Problem 2630: Memoize II

Problem Information

Difficulty: Hard
Acceptance Rate: 0.00%
Paid Only: No

Problem Description

Given a function

fn

, return a

memoized

version of that function.

A

memoized

function is a function that will never be called twice with the same inputs. Instead it will return a cached value.

fn

can be any function and there are no constraints on what type of values it accepts. Inputs are considered identical if they are

===

to each other.

Example 1:

Input:

getInputs = () => [[2,2],[2,2],[1,2]] fn = function (a, b) { return a + b; }

Output:

[{"val":4,"calls":1},{"val":4,"calls":1},{"val":3,"calls":2}]

Explanation:

const inputs = getInputs(); const memoized = memoize(fn); for (const arr of inputs) { memoized(...arr); }

For the inputs of (2, 2): 2 + 2 = 4, and it required a call to fn(). For the inputs of (2, 2): 2 + 2 = 4, but those inputs were seen before so no call to fn() was required. For the inputs of (1, 2): 1 + 2 = 3, and it required another call to fn() for a total of 2.

Example 2:

Input:

getInputs = () => [[{},{}],[{},{}],[{},{}]] fn = function (a, b) { return ({...a, ...b}); }

Output:

[{"val":{},"calls":1},{"val":{},"calls":2},{"val":{},"calls":3}]

Explanation:

Merging two empty objects will always result in an empty object. It may seem like there should only be 1 call to fn() because of cache-hits, however none of those objects are === to each other.

Example 3:

Input:

getInputs = () => { const o = {}; return [[o,o],[o,o],[o,o]]; } fn = function (a, b) { return ({...a, ...b}); }

Output:

[{"val":{},"calls":1},{"val":{},"calls":1},{"val":{},"calls":1}]

Explanation:

Merging two empty objects will always result in an empty object. The 2nd and 3rd third function calls result in a cache-hit. This is because every object passed in is identical.

Constraints:

1 <= inputs.length <= 10

5

0 <= inputs.flat().length <= 10

5

inputs[i][j] != NaN

Code Snippets

JavaScript:

```
/**
* @param {Function} fn
* @return {Function}
*/
function memoize(fn) {

return function() {

}
}
```

```
/**
* let callCount = 0;
* const memoizedFn = memoize(function (a, b) {
* callCount += 1;
* return a + b;
* })
* memoizedFn(2, 3) // 5
* memoizedFn(2, 3) // 5
* console.log(callCount) // 1
*/
```

TypeScript:

```
type Fn = (...params: any) => any

function memoize(fn: Fn): Fn {

return function() {

}
}


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Solutions

JavaScript Solution:

```
/**
* Problem: Memoize II
* Difficulty: Hard
* Tags: general
*
* Approach: Optimized algorithm based on problem constraints
* Time Complexity: O(n) to O(n^2) depending on approach
* Space Complexity: O(1) to O(n) depending on approach
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