JavaScript Intermediate Concepts

Class 7 Course Content

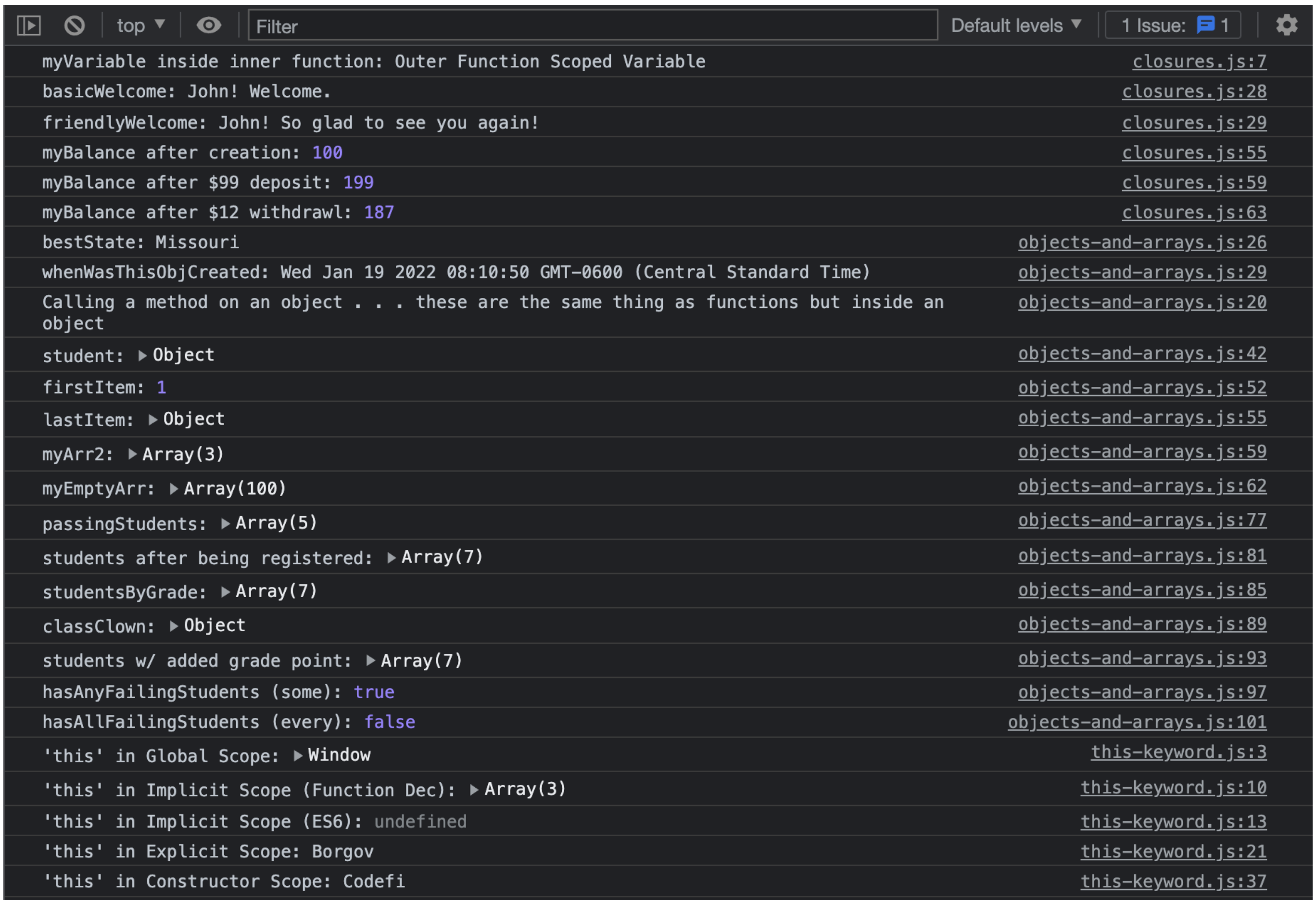
Preparation

GOALS

By the end of this lesson, you will be able to:

1. **Comprehend Closures**
2. **Master JS Objects & Arrays & Use Common Object/Array Methods**
3. **Tolerate the "this" Keyword**

JavaScript Intermediate Concepts



```
myVariable inside inner function: Outer Function Scoped Variable                closures.js:7
basicWelcome: John! Welcome.                                                    closures.js:28
friendlyWelcome: John! So glad to see you again!                                closures.js:29
myBalance after creation: 100                                                   closures.js:55
myBalance after $99 deposit: 199                                                closures.js:59
myBalance after $12 withdrawl: 187                                              closures.js:63
bestState: Missouri                                                   objects-and-arrays.js:26
whenWasThisObjCreated: Wed Jan 19 2022 08:10:50 GMT-0600 (Central Standard Time)  objects-and-arrays.js:29
Calling a method on an object . . . these are the same thing as functions but inside an   objects-and-arrays.js:20
object
student: ▶Object                                                      objects-and-arrays.js:42
firstItem: 1                                                          objects-and-arrays.js:52
lastItem: ▶Object                                                     objects-and-arrays.js:55
myArr2: ▶Array(3)                                                     objects-and-arrays.js:59
myEmptyArr: ▶Array(100)                                               objects-and-arrays.js:62
passingStudents: ▶Array(5)                                            objects-and-arrays.js:77
students after being registered: ▶Array(7)                            objects-and-arrays.js:81
studentsByGrade: ▶Array(7)                                            objects-and-arrays.js:85
classClown: ▶Object                                                   objects-and-arrays.js:89
students w/ added grade point: ▶Array(7)                              objects-and-arrays.js:93
hasAnyFailingStudents (some): true                                    objects-and-arrays.js:97
hasAllFailingStudents (every): false                                  objects-and-arrays.js:101
'this' in Global Scope: ▶Window                                                 this-keyword.js:3
'this' in Implicit Scope (Function Dec): ▶Array(3)                              this-keyword.js:10
'this' in Implicit Scope (ES6): undefined                                       this-keyword.js:13
'this' in Explicit Scope: Borgov                                                this-keyword.js:21
'this' in Constructor Scope: Codefi                                             this-keyword.js:37
```

CONCEPTS

- **Closures:** A *Closure* is a reference to the local scope when code has been executed out of the surrounding state. A closure gives you access to an outer function's scope from an inner function. Closures are handy in cases where you want to use data encapsulation, create higher-order functions or built-in JavaScript methods like `.map()` or `.filter()`.

- **this:** The *this* keyword in JavaScript is notorious for being difficult to explain. It ("this") refers to different things depending on its execution context.

Walkthrough

STEP 1: CLOSURES

Aim: Master the fundamentals of JavaScript Closures

| *./closures.js* |

- [ ] **Brief Introduction on Demo 1**
    - Declare a variable inside a function
    - Create a function inside that function that prints the variable to the console
    - In the first function, call the inner function
    - In the global scope, call the outer function

```
function outer() {
  let myVariable = "Outer Function Scoped Variable";

  function inner() {
    console.log("myVariable inside inner function:", myVariable);
  }

  inner();
}

outer(); // Prints: myVariable inside inner function: Outer Function
Scoped Variable
```

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- [ ] **Walkthrough Full Code for Demo 1**
    - Save the output of the outer function, which calls the inner function in a variable
    - Call the variable and check the console

```
// ~ DEMO 1 START ~ \\
function outer() {
  let myVariable = "Outer Function Scoped Variable";

  function inner() {
    console.log("myVariable inside inner function:", myVariable);
  }

  return inner;
}

const outerFunctionCall = outer();
```

```
outerFunctionCall(); // Prints: myVariable inside inner function: Outer
Function Scoped Variable
// ~ DEMO 1 END ~ \\
```

