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Array Methods

Using array methods for cleaner JavaScript code

JavaScript Fundamentals

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Array Methods for Conditions

Array#every, Array#some

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Array Methods for Conditions: Array#every

- Array#every
  - Signature: `[].every(callback);`
  - Callback: `callback(item [, index [, arr]])`
  - Returns: `Boolean`
  - Behavior: returns TRUE if ALL the elements of the array meets the criteria in callback()
    - Returns FALSE if ANY of the elements does not meet the criteria in callback()
  - Support: everywhere

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Array Methods for Conditions: Array#every

- Examples:
  - Check if all the numbers in the array are odd?

```
function isOdd(number) {
  return !!(number % 2);
}

console.log([1, 2, 3, 4].every(isOdd));          //false
console.log([1, 3, 5, 7].every(isOdd));          //true
```

  - Check if all the numbers are greater than 18

```
function isGreaterThan18(number) {
  return number > 18;
}

console.log([22, 23].every(isGreaterThan18));    //true
console.log([19, 18].every(isGreaterThan18));    //false
```

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Array#every

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Array Methods for Conditions: Array#some

- Array#some
  - Signature: `[].some(callback);`
  - Callback: `callback(item [, index [, arr]])`
  - Returns: `Boolean`
  - Behavior: returns TRUE if ANY of the elements of the array meets the criteria in callback()
    - Returns FALSE if NONE of the elements meets the criteria in callback()
  - Support: everywhere

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Array Methods for Conditions: Array#some

- Examples:
  - Check if there is at least one odd number

```
function isOdd(number) {
  return !!(number % 2);
}
console.log([1, 2, 3, 4].some(isOdd));          //true
console.log([1, 3, 5, 7].some(isOdd));          //true
console.log([2, 4, 6, 8].some(isOdd));          //false
```

  - Check if at least one number greater than 18

```
function isGreaterThan18(number) {
  return number > 18;
}
console.log([22, 23].some(isGreaterThan18));    //true
console.log([19, 18].some(isGreaterThan18));    //true
console.log([17, 18].some(isGreaterThan18));    //false
```

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Array#some

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Array Methods for Transformation

Array#filter, Array#map, Array#reduce

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Array Methods for Transormation: Array#filter

- Array#filter
  - Signature: `[].filter(callback);`
  - Callback: `callback(item [, index [, arr]])`
  - Returns: `Array`
  - Behavior: extracts in a new array only the elements that meet the criteria in callback()
    - Returns empty array, if no element meets the criteria
  - Support: everywhere

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Array Methods for Transormation: Array#filter

- Examples:
  - Extract the odd numbers from the array

```
function isOdd(number) {
  return !!(number % 2);
}
console.log([1, 2, 3, 4].filter(isOdd));   //[1, 3]
console.log([1, 3, 5, 7].filter(isOdd));   //[1, 3, 5, 7]
console.log([2, 4, 6, 8].filter(isOdd));   //[]
```

  - Returns the numbers in a given range

```
function InRange(min, max) {
  return function(item) {
    return min <= item && item <= max;
  };
}
var numbers = [2, 3, 4, 5, 6, 7, 8];
console.log(numbers.filter(inRange(4, 7)));       //[4, 5, 6, 7]
console.log(numbers.filter(inRange(2, 4)));       //[2, 3, 4]
```

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Array#filter

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Array Methods for Transormation: Array#reduce

- Array#reduce
  - Signature: `[].reduce(callback, initial);`
  - Callback: `callback(item [, index [, arr]])`
  - Returns: `Object`
  - Behavior: returns a single object, the result of the callback()
  - Support: everywhere

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Array Methods for Transormation: Array#reduce

- Examples:
  - Calculates the sum and product on numbers

```
var sum = [1, 2, 3, 4].reduce(function(sum, number) {
  return sum + number;
}, 0);
var product = [1, 2, 3, 4].reduce(function(sum, number) {
  return sum * number;
}, 1);
console.log(sum);                    //10
console.log(product);                //24
```

