COSC2007O23F: Data Structures II

Assignment-2
Due-date: Friday, December 8, 2023 @11:59pm
Cut-off date: Sunday, December 10, 2023 @11:59pm

Objective:

The objective of this assignment is to practice and implement binary search tree operations.

Problem Specification:

Write a generic Java program to create a Binary Search Tree. This Binary Search Tree is to store the integer values. Your program should display a menu of choices to operate the Binary Search Tree data structure. **Please download BSTSample before start.** See the sample menu below:

- Insert a node (15, 5, 16, 3, 12, 20, 10, 13, 18, 23, 6, 7)(see Fig. 1a)

- Find a node

- Delete a node (see Fig. 1b, 1c, 1d)

  1. Deleting a node with no children (13)
  2. Deleting a node with one child (16)
  3. Deleting a node with two children (5)

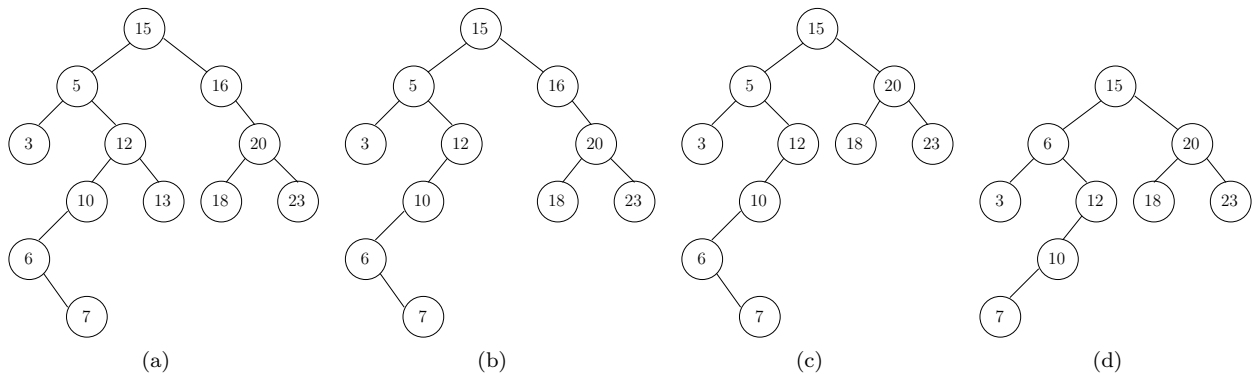- Print preorder, inorder, and postorder traversal

Figure 1: *(a) Binary Search Tree after inserting all the values; (b) Binary Search Tree after deleting 13; (c) Binary Search Tree after deleting 16; (d) Binary Search Tree after deleting 5*

   Here is a sample execution of the program:
   After Insertion:
   Preorder traversal: 15 5 3 12 10 6 7 13 16 20 18 23
   Inorder traversal: 3 5 6 7 10 12 13 15 16 18 20 23
   Postorder traversal: 3 7 6 10 13 12 5 18 23 20 16 15

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After deleting:
Preorder traversal: 15 5 3 12 10 6 7 16 20 18 23
Inorder traversal: 3 5 6 7 10 12 15 16 18 20 23
Postorder traversal: 3 7 6 10 12 5 18 23 20 16 15
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After deleting:
Preorder traversal: 15 5 3 12 10 6 7 20 18 23
Inorder traversal: 3 5 6 7 10 12 15 18 20 23
Postorder traversal: 3 7 6 10 12 5 18 23 20 15
=====================
After deleting:
Preorder traversal: 15 6 3 12 10 7 20 18 23
Inorder traversal: 3 6 7 10 12 15 18 20 23
Postorder traversal: 3 7 10 12 6 18 23 20 15
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Submission Instructions:

Submit your complete Java source code to Moodle. Comment your program carefully so that it can be read and understood. If your program is not properly commented you may lose marks. See **marking scheme** for details.

Marking Scheme:

Comments in the program:	5
Complete program, no compile/logical error, and correct output:	45