THE UNIVERSITY OF VERMONT
COLLEGE OF ENGINEERING &
MATHEMATICAL SCIENCES

Tree Rotations

CS 124 / Department of Computer Science

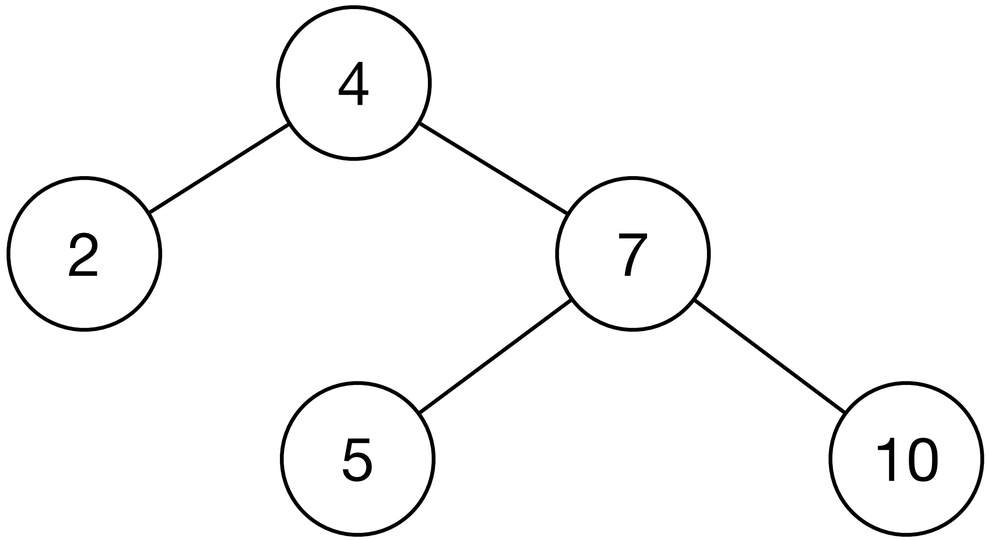
What Is a Tree Rotation?

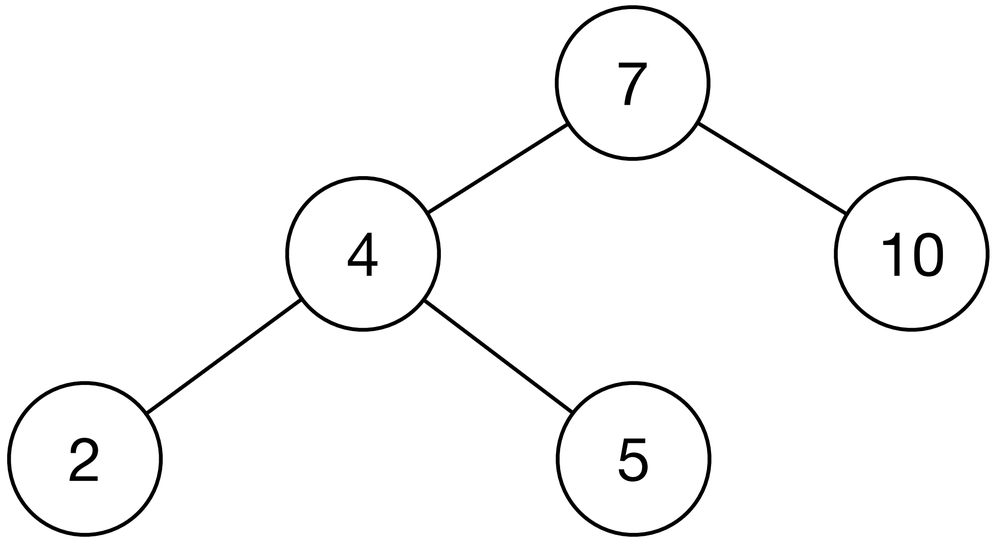
...and why should I care?

- Tree rotations are modifications of a tree that preserve the order of elements while changing the structure.
- Tree rotations are used in AVL trees (this module) and splay trees (next module) to balance a tree and to move a node to the root.
- This operation can be used on binary search trees without violating the BST properties.
- Subtrees can be rotated too.
- Inorder traversal order remains invariant.

