

Briefly answer the following questions.

1. Please read the following items in order, and construct the corresponding trees.

Sep, Aug, Jul, Feb, Jun, May, Mar, Jan, Apr

(1) Binary search tree. (5%)

(2) AVL tree. (7%)

(3) 2-3 tree. (8%)

2. Please write a program that uses a stack to determine whether a string is a palindrome (i.e., the string is spelled identically backward and forward). The program should ignore capitalization, spaces and punctuation. (25%)

3. Given an input list {13, 1, 15, 23, 7, 21, 3, 11, 19, 5, 17}, please demonstrate how the following two sorting methods sorts the list.

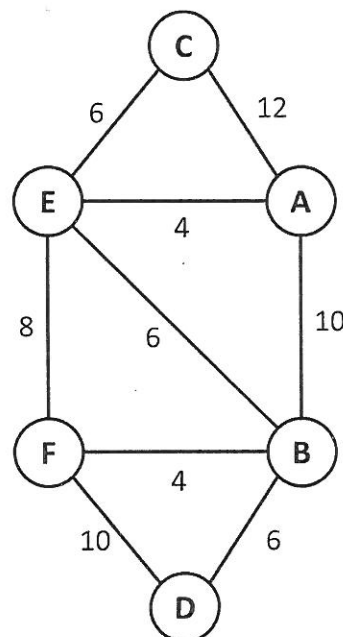
(1) Insertion sort. (10%)

(2) Heap sort. (10%)

4. (1) Describe the hashing technique. (5%)

(2) How to solve the hash collision problem? (At least THREE kinds of methods should be provided). (15%)

5. Given the graph below:



(1) Draw the minimum spanning tree of the graph. (5%)

(2) Find the shortest path between Node C and all other nodes in the graph. (5%)

(3) Provide the adjacency matrix representation of the graph. (5%)