

國立臺灣師範大學 97 學年度學士班二年級轉學生招生考試試題

科目：計算機概論

適用學系(組)：資訊工程學系

注意：1.本試題共 3 頁，請依序作答，並標明題號，不必抄題。

2.答案必須寫在答案卷上之指定作答區內，否則依規定予以扣分。

一、名詞解釋[共 3 題，每題 3 分，共計 9 分]：

1. The relational database models
2. IP (Internet Protocol) address
3. White-box testing (one kind of software testing)

二、名詞比較[共 5 題，每題 6 分，共計 30 分]：請解釋下列引號中之名詞並比較其差異。

1. The software development processes:
“waterfall model” and “incremental model”
2. The methods to handle the addressing of I/O devices:
“isolated I/O” and “memory-mapped I/O”
3. The binary tree traversals:
“depth-first traversals” and “breadth-first traversals”
4. The internet protocols:
“file transfer protocol (FTP)” and “simple mail transfer protocol (SMTP)”
5. The operating systems:
“time sharing systems” and “distributed systems”

三、計算題[共 10 題，每題 5 分，共計 50 分]

1. Given three bit patterns, $A = 01100110$, $B = 10101011$ and $C = 10011101$, please perform the indicated operations $((A \text{ AND } C) \text{ OR } (A \text{ XOR } B))$, and represent the answer by the hexadecimal notation.
2. Convert the binary representation 1010.0101 to its equivalent based ten form.
3. Let the depth of a tree be the maximum level of any node in the tree, and the level of a node is defined by letting the root be at level one. Given a depth of the n -ary tree, k , $k \geq 1$, please answer the maximum number of nodes in the tree.
4. Consider a function **F1** represented by pseudo-code as follows. What is the value of **F1(6)** ?

```
F1(N :integer)
{
    if (N = - 5)    return 0;
    else            return (N + F1(N-1));
```

}

5. Consider a function **F2** represented by pseudo-code as follows. What is the value of **F2(81)** ?

```

F2(N :integer)
{
  if (N <= 3)   return 2;
  else         return (F2(N/3)*F2(N/9));
}

```

6. After running the code as follows, what is the value of **A[5]** ?

```

N = 10; A[1] = 1; A[2] = 4; A[3] = 9;

for i = 4 to N do
  A[i] = A[i-1] - A[i-3];

endfor

```

7. After running the code as follows,, what is the value of **T** ?

```

N = 5; T = 0;

for i = 1 to N do
  for j = i to N do
    T = T + i+j;
  
```

8. If the initial values of array **A** are $A[i] = 0, i = 0, 1, \dots, 6$. After running the code as follows, what is the value of **A[5]** ?

```

k = -1; j = 0;
while (j < 7) do
{
  if (A[j] > 3)   { A[j] = k; k = j-1; }
  else          { A[j] = j; }
  j = j+1;
}

```

9. In using binary search to search a pre-sorted 1925 records, at most how many key-field comparisons are needed to find the desired record?

10. Define a function as follows:

$$f^{(i)}(n) = \begin{cases} n & \text{if } i = 1 \\ f(f^{(i-1)}(n)) & \text{if } i > 1 \end{cases}$$

If $f(n) = 2n$, then $f^{(i)}(n) = ?$

四、簡答題[共 3 題，共計 11 分]

1. [3 分]How many different 3-node binary trees can be created? Please draw all of them.

2. [4 分]Write the infix form of the following postfix expression expressions:

F A E / + C - D B - C * +

3. [4 分]Consider a function **F3** represented by pseudo-code as follows. What is the terminating condition of the **F3** function.

```
F3 (M, N : integer)
{
    if (M < 30) then
        if (N < 10) then    Wow = M+N;
        else                Wow = F3(M, N-2) + N;
    else    Wow = F3(M-2, N) + M;
}
```