Tree Rotation

The basics





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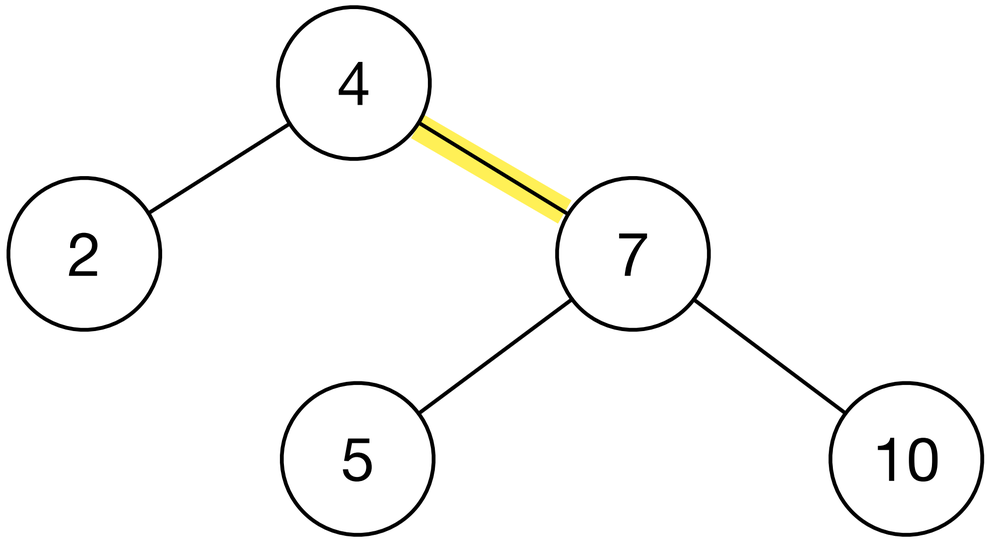

