淡江大學 95 學年度碩士班招生考試試題

136

系別：資訊管理學系　　科目：資　料　結　構

准帶項目請打「V」	
X	簡單型計算機

本試題共 2 頁 -1

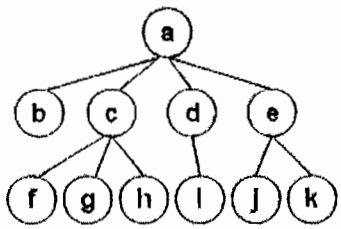
本試題雙面印製

1. Define the following terms. (16%)
   (a) big-O notation (b) ADT List (c) Euler circuits (d) Algorithm

2. What is the final content of queue q after performing the following C++ codes? Please sketch the incremental change of s and q before presenting your answer. (6%)

```
1 Stack<int> s ;     Queue<int> q ;
2 for (int i = 13 ; i>=3; i--) s.push(i) ;
3 while (!s.empty()) {
4   if (s.top()%4==0) q.dequeue() ;
5   q.enqueue(s.top()) ;
6   s.pop() ;
7 }
```

3. Answer the following questions. (15%)
   (a) design a pointer-based data structure to store the following general tree, and present your answer in a pictorial form.



   (b) give the pseudo code of performing depth-first search in this structure (by using recursion).
   (c) express the following expression in tree structure and present its postfix form. (make sure the result of postorder traversal in the tree structure is the same as the postfix form)

```
x-y-b*(c%d*e)/pow(i,j)/g
```

4. Answer the following questions. (15%)
   (a) use an example to explain quadratic probing for resolving the collision in hashing.
   (b) similar to (a), but adopt double hashing to serve as collision resolution.
   (c) discuss the table usage for quadratic probing and double hashing.

5. Answer the following questions. (10%)
   (a) complete the following binary_search() function, which would return the index of `target` in array `rec` and return -1 if `target` is not found.

```
struct record {KeyType key; InfoType info;} ;
int binary_search(record *rec, int size, record& target) {
    int a = 0, b =size-1, ans=-1;
    while (b>=a) {
        // insert your codes here
    }
    return ans ;
}
```

(b) how to delete a node n in a BST when (1) n has only one child (2) n has two children?

6. Consider Bubble Sort, Quick Sort and LSD Radix Sort, (22%)

(a) sort the following data in ascending order by using the three method respectively.

747 118 445 1011 765 33 168 15

(b) analyze the time complexity of Quick Sort and LSD Radix Sort.

(c) describe the importance of choosing a proper pivot for Quick Sort, and give at least two methods for pivot selection.

7. Consider the minimum cost spanning tree of a graph, (16%)

(a) construct an example graph by yourself and apply Kruskal's and Prim's algorithm to obtain its minimum cost spanning tree, respectively.

(b) determine the time complexity of the two algorithms.