

# 大葉大學 95 學年度轉學招生考試試題紙

系 組 別	日 \ 第二部	年 級	考 試 科 目 (中文名稱)	考 試 日期	備 註
資訊工程	日	三	資料結構	8月7日 三	共乙頁

註：考生可否攜帶計算機或其他資料作答，請在備註欄註明（如未註明，一律不准攜帶） 11=10 ~ 12=30

1. Ackermann's function  $A(m, n)$  is defined as follows: (10%)

$$A(m, n) = \begin{cases} n+1 & , \text{if } m = 0 \\ A(m-1, 1) & , \text{if } n = 0 \\ A(m-1, A(m, n-1)) & , \text{otherwise} \end{cases}$$

Write a recursive function for computing Ackermann's function with C++ language.

2. How many values can be held by an array with dimensions  $a[0..n]$ ,  $b[-1..n][2..m]$ ,  $c[-n..0][1..3]$ ? (10%)

3. Compute the failure function for each of the following patterns: (10%)

a. a a a a b

b. a b a b a b a

4. Write the postfix form of the following expressions: (10%)

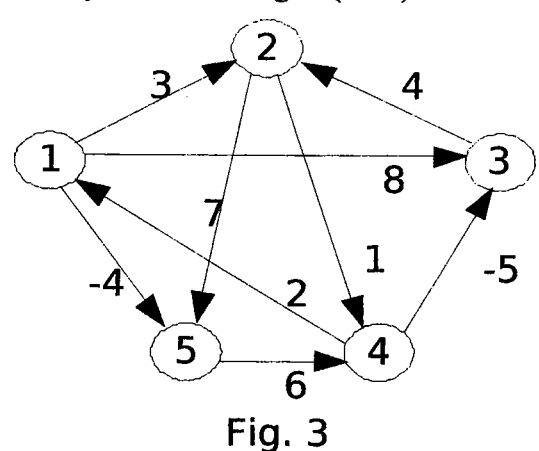
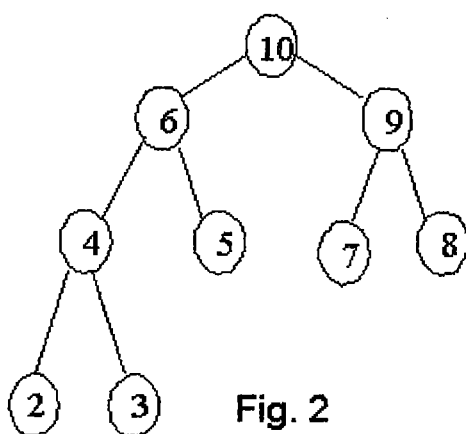
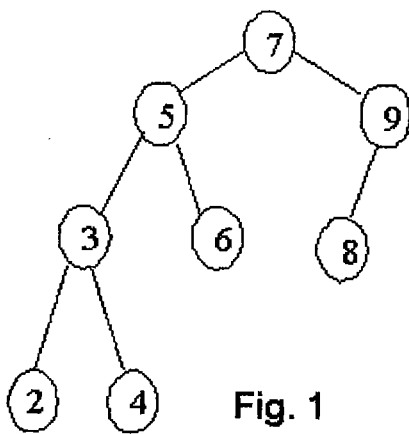
a.  $A * -B + C$

b.  $(A + B) * D + E / (F + A * D) + C$

5. Prove the following lemma. (10%)

For any nonempty binary tree,  $T$ , if  $n_0$  is the number of leaf nodes and  $n_2$  the number nodes of degree 2, then  $n_0 = n_2 + 1$ .

6. Write out the inorder, preorder, postorder, and level-order traversals for the binary tree of the Fig. 1. (12%)



7. Draw a depth-first spanning tree and a breadth-first spanning tree for Fig.2 with root 5. (8%)

8. Find all-pairs of shortest paths of Fig. 3 (10%).

9. The inorder and preorder sequence of a binary tree are EDFCGBAKJLIH and ABCDEFGHIJKL, respectively. Please draw this binary tree (10%)

10. Draw all the binary trees whose postorder sequence is 1234. (10%)