

# Module 11: Overview



## Overview

A dynamic data structure manipulates sets that can grow, shrink, or change. A dictionary is a dynamic data structure that supports insertion, deletion, and search. We will first study binary search trees (BSTs). The major drawback of BSTs is the worst-case running time of the operations insertion, deletion, and search. These operations require  $O(H)$  time, where  $H$  is the height of the tree. We then study RBTs which guarantees worst-case running time of insertion, deletion, and search to be bounded by  $O(\log n)$ , where  $n$  is the number of nodes in the tree. In a RBT with  $n$  nodes, the height of the tree is bounded by  $O(\log n)$ .

## Learning Objectives

By the end of this module, you will be able to:

1. Study the binary search tree data structure and corresponding algorithms
2. Analyze the performance of binary search trees and present the more advanced binary search tree data structure

## Readings

Read the following:

- Section 12.1
- Section 12.2
- Section 12.3
- Section 13.1
- Section 13.2
- Section 13.3
- Section 13.4