南華大學九十四學年度 碩士在職專班 招生考試試題卷

系所別：資訊管理學系碩士班	科目編號：B2-13-11
科　目：資料結構	試題紙第 1 頁共 1

1. Given the following list: **14, 15, 5, 9, 8, 19, 2, 6, 16, 4, 20, 17, 10, 13, 7**
   (a) Please construct a binary search tree. (10%)
   (b) Please traverse this tree in postorder. (10%)
   (c) How many leaf nodes in this tree? (3%)
   (d) What is the level of this tree? (3%)
   (e) Please give an appropriate node representation for this binary search tree in C language. (4%)

2. Convert the infix expression **(a * b) * (c + d) – e** into
   (a) postfix expression (7%)
   (b) prefix expression (7%)
   (c) tree representation (7%)

3. Assume that an array of ten integers contains the elements (16%)

0	1	2	3	4	5	6	7	8	9
1	**3**	**7**	**15**	**21**	**22**	**36**	**78**	**95**	**106**

   Use the binary search to find each of the following items in the array. The searching steps must be listed.
   (a) 1
   (b) 98

4. (a) What are recursive functions? (5%)
   (b) (*i*) Determine what the following recursive Java function computes? (8%)

```
public static int func(int n) {
    if(n == 0) return 0;
    return n + func(n-1);
}
```

   (*ii*) Write an iterative function to accomplish the same purpose. (10%)

5. Sort the sequence 3, 1, 4, 1, 5, 9, 2, 6 ,5 using insertion sort. (must list the intermediate result after each pass) (10%)