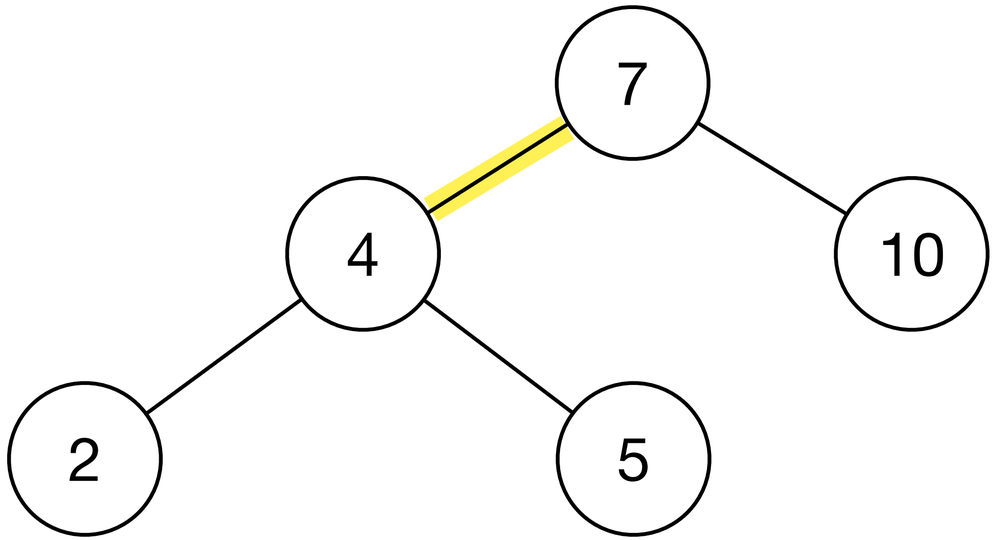

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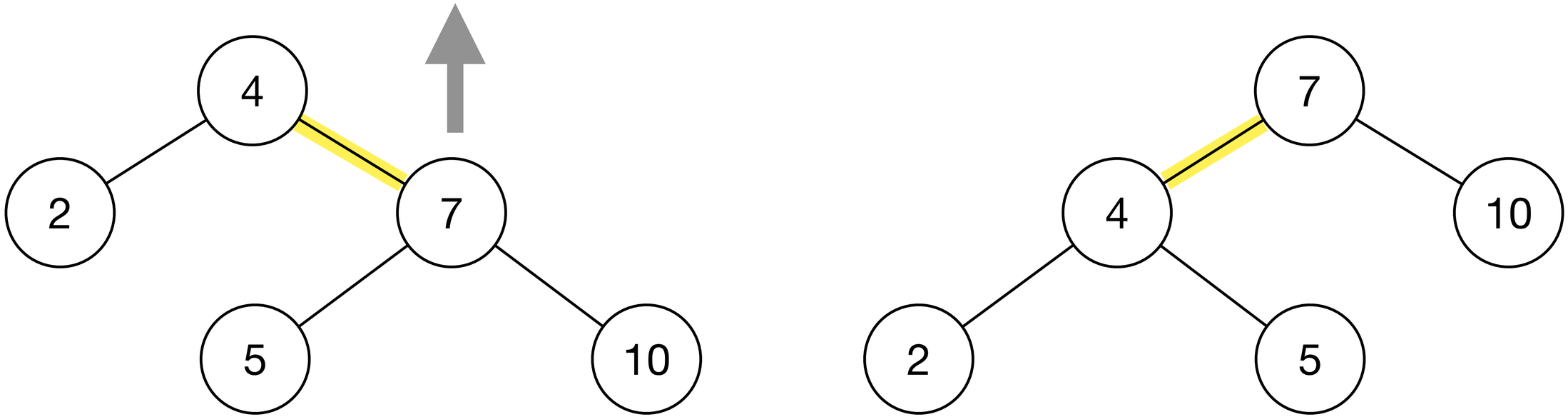
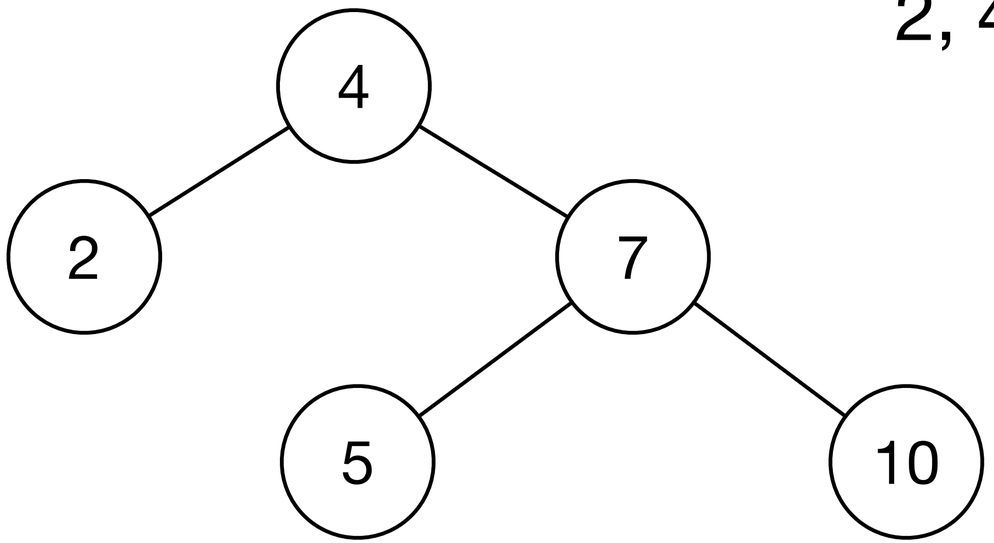
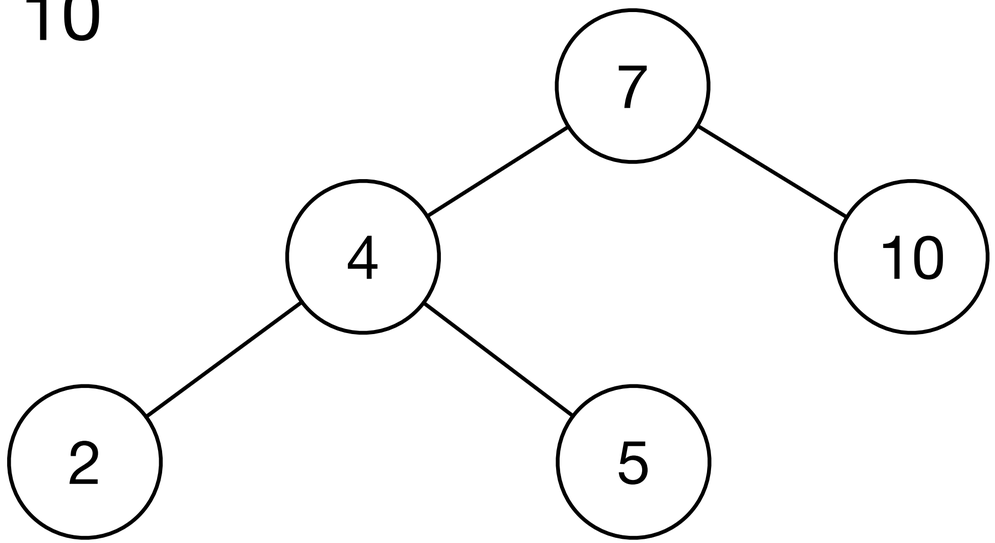