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- ☐ **Walkthrough Demo 2**
  - Create a `greeting` function that returns another function which takes in a second parameter
  - Create a variable that calls the greeting function passing in a generic greeting
  - Call the variable passing in the name (used for the second parameter callback function)
  - Test again

```
// ~ DEMO 2 START ~ \\
function greeting(greeting) {
  return function (name) {
    return `${name}! ${greeting}`;
  };
}

const basicWelcome = greeting("Welcome.");
const friendlyWelcome = greeting("So glad to see you again!");

console.log("basicWelcome:", basicWelcome("John"));
console.log("friendlyWelcome:", friendlyWelcome("John"));
// ~ DEMO 2 END ~ \\
```

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- ☐ **Walkthrough Demo 3**
  - Create a `createBankAccount` function that takes in an initial balance and declares it in the main function scope
  - Return an object of methods that use this variable
  - Create a variable with an initial value
  - Use that variable and call methods on it to add functionality
  - Print the results

```
// ~ DEMO 3 START ~ \\
const createBankAccount = (initialBalance) => {
  let userBalance = initialBalance;

  return {
    getBalance: function () {
      return userBalance;
    },
    deposit: function (amount) {
      userBalance += amount;
      return userBalance;
    },
    withdrawl: function (amount) {
      userBalance -= amount;
      return userBalance;
    },
  };
};

const myAccount = createBankAccount(100);
let myBalance;

myBalance = myAccount.getBalance(); // 100
console.log("myBalance after creation:", myBalance);

myAccount.deposit(99);
myBalance = myAccount.getBalance(); // 100
console.log("myBalance after $99 deposit:", myBalance);

myAccount.withdrawl(12);
myBalance = myAccount.getBalance(); // 100
console.log("myBalance after $12 withdrawl:", myBalance);
// ~ DEMO 3 END ~ \\
```

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Check: Ensure your understanding of JS Closures

- What is a closure, and why would we want to use them?

STEP 2: OBJECTS

Aim: Master the fundamentals of JavaScript Objects

| *./objects-and-arrays.js* |

- [ ] **Walkthrough Creating an Object Example**

```
// ~ OBJECTS ~ \\
// Objects stores data grouped together using key/value pairs

// Object Example
const myObj = {
  key: "Value",
  nestedInfo: {
    nestedKey: "Nested Value",
    age: 42,
    location: {
      state: {
        name: "Missouri",
        initials: "MO",
      },
    },
  },
  createdAt: new Date(),
  someMethod: function (text = "Hello") {
    console.log(text);
  },
};
```

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- ☐ **Walkthrough How to Use an Object**
  - Show how to access a property on an object
  - Show how to call a method on an object

```
// Object Property Usage
const bestState = myObj.nestedInfo.location.state.name;
console.log("bestState:", bestState);

const whenWasThisObjCreated = myObj["createdAt"];
console.log("whenWasThisObjCreated:", whenWasThisObjCreated);

// Object Method Usage
myObj.someMethod(
  "Calling a method on an object . . . these are the same thing as
functions but inside an object"
);
```

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- ☐ **Walkthrough Object Constructors**

```
// Object Constructors
const student = new Object();

student.learning = "JavaScript";
student.name = "Missy";

console.log("student:", student);
```

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Check: Ensure your understanding of JS Objects

- Can an object store multiple different data-types?
- What are the two ways you can select a property on an object?

STEP 3: ARRAYS

Aim: Master the fundamentals of JavaScript Arrays

| *./objects-and-arrays.js* |

- ☐ **Walkthrough Creating an Array Example**

```
// ~ ARRAYS ~ \\
// Arrays stores information in a list-like format

// Array Example
const myArr = [1, "Test", false, { name: "Chris", age: 33 }];
```

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- ☐ **Walkthrough Accessing Arrays**

```
// Accessing Arrays
let firstItem = myArr[0];
console.log("firstItem:", firstItem);

let lastItem = myArr[myArr.length - 1];
console.log("lastItem:", lastItem);
```

