Intro to Programming

Learning Objectives

- **Practice** programmatic thinking by writing pseudo code to solve a basic problem.
- **Define** web site behaviour and the practical uses of JavaScript.
- **Predict** DOM output / changes by reading JS code.

Agenda

- Introduction to Programming
  - Algorithms, Pseudo-Code
- What can JavaScript do?
- Reading JavaScript
- Lab Time

A couple of things

- It's a really picky programming language
- Focus on the logic before diving into the coding
  - Problem solving before syntax!
- It takes a long time to get used to it
- Remember that next Thursday the wireframes, and the idea for the website you are going to build, is due

Review

Programming?

What is it?

A very general machine learning to do very specific things

Programming is the task of writing instructions in a language that a computer can understand

Algorithms

An algorithm is a step-by-step set of operations to be performed

Think of it like a recipe. Every program we write is a recipe that tells the computer how to do something

JavaScript is the **syntax** in which we write those recipes for the web

Pseudocode

Pseudocode is the language we use when writing a program without using the syntax of a programming language

It's a universal programming language for humans

It is a way to plan - essentially a shorthand we use before we write a program

Pseudocode - Area

```
STORE the rectangle width as rectangleWidth
STORE the rectangle height as rectangleHeight
CALCULATE and STORE the area by:
    MULTIPLYING the width and the height
```

Pseudocode - Click Count

```
STORE the number of clicks as numClicks
    SET the value to be 0
EVERY TIME the button with ID "click" is clicked:
    INCREMENT numClicks
    UPDATE TEXT of paragraph with ID of "main"
```

Pseudocode - Events

```
EVERY TIME the user scrolls down the page
CHECK to see if the user is over 100px down
    IF they are:
        SHOW the button with ID "backToTop"
    ELSE:
        HIDE the button with ID "backToTop"
```

Programs are made with?

- Variables
- Data types
- Conditionals
- Logical and Comparison Operators
- Loops
- Functions
- etc.

Comparison Operators

```
===   Equal to

!==   Does not equal

<     Less than

>     Greater than

>=    Greater than or equal to

<=    Less than or equal to
```

Logical Operators

`&&`	AND
`||`	OR
`!`	NOT

Exercise!

Write Pseudocode for a functioning thermostat

While the device is on; A thermostat measures your home's ambient temperature and uses that information to activate your heating or air conditioner, depending on the thermostat's temperature setting by the user and whether it needs to cool or heat the area

Exercise!

Write Pseudocode for Rock, Paper, Scissors

Part One

For a single game

Part Two

For a best of three game

JavaScript?

What is it?

- The largest programming language in the world
- A very flexible language
  - In browsers
  - On the back end - Node.js
  - Lots of other places
- A "weird, poorly designed" language...
- ...That is everywhere

History

- Built in 10 days by Brendan Eich
- Released in May 1995
- Current Version: ES2017
  - It's based on something called ECMAScript

What can it do?

- Validating information
- Live updating pages
- Adding interactivity
- Adding animations
- Internet of things and Hardware
- Visualise data
- Communicate between other devices
- Can be used for art
- Lots of other things...

Adding JS to the page

```
<script src="PATH/FILENAME.js"></script>

<script src="js/main.js"></script>
```

Data Types

What are they?

- Data types are the types of information provided by a programming language
- The building blocks of the language

Some of them...

- string
- number
- boolean
- undefined
- null
- array
- object
- function

Strings

What are they?

Basically, a collection of letters. It could be a word, a sentence, a blog post etc.

They are letters wrapped in single or double quotes

Strings

```
"Hello World";

"You can tell an ant's gender by dropping it in water...";

"Jane's Bag";

'Lesser of two weavils';

'It\'s gibberish';

"Hello " + "World"; // Concatenation
```

Numbers

Numbers

Numbers in JavaScript can come as:

- Integers
- Floats (Decimals)

Can be negative or positive

Numbers

```
1;

12497;

1.4;

3.14159;

-100;

-252.60;
```

Numbers - Maths

```
1 + 5;

3 - 2;

5 * 7;

10 / 5;

9 % 2;
```

Booleans

Booleans

True or false!

Often used in conditionals - to make decisions with code

Booleans

```
true;

false;
```

Undefined & Null

Undefined & Null

Undefined means it is empty

Null means it is nothing

Undefined & Null

```
null;

undefined;
```

Others

Arrays, Objects, Functions

An array is an ordered list of data

An object is a collection of key-value pairs

A function is a way to make code repetitive and reusable

Don't worry about these for the moment...

Arrays, Objects, Functions

```
[];

[ "ITEM ONE", 'item two', 3 ];

{};

{ key: "value", name: "Serge" };

function doSomething () {}

var doSomethingElse = function () {};
```

Variables

What are they?

- Variables are ways to store information in memory.
  - You assign a name to a certain piece of data or collection of code. Think of them as named containers.
- The name of a variable is occasionally called the JavaScript identifier.
- You can change the value, and you can access it if need be

Variables

```
var name = "James Joyce";

var courseName = "FEWD";

var courseNumber = 32;

var isThisJavaScript = true;
```

Variables

```
var courseName = "FEWD";

var courseNumber = 32;

var course = courseName + courseNumber;


var firstName = "William";

var lastName = "Gibson";

var fullName = firstName + " " + lastName;


var someNumber = 10 + 32;
```

Variables can change types

```
var x = 2;

x = null;

x = "Hello World";
```

How to name them?

- Begin with letters, $ or _
- Only contain letters, numbers, $ or _
- Case sensitive
- Avoid reserved words
- Choose clarity and meaning
- Pick a naming convention
  - Use camelCase for multipleWords

Exercise!

Variables and Data Types

Homework

- Finish off the Variables and Data Types exercises
- CodePen homework. "Fork" and fix!
  - Colour Scheme Switcher and Traffic Light
- Look into JavaScript Conditionals, Loops, Arrays and Objects
  - Eloquent JavaScript
  - Speaking JavaScript
  - You Don't Know JS

Next class?

- All JavaScript!

Q & A

Feedback Time

Lesson 9: **Introduction to Programming**

https://ga.co/fewd32syd

Thanks!