Tree Rotation

The basics

In-order traversal:
2, 4, 5, 7, 10





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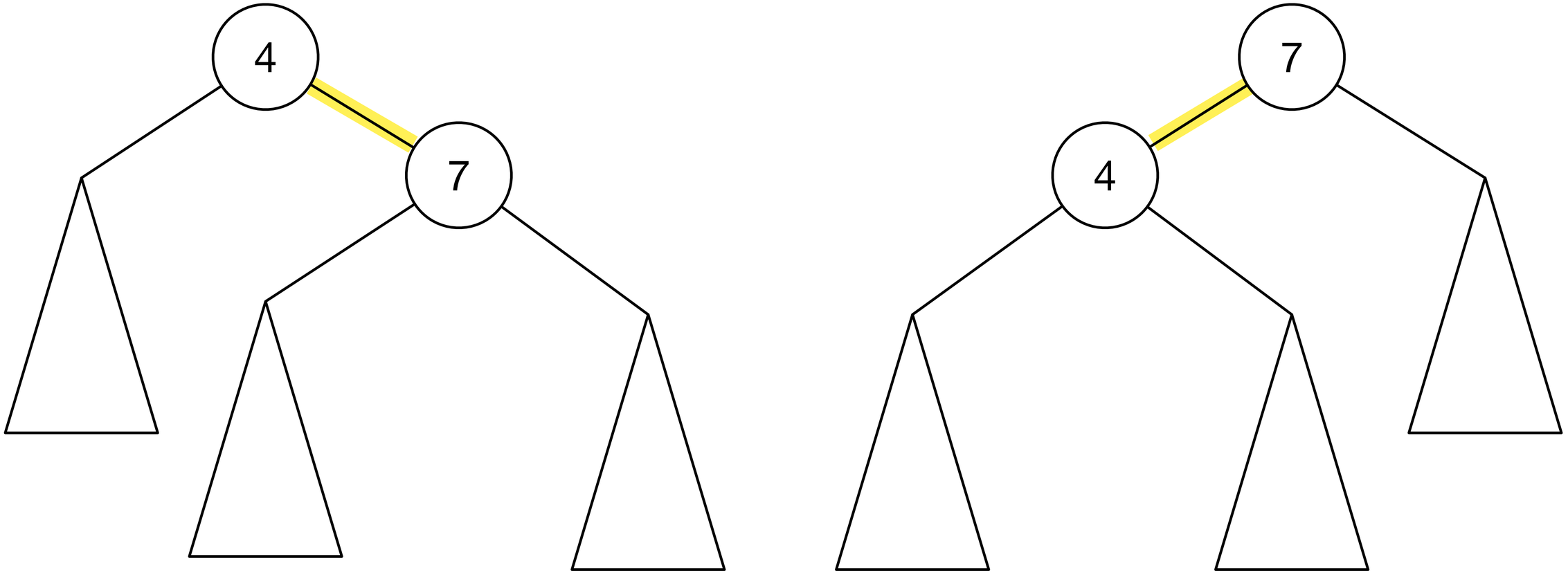

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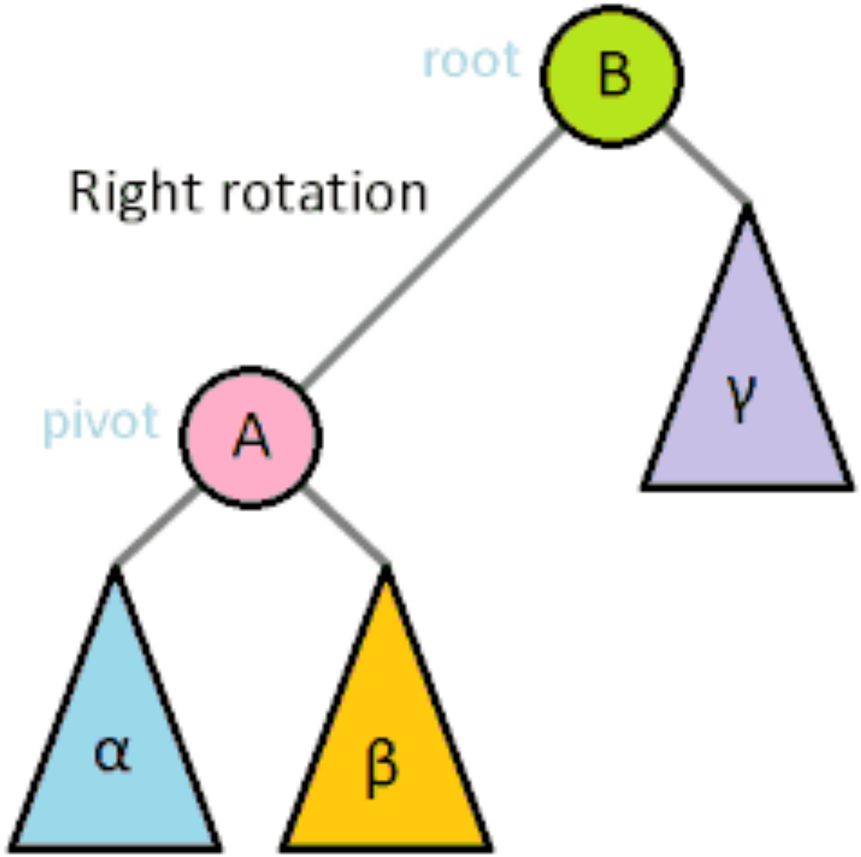

