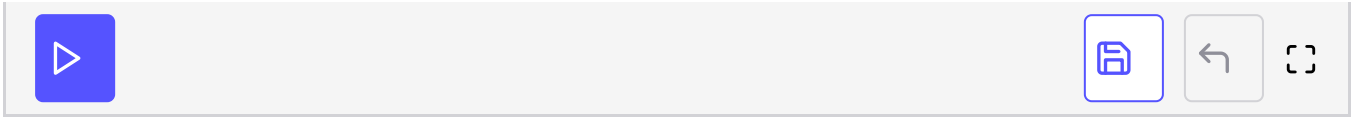
Writing an Array Extension

Write a function that creates a palindrome of any array.

Suppose an array of numbers is given. Create a method `toPalindrome` that creates a palindrome out of your array in the following way:

```
const arr = [1,2,3];
//[1, 2, 3]
const arr2 = arr.toPalindrome()
//[1, 2, 3, 2, 1]
const arr3 = arr2.toPalindrome()
//[1, 2, 3, 2, 1, 2, 3, 2, 1]
console.log( arr, arr2, arr3 );
//[1, 2, 3] [1, 2, 3, 2, 1] [1, 2, 3, 2, 1, 2, 3, 2, 1]
//undefined
```

```
Array.prototype.toPalindrome = function(){
//write your code here
}
```



gives an error

`toPalindrome()` returns a new array. It keeps the element `arr[arr.length - 1]` the same, and concatenates all the other elements of the array after the end in reverse order.

Solution:

This exercise is straightforward, it only requires basic JavaScript knowledge, including JavaScript prototypes. We can go on the safe route, and only use basic ES5 constructs.

```
Array.prototype.toPalindrome = function() {
    const result = this.slice();
    for ( var i = this.length - 2; i >= 0; --i ) {

        result.push( this[i] );
    }
    return result;
}

const arr = [1,2,3];
console.log(arr.toPalindrome())
//[1, 2, 3, 2, 1]
console.log(arr.toPalindrome().toPalindrome())
//[1, 2, 3, 2, 1, 2, 3, 2, 1]
```

To solve this task, you need to know the following about JavaScript:

- To create an array method, we need to extend the prototype of the `Array` object
- The `slice` method without arguments *clones* an array of integers. In reality, this is a *shallow copy*, which is fine in case of atomic values like integers. To read more about cloning, check out my blog posts Cloning Objects in JavaScript and Understanding Value and Reference Types in JavaScript.
- We use a simple `for` loop to iterate on the elements of the original array that we want to `push` to the end of the array. Push modifies the original `result` array.

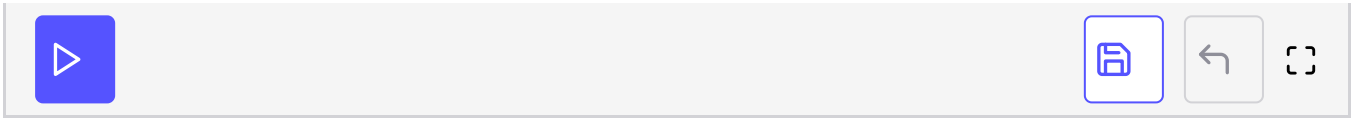
This is a safe and straightforward solution. You can use some more native array methods to make the solution more compact:

```
Array.prototype.toPalindrome = function() {
    return this.slice().concat( this.slice( 0, this.length - 1 ).reverse() )
}
const arr = [1,2,3];
console.log(arr.toPalindrome())
//[1, 2, 3, 2, 1]

console.log(arr.toPalindrome().toPalindrome())
//[1, 2, 3, 2, 1, 2, 3, 2, 1]
```

The solution can be explained as follows:

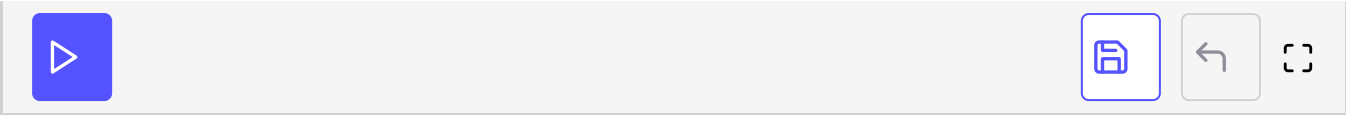
- `slice` still makes a shallow copy of the original array
- `this.slice( 0, this.length - 1 )` makes a shallow copy of the original array, excluding the last element
- `reverse` reverses the elements of the array. Although `reverse` mutates the original array, we are mutating the shallow copy `this.slice( 0, this.length - 1 )`.
- `concat` concatenates two arrays

```
const arr = [1,2,3];

// slice: shallow copy
const arr2 = arr.slice();
//[1, 2, 3]
arr2[ 1 ] = 5;
console.log( arr, arr2 );
//[1, 2, 3] [1, 5, 3]
const arr3 = arr.slice( 0, arr.length - 1 );
//[1, 2]

// reverse
arr2.reverse();
console.log( arr, arr2 );
//[1, 2, 3] [3, 5, 1]

// concat
console.log(arr.concat( arr3 ));
//[1, 2, 3, 1, 2]

console.log( arr, arr3 )
//[1, 2, 3] [1, 2]

console.log(arr.concat( arr3.reverse() ))
//[1, 2, 3, 2, 1]

console.log(arr3)
//[2, 1]
```



If we use ES6, we can replace the `slice` and the `concat` methods with the spread operator:

```
Array.prototype.toPalindrome = function() {
    return [...this, ...this.slice( 0, this.length - 1 ).reverse() ];
}

const arr = [1,2,3];
console.log(arr.toPalindrome())
```



If you would like to read more about the spread operator, sign up for my ES6 minicourse or check out my article on the Spread Operator and Rest Parameters.

As you can see, this simple exercise is linked to a lot of JavaScript knowledge that you need to be aware of.