gridTravelerDynProgJS

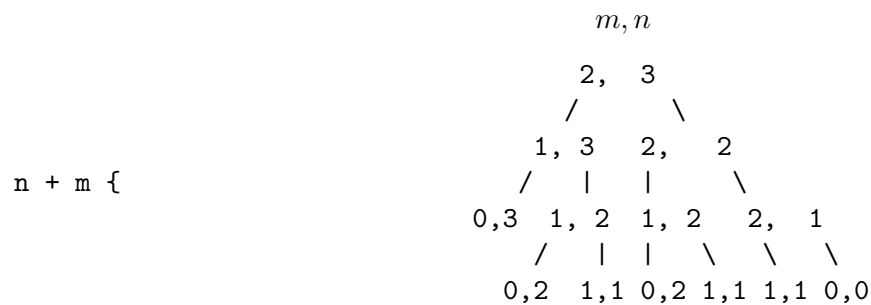March 9, 2021

1 Grid Traveler

1.0.1 Traveling on a 2D grid

Begin in top-left corner towards bottom-right, moving only downward or right. How many iterations of grid travel with dimensions

$$m * n$$

gridTraveler(m, n)

// calculate

$$m, n$$

```
                    2,  3
                   /       \
                 1, 3   2,   2
 n + m {        /  |   |     \
             0,3  1, 2 1, 2   2,  1
             /   |  |  \   \   \
           0,2  1,1 0,2 1,1 1,1 0,0
```

$$O(2^{n+m}) time$$

$$O(n + m) space$$

Can become more efficient with passing in a memo object in JavaScript:

```
const gridTraveler = (m, n, memo={}) => {
  const key = m + ',' + n;

  if (key in memo) return memo[key];
  if (m === 1 && n === 1) return 1;
  if (m === 0 || n === 0) return 0;

  memo[key] = gridTraveler(m - 1, n, memo) + gridTraveler(m, n - 1, memo);
  return memo[key];
};

// console.log(gridTraveler(18, 18)); // 2333606220
```