Source: https://en.wikipedia.org/wiki/Tree_rotation#/media/File:Tree_rotation_animation_250x250.gif

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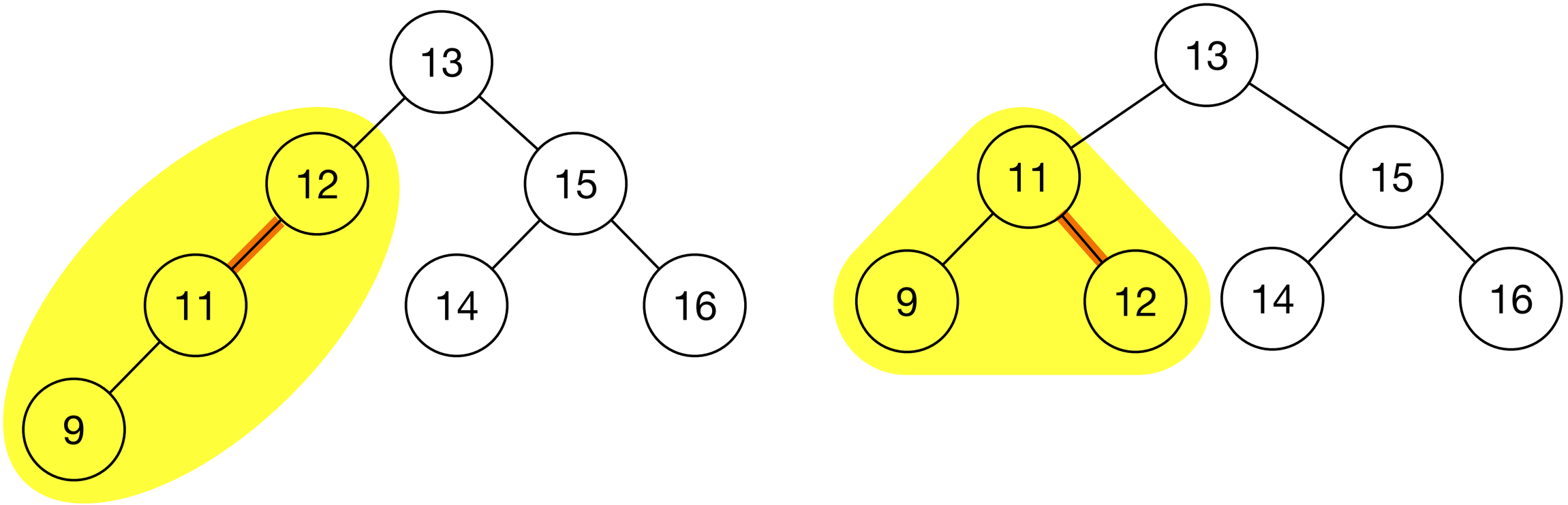
The basics



