

CS 331: Algorithms and Complexity (Spring 2024)

Unique numbers: 50930/50935/50940/50945

Discussion Section 5

Problem 1

Solve the following recurrences.

1. $T(n) = 9T(n/3) + n + n^2 + 1$
2. $T(n) = 2T(2n/9) + \sqrt{n}$
3. $T(n) = 2T(n/11) + \sqrt{\sqrt{n}}$
4. $T(n) = T(n - 2) + O(1)$
5. $T(n) = 2T(n^{1/4}) + 1$
6. $T(n) = 2T(n) + n^2$

Problem 2

You are climbing a stair case. It takes n steps to reach to the top. Each time you can either climb 1 or 2 steps. In how many distinct ways can you climb to the top?

Problem 3

Given n , how many structurally unique binary search trees (BST's) can you construct that store values $1 \dots n$?

For example, given $n = 3$, there are a total of 5 unique BST's:

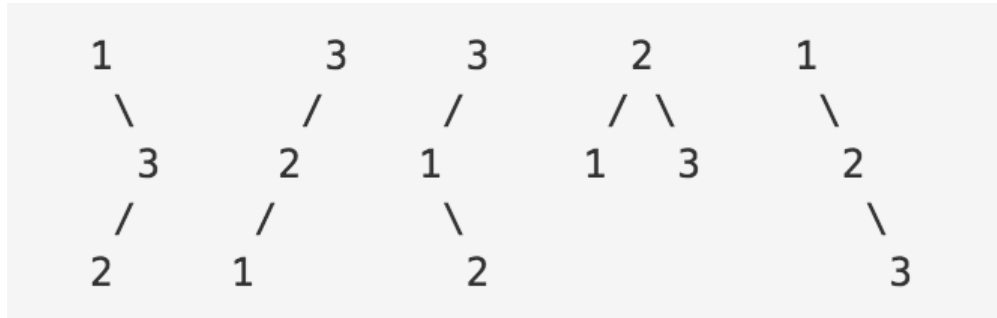


Figure 1: All the unique BST's given $n = 3$