Let's dive into JavaScript's map() and filter() methods.

Map()
The map() method creates a new array with transformed elements from the original array.
Syntax: arr.map(callbackFunction)

Real-World Example:
Suppose you have an e-commerce website with an array of product prices. You want to add a 10% discount to each price.

```
const prices = [100, 200, 300, 400, 500];
const discountedPrices = prices.map((price) => price * 0.9);
console.log(discountedPrices); // [90, 180, 270, 360, 450]
```

How it works:
1. The map() method iterates through each element in the prices array.
2. For each element, the callback function (price) => price * 0.9 is executed.
3. The result of the callback function is added to the new discountedPrices array.

Filter()
The filter() method creates a new array with elements that pass a test implemented by a provided function.
Syntax: arr.filter(callbackFunction)

Real-World Example:
Suppose you have an array of students with their ages. You want to find students who are 18 or older.

```
const students = [
  { name: 'John', age: 17 },
  { name: 'Alice', age: 20 },
  { name: 'Bob', age: 15 },
  { name: 'Charlie', age: 22 },
];

const adultStudents = students.filter((student) => student.age >= 18);
```

```
console.log(adultStudents);
// [{ name: 'Alice', age: 20 }, { name: 'Charlie', age: 22 }]
```

How it works:
1. The filter() method iterates through each element in the students array.
2. For each element, the callback function (student) => student.age >= 18 is executed.
3. If the callback function returns true, the element is added to the new adultStudents array.

Problem Sets:

Map() Exercises:
1. Double each number in the array [1, 2, 3, 4, 5].
2. Convert each string in the array ['hello', 'world'] to uppercase.
3. Calculate the square root of each number in the array [16, 25, 36].

Filter() Exercises:
1. Find even numbers in the array [1, 2, 3, 4, 5].
2. Find strings longer than 5 characters in the array ['hello', 'world', 'abc'].
3. Find objects with a price greater than 100 in the array [{ price: 50 }, { price: 150 }, { price: 200 }].

Mixed Exercises:
1. Find the square of each even number in the array [1, 2, 3, 4, 5].
2. Convert each string to uppercase and filter out strings shorter than 5 characters.