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**Introduction to Programming With JavaScript**
**Arrays – Exercises**

**1:** This exercise asks us to say what the final length values of array1, array2, array3, array4, and array5 are in the following code:

```javascript
let array1 = [1, 2, undefined, 4];

let array2 = [1];
array2.length = 5;

let array3 = [];
array3[-1] = [1];

let array4 = [1, 2, 3, 4, 5];
array4.length = 3;

let array5 = [];
array5[100] = 3;
```

*array1* has length 4; it has 4 elements, even if one of them is undefined.
*array2* has length 5; the length property of the array is changed to 5.
*array3* has length 0; -1 is not a valid index for the array, so even though it now has a -1 property, the length is unchanged.
*array4* has length 3; the length property of the array is changed to 3.
*array5* has length 101; the assignment of the value 3 to index 100 changes the array from an empty array to an array with length 101.

**2:** This exercise asks us to log all the even values of an array named myArray to the console. I
did this in the two following ways:

```
let myArray = [1, 3, 6, 11, 4, 2,
   4, 9, 17, 16, 0];

for (let index in myArray) {
  if (myArray[index]%2 === 0) console.log(myArray[index]);
}
```

```
let myArray = [1, 3, 6, 11, 4, 2,
   4, 9, 17, 16, 0];

myArray.forEach(element => {
  if (element%2 === 0) console.log(element);
});
```

**3:** This exercise asks us to log the even numbers in a nested array. I did this as follows:

```
let myArray = [
  [1, 3, 6, 11],
  [4, 2, 4],
  [9, 17, 16, 0],
];

for (let i = 0; i < myArray.length; i++) {
  for (let j = 0; j < myArray[i].length; j++) {
    if (myArray[i][j]%2 === 0) console.log(myArray[i][j]);
  }
}
```

```
let myArray = [
  [1, 3, 6, 11],
  [4, 2, 4],
  [9, 17, 16, 0],
];

myArray.forEach(array => {
  array.forEach(element => {
    if (element%2 === 0) console.log(element);
  });
});
```

**4:** This exercise asks us to use the map function/method to create an array that contains an element for every element in the input array that is 'even' if the corresponding element is even, and 'odd' if the corresponding element is odd. I did this as follows:

```
let myArray = [
  1, 3, 6, 11,
  4, 2, 4, 9,
  17, 16, 0,
];

let newArray = myArray.map(num => (num%2 === 0) ? 'even' : 'odd');
```

**5:** This exercise asks us to us the filter method to implement a function that returns a new array with only the integers of the argument array. I did this as follows:

```
let array = [1, 'a', '1', 3, NaN, 3.1415, -4, null, false];

function removeNonInteger(anArray) {
  return anArray.filter(num => Number.isInteger(num));
}
```

**6:** This exercise asks us to use the map and filter methods to implement a function that first determines the lengths of the elements in an array of strings and then discards the even value. I did this as follows:

```
let arr = ['a', 'abcd', 'abcde', 'abc', 'ab'];
console.log(oddLengths(arr));

function oddLengths(array) {
   return array.map(string => string.length).filter(num => num%2 === 0);
}
```

**7:** This exercise asks us to use the reduce method to compute the sum of the squares of all the elements of an array. I did this as follows:

```
let numbers = [3, 5, 7];
console.log(sumOfSquares(numbers));

function sumOfSquares(array) {
   return array.reduce((accumulator, element) => accumulator + element**2, 0);
}
```

**8:** This exercise asks us to refactor the function from exercise 6 using only the reduce method. I did this as follows:

```
let arr = ['a', 'abcd', 'abcde', 'abc', 'ab'];
console.log(oddLengths(arr));

function oddLengths(array) {
   return array.reduce((accumulator, element) => {
     if (element.length%2 !== 0) accumulator.push(element.length);
     return accumulator;
   }, []);
}
```

**9:** This exercise asks us to write some code that checks whether the value 3 is in an array without using a for, while, do/while loops. I did this as follows:

```javascript
let numbers1 = [1, 3, 5, 7, 9, 11];
let numbers2 = [];
let numbers3 = [2, 4, 6, 8];

console.log(numbers1.includes(3));
console.log(numbers2.includes(3));
console.log(numbers3.includes(3));
```

**10:** This exercise asks us to write some code to extract the value 'mem' from an array. I did this as follows:

```javascript
let arr = [["test", "hello", "world"], ["example", 6, "mem", null], [4, 8, 12]];
console.log(arr[1][2]);
```