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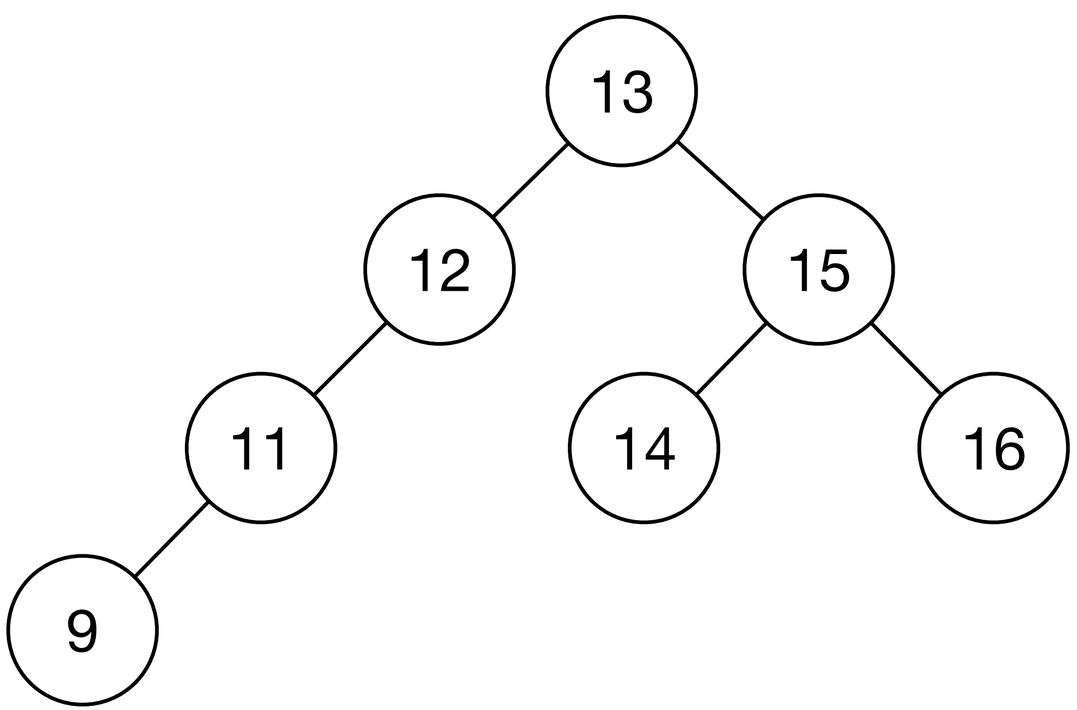
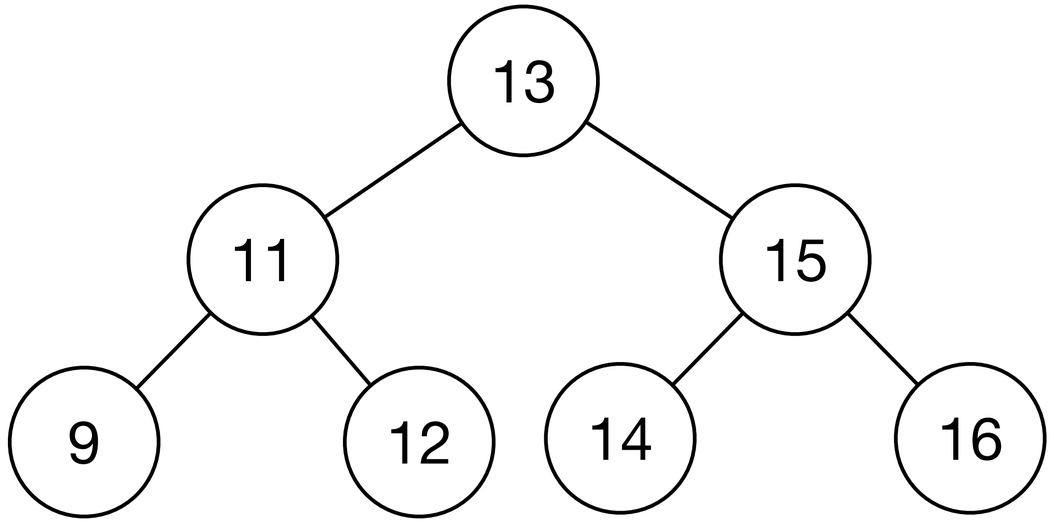
The basics