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- ☐ **Walkthrough Using the Array Constructor**

```
// Array Constructor
const myArr2 = new Array("item 1", "item 2", "item 3");
console.log("myArr2:", myArr2);

const myEmptyArr = new Array(100);
console.log("myEmptyArr:", myEmptyArr);
```

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- ☐ **Walkthrough Common Array Methods**
  - Filter
  - Map
  - Sort
  - Find
  - ForEach
  - Some
  - Every

```js
// ~ Common Array Methods ~ \\
const students = [
  { name: "Medina", grade: 88 },
  { name: "Blake", grade: 72 },
  { name: "Roscoe", grade: 58 },
  { name: "Stephanie", grade: 99 },
  { name: "Edith", grade: 93 },
  { name: "Janey", grade: 34 },
  { name: "Ivan", grade: 89 },
];

// filter
const passingStudents = students.filter((student) => student.grade > 58);
console.log("passingStudents:", passingStudents);

// map
students.map((student) => (student.isRegistered = true));
console.log("students after being registered:", students);

// sort
const studentsByGrade = students.sort((a, b) => b.grade - a.grade);
console.log("studentsByGrade:", studentsByGrade);

// find
const classClown = students.find((student) => student.name === "Roscoe");
console.log("classClown:", classClown);

// forEach
students.forEach((student) => student.grade++);
console.log("students w/ added grade point:", students);

// some
const hasAnyFailingStudents = students.some((student) => student.grade <
59);
console.log("hasAnyFailingStudents (some):", hasAnyFailingStudents);

// every
const hasAllFailingStudents = students.every((student) => student.grade <
59);
console.log("hasAllFailingStudents (every):", hasAllFailingStudents);
```

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Check: Ensure your understanding of JavaScript Arrays

- How do you access the first item in an array? How about the last?
- How would you create an array with nine empty spaces?
- What array method would you use to check if at least one element in an array meets a particular condition?

STEP 4: THIS KEYWORD

Aim: Master the fundamentals of the JavaScript "*this*" keyword

| *./this-keyword.js* |

- [ ] **Walkthrough Global Binding**

```
// ~ Global Binding (Default) ~ //
console.log("'this' in Global Scope:", this);
```

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- [ ] **Walkthrough Implicit Binding**

```
// ~ Implicit Binding ~ //
const classroom = {
  name: "High Five",
  students: ["Valory", "Zane", "Ipsum"],
  printStudents: function () {
    console.log("'this' in Implicit Scope (Function Dec):",
this.students);
  },
  printStudentsES6: () =>
    console.log("'this' in Implicit Scope (ES6):", this.students), //
'this' refers to the global window object here
};

classroom.printStudents();
classroom.printStudentsES6();
```

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- [ ] **Walkthrough Explicit Binding**

```
// ~ Explicit Binding ~ //
const getName = function () {
  console.log("'this' in Explicit Scope:", this.name);
};

const player = {
  name: "Borgov",
  isHappy: false,
};

getName.call(player);
```

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- [ ] **Walkthrough Constructor Binding**

```
// ~ Constructor Binding ~ //
function Company(name) {
  this.name = name;
}

const codefi = new Company("Codefi");
console.log("'this' in Constructor Scope:", codefi.name);
```

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Check: Ensure your understanding of the JavaScript "*this*" keyword

- What does the 'this' keyword point to in the global scope?
- When using implicit binding, what style of function do you want to use to ensure 'this' refers to the object's instance rather than the global window object?

Review

ACCOMPLISHMENTS

Congratulations yet again! 🎊 🎉

Feel proud that **you learned something new and valuable today**.

Learning to code is a journey, and you are taking the necessary steps to improve your skills and opportunities for the future.

Good on you!

Specifically, we learned how to:

- Utilize the power of JavaScript Closures
- Understand and apply objects and arrays in JavaScript
- Demystify and harness the power of the "*this*" keyword

RESOURCES

Array Method Explorer *(Tool)*

8 Must Know JavaScript Array Methods *(Video)*
