

Problem 2691: Immutability Helper

Problem Information

Difficulty: Hard

Acceptance Rate: 40.23%

Paid Only: Yes

Problem Description

Creating clones of immutable objects with minor alterations can be a tedious process. Write a class `ImmutableHelper` that serves as a tool to help with this requirement. The constructor accepts an immutable object `obj` which will be a JSON object or array.

The class has a single method `produce` which accepts a function `mutator`. The function returns a new object which is similar to the original except it has those mutations applied.

`mutator` accepts a **proxied** version of `obj`. A user of this function can (appear to) mutate this object, but the original object `obj` should not actually be effected.

For example, a user could write code like this:

```
const originalObj = {"x": 5}; const helper = new ImmutableHelper(originalObj); const newObj = helper.produce((proxy) => { proxy.x = proxy.x + 1; }); console.log(originalObj); // {"x": 5} console.log(newObj); // {"x": 6}
```

Properties of the `mutator` function:

- * It will always return `undefined`.
- * It will never access keys that don't exist.
- * It will never delete keys (`delete obj.key`)
- * It will never call methods on a proxied object (`push`, `shift`, etc).
- * It will never set keys to objects (`proxy.x = {}`)

****Note on how the solution will be tested:**** the solution validator will only analyze differences between what was returned and the original `obj`. Doing a full comparison would be too computationally expensive. Also, any mutations to the original object will result in a wrong answer.

****Example 1:****

```
**Input:** obj = {"val": 10}, mutators = [ proxy => { proxy.val += 1; }, proxy => { proxy.val -= 1; } ]
**Output:** [ {"val": 11}, {"val": 9} ]
**Explanation:** const helper = new ImmutableHelper({val: 10}); helper.produce(proxy => { proxy.val += 1; }); // { "val": 11 } helper.produce(proxy => { proxy.val -= 1; }); // { "val": 9 }
```

****Example 2:****

```
**Input:** obj = {"arr": [1, 2, 3]} mutators = [ proxy => { proxy.arr[0] = 5; proxy.newVal = proxy.arr[0] + proxy.arr[1]; } ]
**Output:** [ {"arr": [5, 2, 3]}, {"newVal": 7} ]
**Explanation:** Two edits were made to the original array. The first element in the array was set to 5. Then a new key was added with a value of 7.
```

****Example 3:****

```
**Input:** obj = {"obj": {"val": {"x": 10, "y": 20}}} mutators = [ proxy => { let data = proxy.obj.val; let temp = data.x; data.x = data.y; data.y = temp; } ]
**Output:** [ {"obj": {"val": {"x": 20, "y": 10}}} ]
**Explanation:** The values of "x" and "y" were swapped.
```

****Constraints:****

* `2 <= JSON.stringify(obj).length <= 4 * 105` * `mutators` is an array of functions * `total calls to produce() < 105`

Code Snippets

JavaScript:

```
var ImmutableHelper = function(obj) {
  ;

  /**
   * @param {Function} mutator
   * @return {JSON} clone of obj
   */
  ImmutableHelper.prototype.produce = function(mutator) {
  };
}
```

```

/**
* const originalObj = {"x": 5};
* const mutator = new ImmutableHelper(originalObj);
* const newObj = mutator.produce((proxy) => {
* proxy.x = proxy.x + 1;
* });
* console.log(originalObj); // {"x: 5"}
* console.log(newObj); // {"x": 6}
*/

```

TypeScript:

```

type JSONValue = null | boolean | number | string | JSONValue[] | { [key: string]: JSONValue };
type InputObj = Record<string, JSONValue> | Array<JSONValue>;

class ImmutableHelper {

constructor(obj: InputObj) {

}

produce(mutator: (obj: InputObj) => void) {

}

}

/** 
* const originalObj = {"x": 5};
* const mutator = new ImmutableHelper(originalObj);
* const newObj = mutator.produce((proxy) => {
* proxy.x = proxy.x + 1;
* });
* console.log(originalObj); // {"x: 5"}
* console.log(newObj); // {"x": 6}
*/

```