

Binary Search Trees: Search Trees

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Data Structures Fundamentals
Algorithms and Data Structures

Learning Objectives

- Describe how a Binary Search Tree data structure is constructed.
- Determine whether a tree is properly sorted.

Last Time

- Want data structure for local search.

Last Time

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- None of the existing data structures work.

Last Time

- Want data structure for local search.
- None of the existing data structures work.
- Sorted arrays can search but not update.

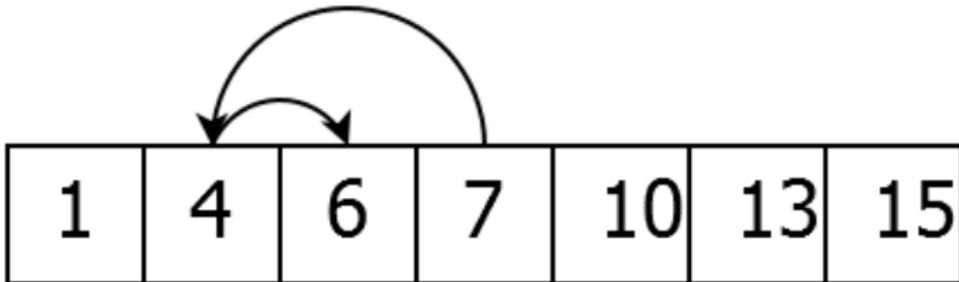
Outline

① Array Search

② The Search Tree Structure

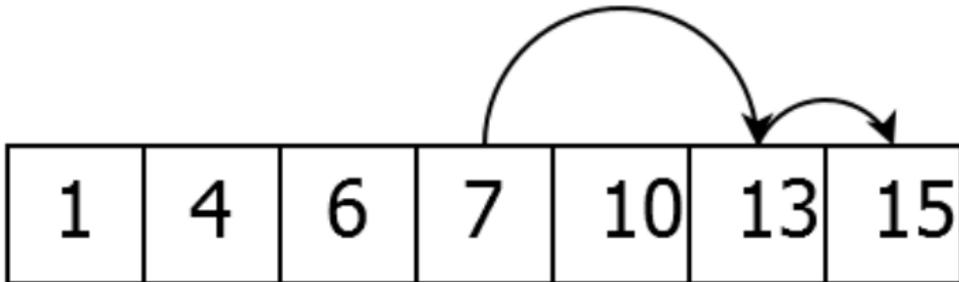
Binary Search

Search an array:



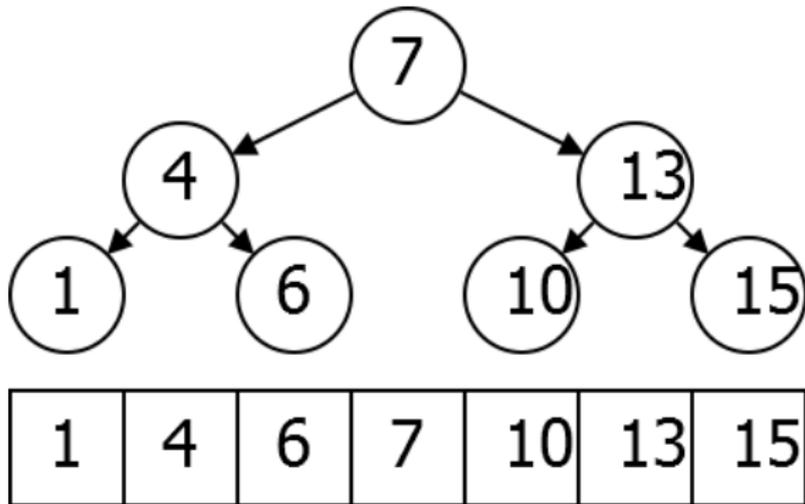
Binary Search

Search an array:



Search Tree

Consider questions asked:



The search tree is much easier to insert into.

