AlgoExpert Quad Layout C++ 12px Sublime Monokai 00:00:00

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Solution 1 Solution 2 Solution 3

```cpp
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using namespace std;

// O(n^2) time | O(n) space
int numberOfBinaryTreeTopologies(int n) {
  vector<int> cache{1};
  for (int m = 1; m < n + 1; m++) {
    int numberOfTrees = 0;
    for (int leftTreeSize = 0; leftTreeSize < m; leftTreeSize++) {
      int rightTreeSize = m - 1 - leftTreeSize;
      int numberOfLeftTrees = cache[leftTreeSize];
      int numberOfRightTrees = cache[rightTreeSize];
      numberOfTrees += numberOfLeftTrees * numberOfRightTrees;
    }
    cache.push_back(numberOfTrees);
  }
  return cache[n];
}
```