  - Flattens array

```
var arr = [1, [2, 3], [4], [5, 6], 7];
function flatten(arr, item) {
  if (Array.isArray(item)) { return arr.concat(item); }
  return arr.concat([item]);
}
console.log(arr.reduce(flatten, [])); //[ 1, 2, 3, 4, 5, 6, 7 ]
```

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Array#reduce

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Array Methods for Transormation: Array#map

- Array#map
  - Signature: `[].map(callback);`
  - Callback: `callback(item [, index [, arr]])`
  - Returns: `Object`
  - Behavior: returns a new array with the same size. Each element is mapped, based on callback()
  - Support: everywhere

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Array Methods for Transormation: Array#map

- Examples:
  - Calculates the sum and product on numbers

```
var squares = [1, 2, 3, 4, 5].map(function(number) {
  return number * number;
});
console.log(squares); //prints [ 1, 4, 9, 16, 25 ]
```

  - Parses a matrix given as an array of rows into an array of arrays of numbers

```
var lines = ['1 2 3',
             '4 5 6'];
var matrix = lines.map(function(line) {
  return line.split(' ')
             .map(Number);
});                                          // [[1, 2, 3],
console.dir(matrix);                         //  [4, 5, 6]]
```

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Array#map

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Array Methods for Iteration

Array#forEach

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Array Methods for Iteration: Array#forEach

- Array#forEach
  - Signature: `[].forEach(callback);`
  - Callback: `callback(item [, index [, arr]])`
  - Returns: `undefined`
  - Behavior: iterates the elements and passes each element as argument to callback
    - Much like a for-of loop where the callback is the body of the loop
  - Support: everywhere

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Array Methods for Iteration: Array#forEach

- Examples:
  - Print the elements of an array with their index

```
var numbers = ['One', 'Two', 'Three', 'Four', 'Five'];
numbers.forEach(function(item, index) {
  console.log('Item at' + index + 'has value' + item);
});
```

  - Call a method for each object in an array

```
function createPerson(name, age) { //… }
var people = [createPerson('Peter', 13),
              createPerson('John', 18),
              createPerson('Susan', 21)];
people.forEach(function(person) {
  person.introduce();
});
```

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Array#forEach

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Array Methods for Searching

Array#find, Array#findIndex

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Array Methods for Searching: Array#find

- Array#find
  - Signature: `[].find(callback);`
  - Callback: `callback(item [, index [, arr]])`
  - Returns: `Object` or `undefined`
  - Behavior: returns the leftmost element in the array, that meets the criteria in callback
    - If no such element is found, returns `undefined`
  - Support: Almost nowhere, needs a polyfill

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Array Methods for Searching: Array#find

- Examples:
  - Find the leftmost odd number, greater than 5

```
var numbers = [1, 2, 3, 4, 5, 6, 7, 8, 9, 10];
console.log(numbers.find(function(item) {
  return !!(item % 2) && item > 5;
}));              //prints 7
```

  - Find the leftmost odd number, that is after index 3

```
var numbers = [1, 2, 3, 4, 5, 6, 7, 8, 9, 10];
console.log(numbers.find(function(item, index) {
  return index > 3 && !!(item % 2);
}));              //prints 5
```

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Array#find

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Array Methods for Searching: Array#findIndex

- Array#findIndex
  - Signature: `[].findIndex(callback);`
  - Callback: `callback(item [, index [, arr]])`
  - Returns: `Number` or `-1`
  - Behavior: returns the index of the leftmost element in the array, that meets the criteria in callback
    - If no such element is found, returns `-1`
  - Support: Almost nowhere, needs a polyfill

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Array Methods for Searching: Array#findIndex

- Examples:
  - Find the index of leftmost odd number, greater than 5

```
var numbers = [1, 2, 3, 4, 5, 6, 7, 8, 9, 10];
console.log(numbers.findIndex(function(item) {
  return !!(item % 2) && item > 5;
}));              //prints 6(element 7)
```

  - Find the index of the leftmost odd number, that is after index 3

```
var numbers = [1, 2, 3, 4, 5, 6, 7, 8, 9, 10];
console.log(numbers.findIndex(function(item, index) {
  return index > 3 && !!(item % 2);
}));              //prints 4(element 5)
```