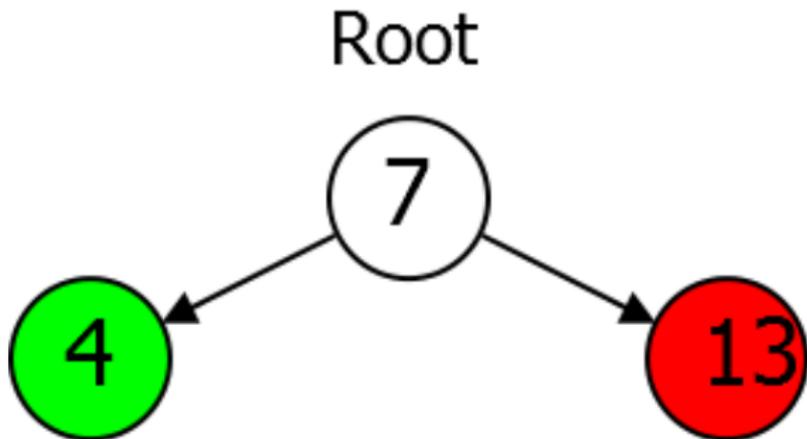
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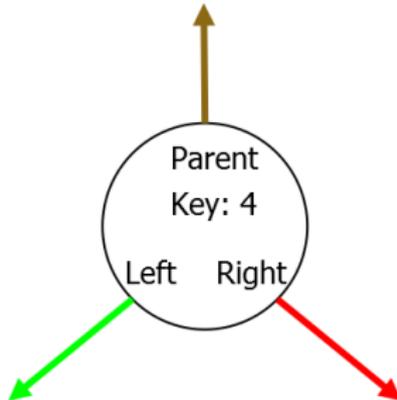
Parts of a Tree

- Root node.
- Left subtree smaller keys.
- Right subtree bigger keys.



Tree Node Data Type

- Key
- Parent
- Left Child
- Right Child

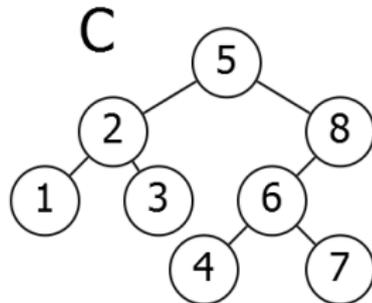
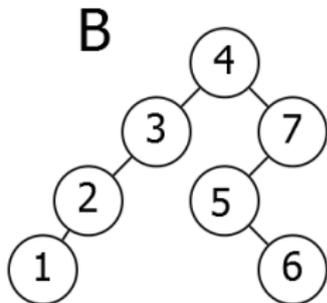
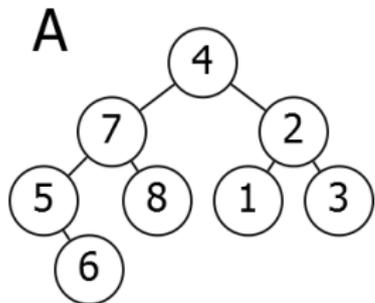


Search Tree Property

X 's key is larger than the key of any descendent of its left child, and smaller than the key of any descendant of its right child.

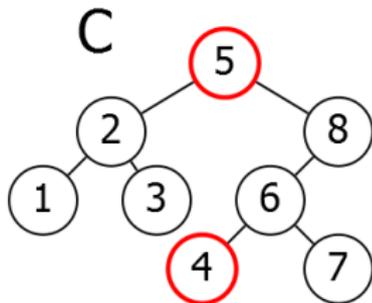
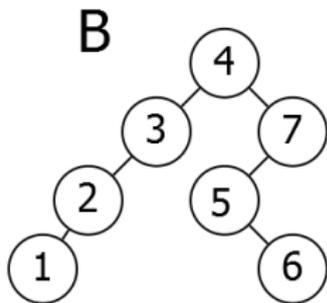
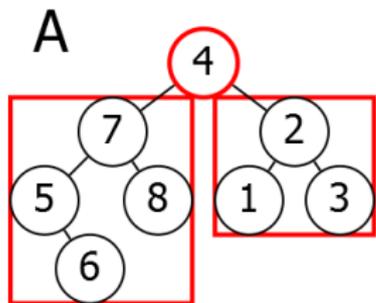
Problem

Which of the following Trees satisfies the Search Tree Property?



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Next Time

How to do basic operations on Binary Search Trees.