

ENSF-381: Full Stack Web Development Laboratory
Lab04

GitHub Link:

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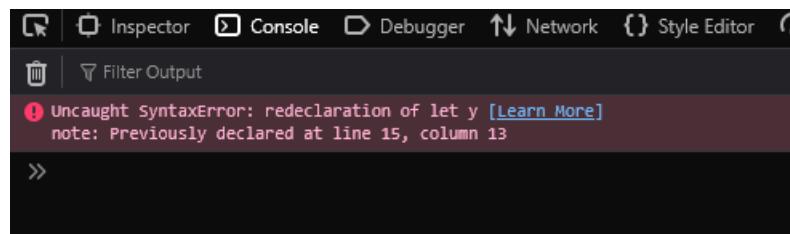
Exercise 1: Exploring JavaScript Fundamentals

1A: Variable Declaration

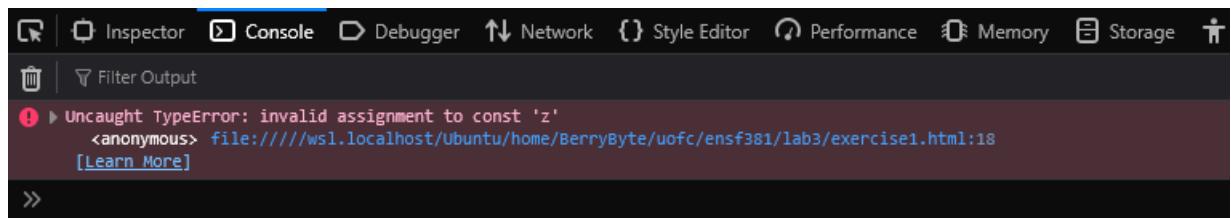
Variable Declarations (var, let, const):

```
var x = 10;
let y = 20;
const z = 30;
```

Observation - Reassigning let:



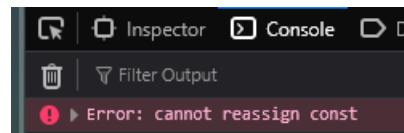
Observation - Reassigning const:



Try...Catch Block Code:

```
<script>
var x = 10;
let y = 20;
const z = 30;
try {
    x = 15;
    y = 25;
    z = 35;
} catch (error) {
    console.error("Error: cannot reassign const")
}
</script>
```

Console Output:



1B: String Operations

Code Implementation:

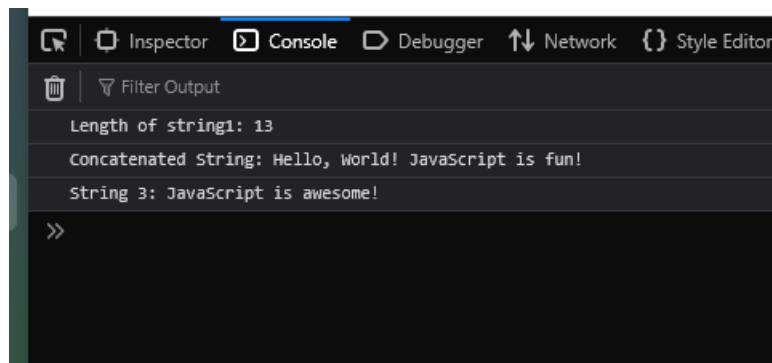
```
let string1 = "Hello, World!"
let string2 = "JavaScript is fun!"

length1 = string1.length; // Getting the length of string1
console.log("Length of string1: " + length1);

concatenatedString = string1 + " " + string2; // Concatenating string1
and string2
console.log("Concatenated String: " + concatenatedString);

var string3 = string2.replace("fun", "awesome"); // Replacing "fun" with
"awesome" in string2
console.log("String 3: " + string3);
```

Console Output:

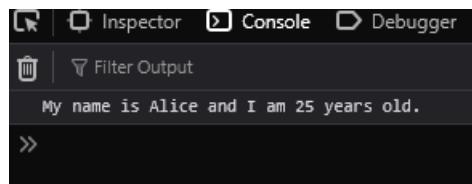


1C: String Templates

Template Literal Code:

```
let name = "Alice"
let age = 25
let message = `My name is ${name} and I am ${age} years old.`
console.log(message)
```

Console Output:



A screenshot of a browser's developer tools console. The tabs at the top are 'Inspector', 'Console' (which is selected), and 'Debugger'. Below the tabs is a toolbar with a trash can icon and a 'Filter Output' dropdown. The main area of the console shows the output of the code execution: 'My name is Alice and I am 25 years old.' followed by a double arrow indicating the end of the output.