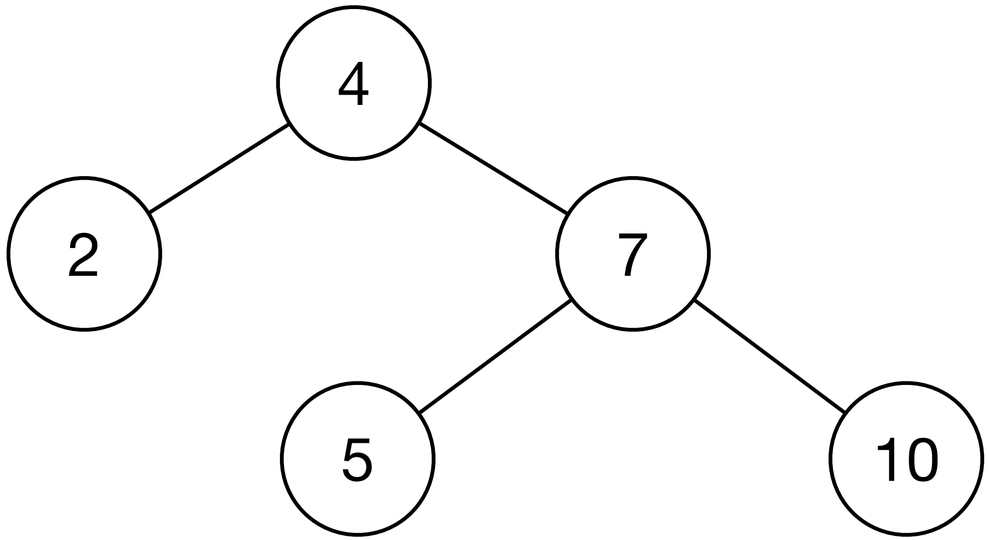


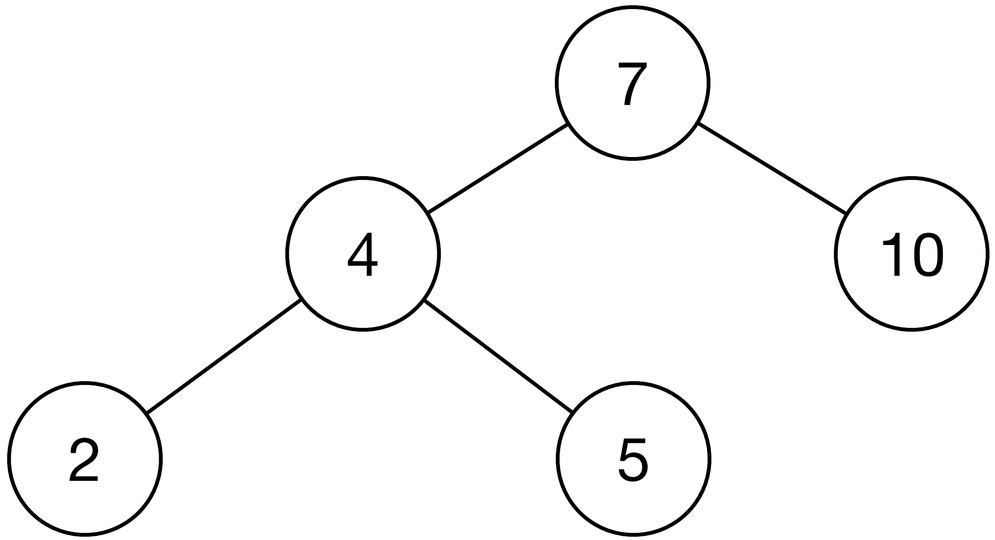


In-order traversal: 9, 11, 12, 13, 14, 15, 16

Tree Rotation

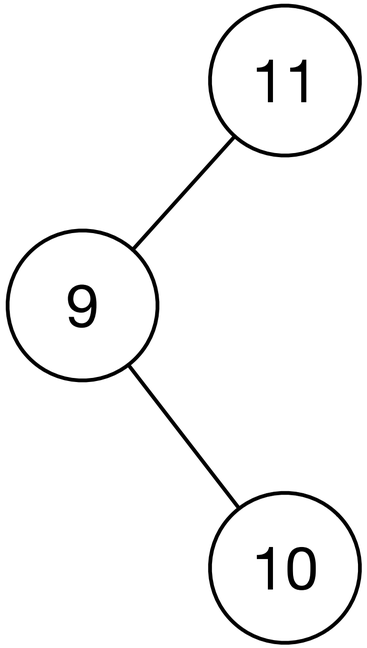
The basics





Tree Rotation

The basics: double rotation



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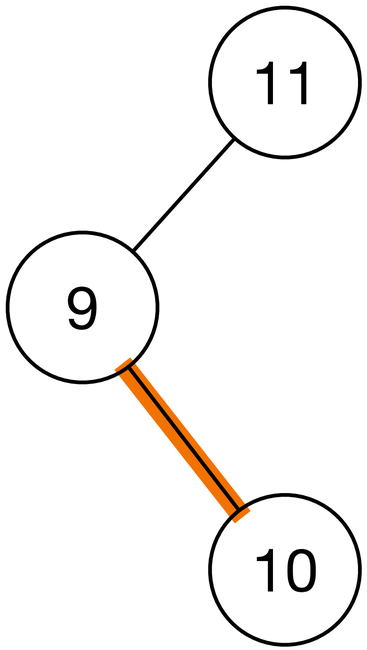