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Array#findIndex

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Other Array Methods

Array#sort, Array#fill

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Other Array Methods: Array#sort

- Array#sort
  - Signature: `[].sort(callback);`
  - Callback: `callback(obj1, obj2)`
  - Returns: `undefined`
  - Behavior: sorts the items from the array, based on the callback()
  - Support: everywhere

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Other Array Methods: Array#sort

- Examples:
  - Sorts an array of numbers descending

```
var numbers = [5, 1, 2, 4, 6];
numbers.sort(function(x, y) {
  return y - x;
});
console.log(numbers);                    //[ 6, 5, 4, 2, 1 ]
```

  - Sorts array of people by name

```
var people = [createPerson('Peter', 13),
  createPerson('John', 18),
  createPerson('Susan', 21)
];
people.sort(function(p1, p2) {
  return p1.name > p2.name;
});
console.log(people);                     // John, Peter, Susan
```

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Array#sort

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Other Array Methods: Array#fill

- Array#fill
  - Signature: `[].fill(callback);`
  - Callback: `callback(value [, from [, to]])`
  - Returns: `Array`
  - Behavior: fills an array with the given value
  - Support: Almost nowhere, needs a polyfill

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Other Array Methods: Array#fill

- Examples:
  - Fills an array with the number 1

```
var arr = [],
    count = 15;
arr[count - 1] = undefined;
arr.fill(1);
console.log(arr);
```

  - Create array of arrays

```
var arr = [],
  count = 5;
arr[count - 1] = undefined;

arr.fill([1, 2, 3, 4, 5]);
console.log(arr);
```

```
[ [ 1, 2, 3, 4, 5 ],
  [ 1, 2, 3, 4, 5 ],
  [ 1, 2, 3, 4, 5 ],
  [ 1, 2, 3, 4, 5 ],
  [ 1, 2, 3, 4, 5 ] ]
```

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Array#fill

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Chaining Array Methods

How to write more functional code

What is Chaining?

- Chaining is a pattern for calling/invoking methods in functional programming
  - Each method returns an object
    - Another method can be called on this object
    - Etc…
- To implement chaining, follow the simple pattern:
  - If a method needs to return result -> Ok, return it
    - Else return an object to enable chaining

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Chaining Array Methods

- Most of the array methods return a result
  - So they can be chained
  - Example: Fill an array with random digits, remove the even digits, return an array with the names of the remaining digits

```
var n = 10, digits = [];
digits[n - 1] = undefined;
function getRandomDigit() { return (Math.random() * 10) | 0; }
function isOdd(item) { return !!(item % 2); }
function digitToDigitName(digit) {
  return ['Zero', 'One', /* … */, 'Nine'][digit];
}
var digitNames = digits.fill(0)
  .map(getRandomDigit)
  .filter(isOdd)
  .map(digitToDigitName);
console.log(digitNames);
```

In ES6:

```
var digitNames = digits.fill(0)
  .map(x => Math.random()*10 | 0)
  .filter(x=> !!(x%2))
  .map(x=> […][x]);
console.log(digitNames);
```

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Chaining Array Methods

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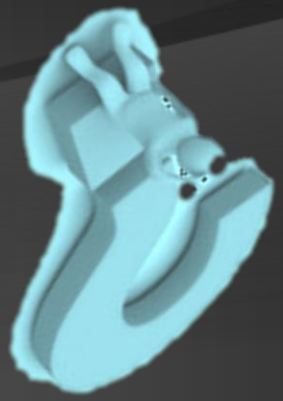
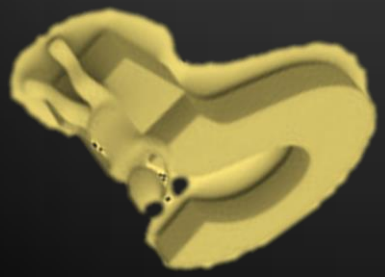
Array Methods



Questions?



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