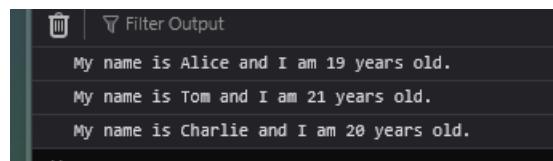
1D: Iteration

Loop Implementation:

```
const students = ["Alice", "Tom", "Charlie"]
const ages = [19, 21, 20]

for (let index = 0; index < students.length; index++) {
    const student = students[index];
    const age = ages[index];
    console.log(`My name is ${student} and I am ${age} years old.`);
}
```

Console Output:



A screenshot of a browser's developer tools console. The tabs at the top are 'Inspector', 'Console' (selected), and 'Debugger'. Below the tabs is a toolbar with a trash can icon and a 'Filter Output' dropdown. The main area shows three lines of output from the loop: 'My name is Alice and I am 19 years old.', 'My name is Tom and I am 21 years old.', and 'My name is Charlie and I am 20 years old.'

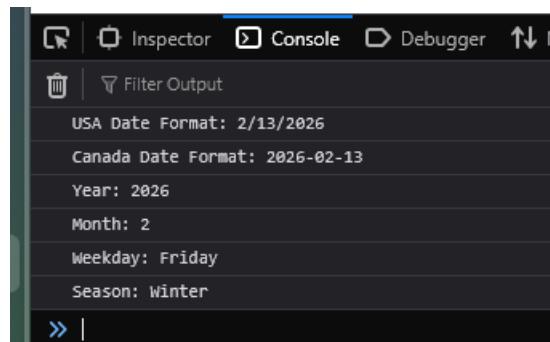
1E: Working with Dates

Date Code:

```
year = current_date.getFullYear();
month = current_date.getMonth() + 1; // Months are zero-indexed, so 1 for
correction
weekday = current_date.toLocaleDateString('en-US', { weekday: 'long' }); // //
weekday name in English
season = (month >= 3 && month <= 5) ? "Spring" :
          (month >= 6 && month <= 8) ? "Summer" :
          (month >= 9 && month <= 11) ? "Autumn" : "Winter";

console.log("Year: " + year);
console.log("Month: " + month);
console.log("Weekday: " + weekday);
console.log("Season: " + season);
```

Console Output:



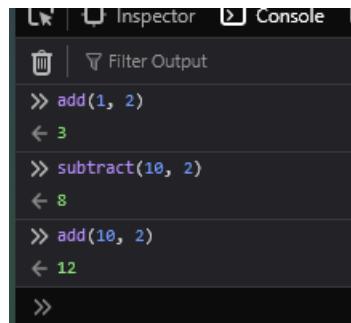
Exercise 2: Building a Simple Calculator

2A: Declaring Functions

Function Definitions (add and subtract):

```
function add(a, b){  
    return a + b;  
}  
function subtract(a, b){  
    return a - b;  
}
```

Test Results:



A screenshot of a browser's developer tools console. The tabs at the top are 'Inspector' and 'Console'. The 'Console' tab is active. The output area shows the following interactions:

```
» add(1, 2)  
← 3  
» subtract(10, 2)  
← 8  
» add(10, 2)  
← 12  
»
```

2B: Using Default Parameters

Modified Functions:

```
function add(a, b=5){  
    return a + b;  
}  
function subtract(a, b=5){  
    return a - b;  
}
```

Observation:



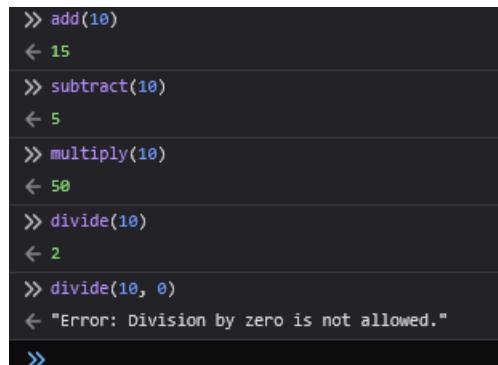
A terminal window showing the execution of several functions. The output is as follows:

```
» subtract(10, 2)
← 8
» add(10, 2)
← 12
» add(10)
← 15
» subtract(10)
← 5
```

2C: Implementing Arrow Functions

```
// arrow syntax
const add = (a, b=5) => a + b;
const subtract = (a, b=5) => a - b;
const multiply = (a, b=5) => a * b;
const divide = (a, b=5) => b === 0 ? "Error: Division by zero is not allowed." : a / b;
```

Observation:



A terminal window showing the execution of several functions. The output is as follows:

```
» add(10)
← 15
» subtract(10)
← 5
» multiply(10)
← 50
» divide(10)
← 2
» divide(10, 0)
← "Error: Division by zero is not allowed."
»
```

2D: Understanding Callback Functions

Calculator Function Code:

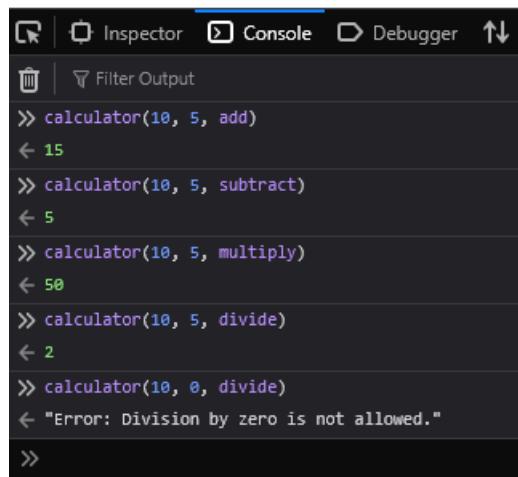
```
<h1>JavaScript Lab Exercise 2</h1>
<script>
/*
function add(a, b=5){
    return a + b;
}
function subtract(a, b=5){
    return a - b;
}
```

```
}

*/
// arrow syntax
const add = (a, b=5) => a + b;
const subtract = (a, b=5) => a - b;
const multiply = (a, b=5) => a * b;
const divide = (a, b=5) => b === 0 ? "Error: Division by zero is not allowed." : a / b;

function calculator(num1, num2, operation) {
    return operation(num1, num2);
}
```

Test Results:



The screenshot shows a browser's developer tools console tab labeled 'Console'. The console output is as follows:

```
>> calculator(10, 5, add)
← 15
>> calculator(10, 5, subtract)
← 5
>> calculator(10, 5, multiply)
← 50
>> calculator(10, 5, divide)
← 2
>> calculator(10, 0, divide)
← "Error: Division by zero is not allowed."
>>
```

Exercise 3: Managing Data with JavaScript

3A: Arrays and Basic Methods

Array Code:

```
let classRoster = ["Alice", "Tom", "Charlie", "Diana", "Evan"];
console.log("Initial Array: " + classRoster);

// To string
classRoster = classRoster.toString();
console.log("Converted to String : " + classRoster);

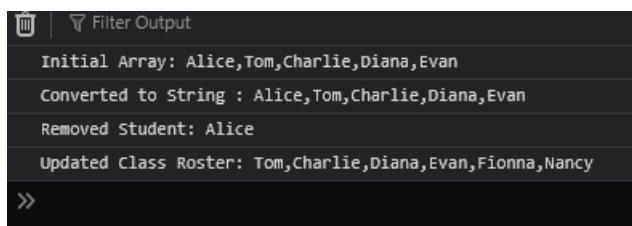
// To array
classRoster = classRoster.split(",");

classRoster.push("Fionna");
classRoster.push("Nancy");

removedStudent = classRoster.shift();    // Remove Alice
console.log("Removed Student: " + removedStudent);

console.log("Updated Class Roster: " + classRoster);
```

Console Outputs:



The screenshot shows a terminal window with the following text output:

```
Initial Array: Alice,Tom,Charlie,Diana,Evan
Converted to String : Alice,Tom,Charlie,Diana,Evan
Removed Student: Alice
Updated Class Roster: Tom,Charlie,Diana,Evan,Fionna,Nancy
>>
```

3B: Objects with Nested Structures

Object Code:

```
// --- ENSF 381 -- Lab 3 Exercise 3, A ---

let classRoster = ["Alice", "Tom", "Charlie", "Diana", "Evan"];
//console.log("Initial Array: " + classRoster);

// To string
//classRoster = classRoster.toString();
//console.log("Converted to String : " + classRoster);

// To array
//classRoster = classRoster.split(",");

classRoster.push("Fionna");
classRoster.push("Nancy");

removedStudent = classRoster.shift();      // Remove Alice
//console.log("Removed Student: " + removedStudent);

//console.log("Updated Class Roster: " + classRoster);


// --- ENSF 381 -- Lab 3 Exercise 3, B ---
classInfo = Object();
classInfo.className = "ENSF381: Full-Stack Web Development";
classInfo.instructor = "Dr. Smith";
classInfo.students = classRoster;
classInfo.details = Object();
    classInfo.details.semester = "Winter";
    classInfo.details.year = 2026;
classInfo.schedule = ["Monday", "Wednesday", "Friday"];

classInfo.instructor = "Dr. Abdellatif" // Update instructor name

console.log("Class Name: " + classInfo.className);
console.log("Instructor: " + classInfo.instructor);
console.log("Students: " + classInfo.students);
console.log("Semester: " + classInfo.details.semester);
console.log("Year: " + classInfo.details.year);
```

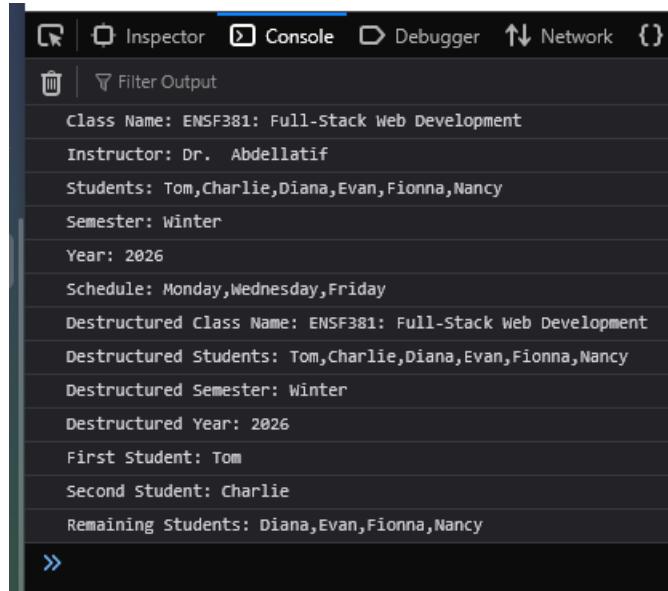
```
console.log("Schedule: " + classInfo.schedule);

// Destructuring
// className and students into variables
const { className, students } = classInfo;
console.log("Destructured Class Name: " + className);
console.log("Destructured Students: " + students);

// semester and year into variables
const { details: { semester, year } } = classInfo;
console.log("Destructured Semester: " + semester);
console.log("Destructured Year: " + year);

// first 2 students into variables
const [student1, student2, ...remainingStudents] = students;
console.log("First Student: " + student1);
console.log("Second Student: " + student2);
console.log("Remaining Students: " + remainingStudents);
```

Console Outputs:



The screenshot shows the 'Console' tab of a browser's developer tools. The output area displays the results of the code execution:

```
Class Name: ENSF381: Full-Stack Web Development
Instructor: Dr. Abdellatif
Students: Tom,Charlie,Diana,Evan,Fionna,Nancy
Semester: Winter
Year: 2026
Schedule: Monday,Wednesday,Friday
Destructured Class Name: ENSF381: Full-Stack Web Development
Destructured Students: Tom,Charlie,Diana,Evan,Fionna,Nancy
Destructured Semester: Winter
Destructured Year: 2026
First Student: Tom
Second Student: Charlie
Remaining Students: Diana,Evan,Fionna,Nancy
»
```