Data Structures and Algorithms

Lecture 14

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Contents

1 Agenda

1.1 Data Structures

1.2 Searching

2 Searching

- Given a set S of n elements, we want to search whether $x \in S$.
- Time Complexity can be improved if S is an ordered set.
- What data structure should be used? Array? Linked Lists?

- Given a **dynamic** set S of ordered elements (e.g., numbers), we want to search whether $x \in S$.
- What data structure should be used?

2.1 We want to create a data structure that supports the following operations

- Insert(x)
- Delete(x)
- Find(x)
- List-All-Elements()

3 Binary Search Trees

3.1 Traversals

- Preorder

```
Preorder(T) {
 Print(T.key)
 Preorder(T.left)
 Preorder(T.right)
}
```

- Inorder

```
Inorder(T) {
 Inorder(T.left)
 Print(T.key)
 Inorder(T.right)
}
```

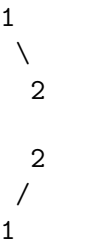
- Postorder

```
Postorder(T) {
 Postorder(T.left)
 Postorder(T.right)
 Print(T.key)
}
```

4 Counting the number of BSTs

- $n = 1$

- $n = 2$



- $n = 3$