only the X array and F array defined above.