CS163 – Data Structures & Algorithms

Lab 04
23 tree

Department of Software Engineering-FIT-VNU-HCMUS

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Notes

Create a single solution/folder to store your source code in a week.

Then, create a project/sub-folder to store your source code of each assignment.

The source code in an assignment should have at least 3 files:

- A header file (.h): struct definition, function prototypes/definition.
- A source file (.cpp): function implementation.
- Another source file (.cpp): named YourID_Ex01.cpp, main function. Replace 01 by id of an assignment.

Make sure your source code was built correctly. Use many test cases to check your code before submitting to Moodle.

Name of your submission: **StudentID_W04_YY.zip**. YY: number of assignments you have done. YY: 00 – 99.

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Content

In this lab, we will review the following topics:

- How to insert and delete an item to a 23 tree?

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Assignments

A: YY: 01 (Paper assignment)

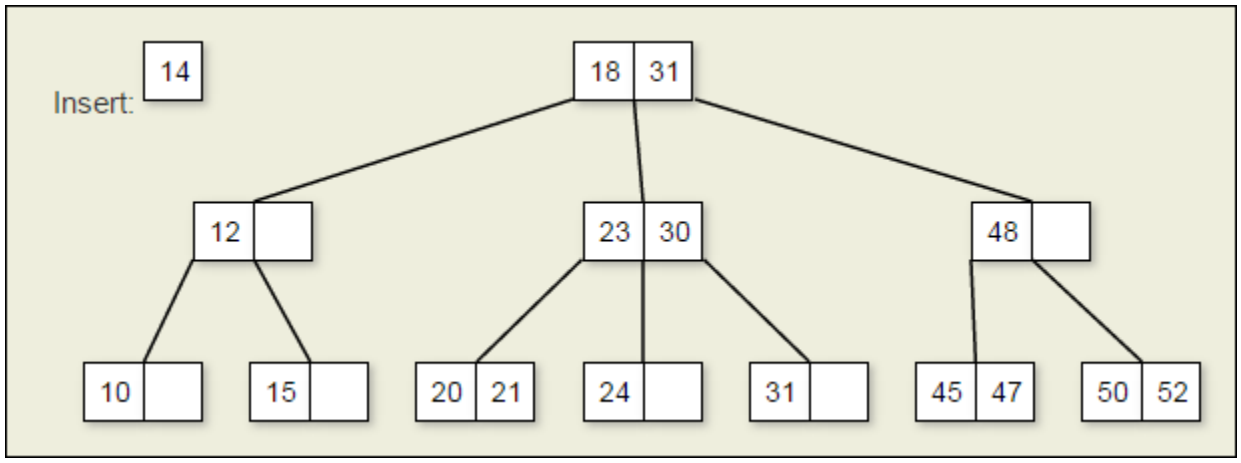
H: YY: 06

Visualization:

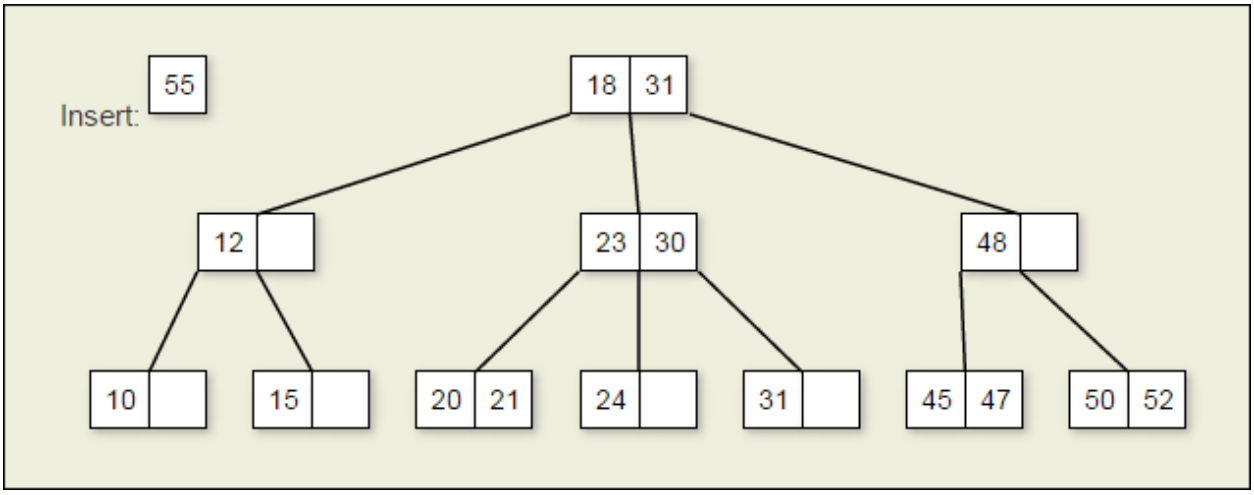
1. https://www.cs.usfca.edu/~galles/visualization/Algorithms.html
   a. 23 tree: **UNCHECK** option "Preemtive Split / Merge"
   b. 234 tree: **CHECK** option "Preemtive Split / Merge"
2. https://visualgo.net/en

