Algorithms and Data Structures 1 2024 - Assignment 4
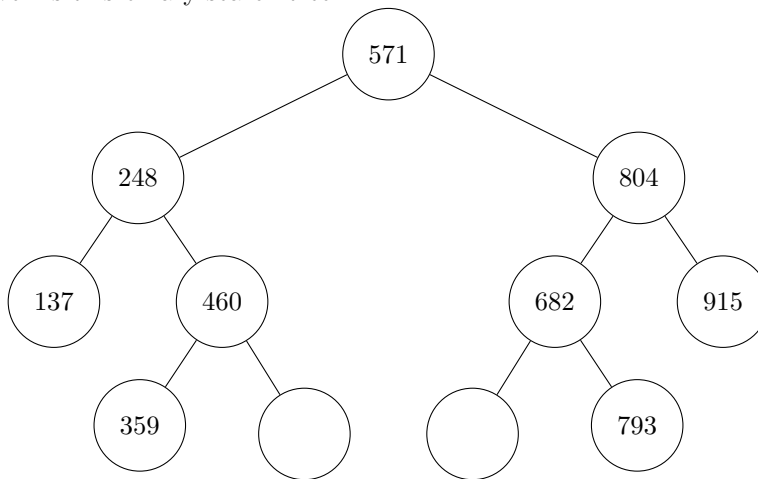
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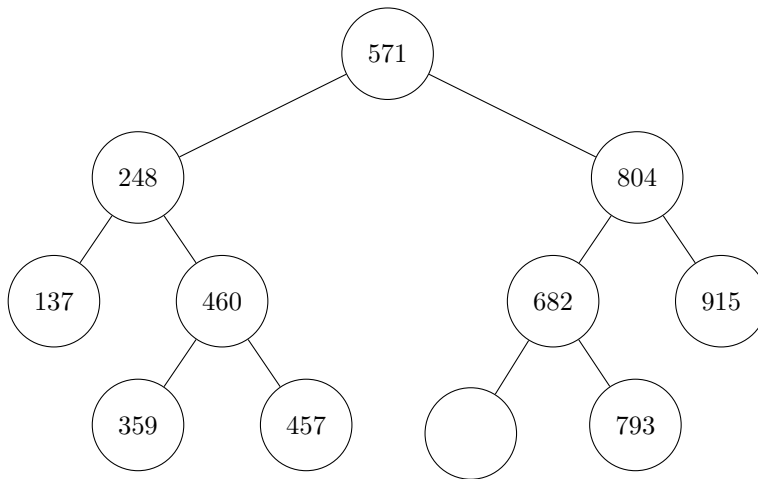## 1. Binary Search Tree - Insert and remove

Given is this binary search tree:

Insert a new node with the key **457** to the tree:

Comparisons:

- $457 < 571$, go left

- $457 > 248$, go right

- $457 < 804$, go left

- $457 < 460$, go left

- $457 > 359$, go right

- Insert 457 as right child of 460

The root has 2 children, we need to find a node that will keep the structure of the tree the same, either the largest node in the subtree on the left or the smallest node in the subtree on the right.

Remove the node with the key **571** from the tree:

Comparisons:

- 571 > 248, go right
- 571 < 804, go left
- 571 > 460, go right
- 571 < 682, stay on the right and check the other nodes on that level.
- Remove 571
- Replace 571 with 682 (keep the structure same w.r.t the right child of 682)
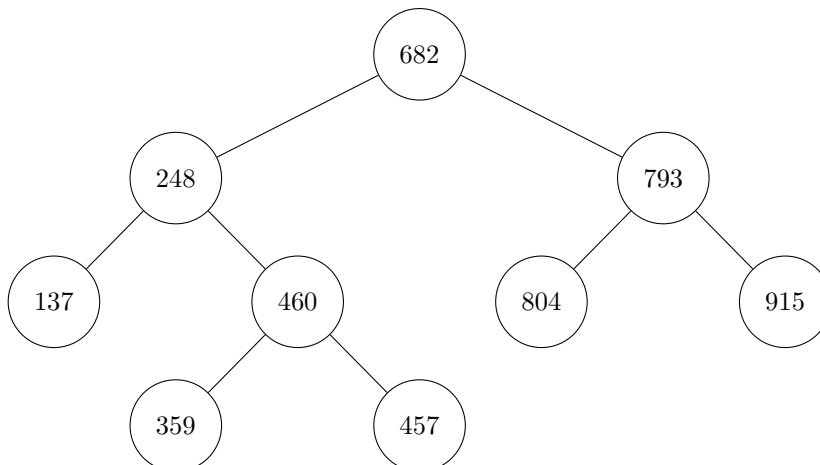
Insert a new node **117**:

Comparisons:

- 117 < 682, go left

- 117 < 248, go left

- 117 < 137, go left

- Insert 117 as the left child of 137