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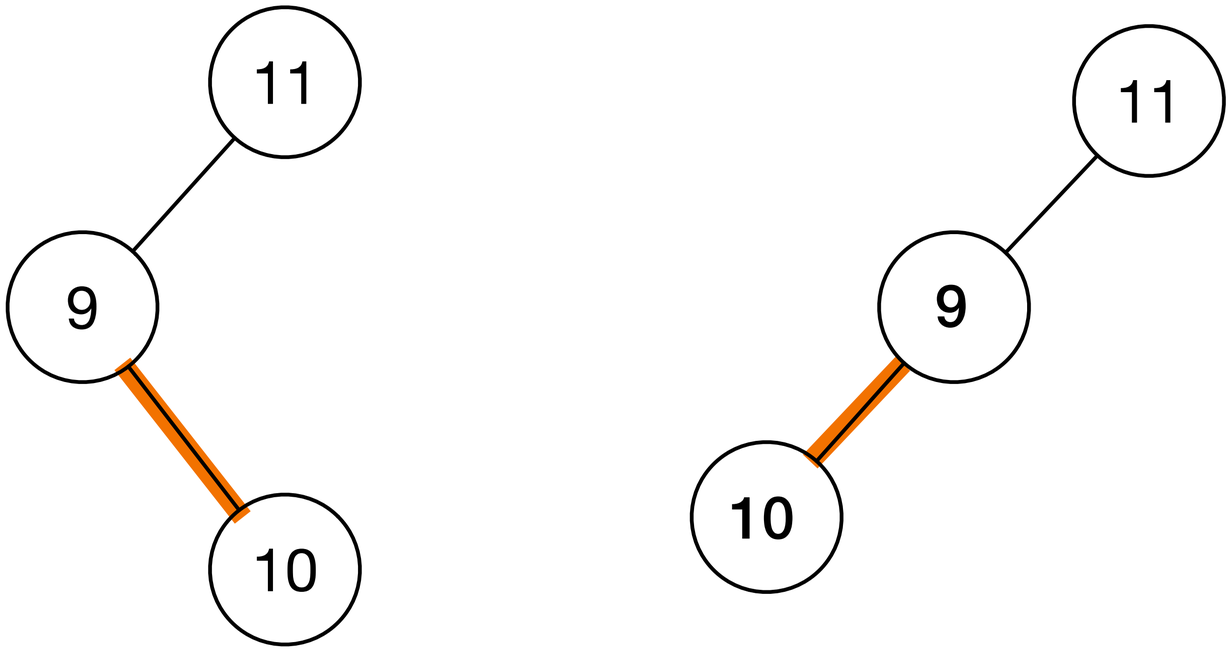

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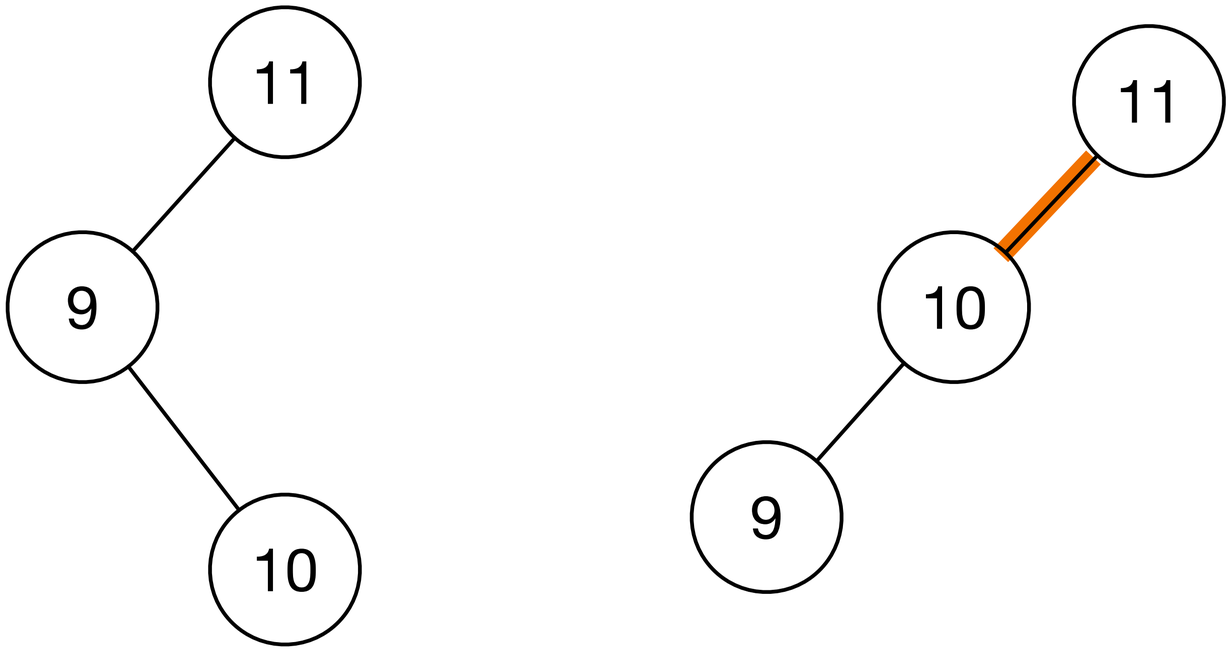

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The basics: double rotation