考試科目	資料結構	系所別	資訊管理學系(丙組)	考試時間	2月3日(五)第4節

I. Dynamic Programming:

Given two strings X and Y, the longest common subsequence (LCS) problem is to find a longest subsequence common to both X and Y.

1.1 (10%) L[m,n] denote the LCS of two strings X[0..m] and Y[0..n]. Define the recurrence equation on L[m,n], and define the dynamic programming algorithm to solve the LCS problem.

1.2 (10%)Consider the following two strings:

X = ACACACBAACCAA
Y = CAACABCACA

Show the complete table L to compute L[12, 9].

II. AVL and Splay Binary Search Tree:

An AVL tree is a binary search tree where the difference on height of sub trees is less than or equal to 1. A Splay tree is a binary search tree where a node is splayed after it is accessed. "splay" means to move the splay node to the root. For T.get(k), the splay node is the node that has key k, or the parent node of the exiting external node. For T. put(k), the splay node is the node that has key k.

2.1 (10%) Build an AVL tree T by inserting the following keys one by one.
108, 72, 99, 29, 97, 22, 69, 120, 208, 27, 33, 53, 54, 48, 26, 49.

2.2 (10%) Define a sorting algorithm that takes T and prints its keys in an increasing order. Apply the algorithm on the tree constructed in2.1.

2.3 (10%) Consider the result of 2.2 as a splay tree T. Show T and the result after calling T. put(118)

III. Hash Table:

Consider a hash table storing the following keys:
108, 72, 99, 29, 97, 22, 69, 120, 208, 27, 33, 53, 54, 48, 26, 49.
Let N=27. h(k) = k mod 27.

3.1 (10%) Show the hash table that handles collision with liner probing.
3.2 (10%) Show the hash table that handles collision with double hashing.
Let d(k) = 13- (k mod 13).

IV. Tree Traversal:

4.1 (10%) Represent the expression 9 * (3 * 5) -28/(8-1)< 105 + 2 * (3 + 4)-18 using a binary tree. (An internal node stores an operator, e.g., *,/, +,-, and an external node stores a value, e.g., 3, 5.)

4.2 (10%) Write the pseudo code that evaluates such kind of an expression.

4.3 (10%) Write the pseudo code that prints a binary tree expression given the root node v with correct parentheses.

備註	一、作答於試題上者，不予計分。 二、試題請隨卷繳交。