1. Provide a dynamic programming algorithm that, given n, calculates the number of distinct binary search trees you can construct with exactly n nodes, using all the values from 1 to n, and analyze the runtime. If $n = 2$, then you should return 2, since you can either have 2 as the root with 1 as its left child, or 1 as the root with 2 as its right child. If $n = 3$, then you should return 5.