3.1. Assignment 1 – Paper assignment

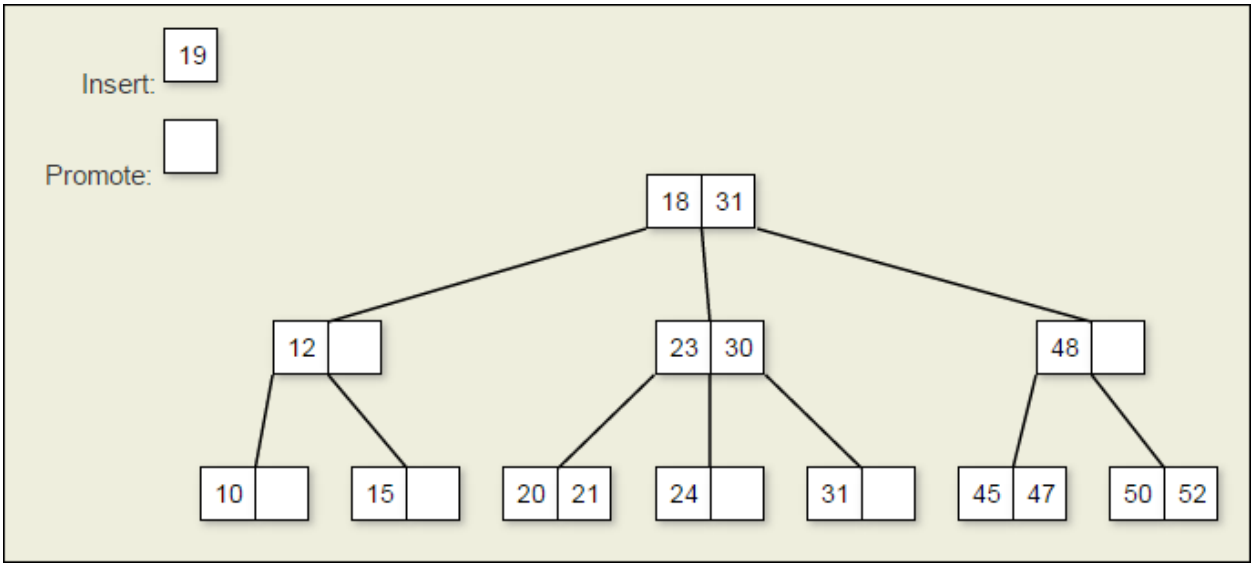
1. Insert 14 into the following 2-3 tree



2. Insert 55 into the following 2-3 tree



3. Insert 19 into the following 2-3 tree



4. Insert to a tree the list of numbers as follow: 74, 12, 217, 36, 61, 77, 286, 153, 337, 93, 121, 47, 463, 248 and 146.
    a. 23 tree

3.2. Assignment 2 - Insertion of 2-3 tree

Load a list of integer numbers from a text file to a 2-3 tree.

Save the tree to another text file in in-order traversal.

3.3. Assignment 3 - Invert Binary Tree

https://leetcode.com/problems/invert-binary-tree/

3.4. Assignment 4 - Same Differences

https://codeforces.com/problemset/problem/1520/D

3.5. Assignment 5 - Vanya and Lanterns

https://codeforces.com/problemset/problem/492/B

3.6. Assignment 6 - T-Prime

https://codeforces.com/problemset/problem/230/B