Intro to Programming

JavaScript

What is programming?

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Programming in Daily Life

You program things already in your life

- Microwave
- DVR
- Yourself

You've been programmed

- Advertisements
- Media
- Society
- School

Foundations of Programming

Logic

- True/False
- And/Or/Not
- If/Else

Math

- Arithmetic
- Computation (Discrete Mathematics)

Language

- Keywords
- Syntax (grammar)
- Text

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Problem Solving

How would you make a peanut butter and jelly sandwich?

Problem Solving

- Fully understand the problem
- Think of examples
- Break problems down into smaller parts
- Solve problems in simple steps

How do you reverse a string?

Brief history of JavaScript

JavaScript was created by Brendan Eich in May 1995 at Netscape in just 10 days

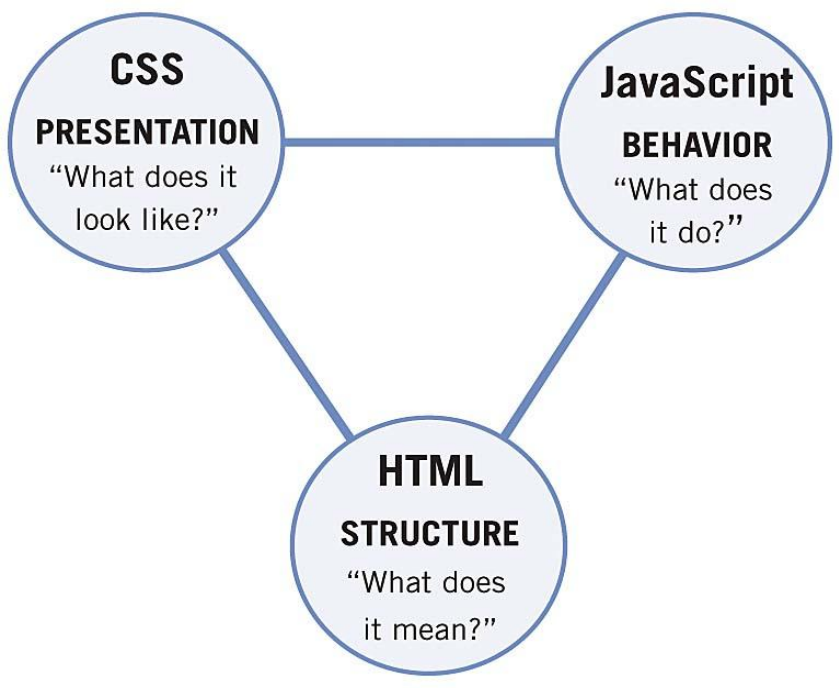
No relation to Java

AKA - ECMAScript, ES6/ES2015 (major update), ES8 (current)

Language Profile:

- High Level
- Asynchronous
- Single Threaded
- Weakly Typed
- Prototypical inheritance (supports OOP)

User Interface - Three Pillars



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Including in a website

Embed

```
<body>
  <script type="text/javascript">
    console.log("Hello World")
  </script>
</body>
```

Separate File

`index.html`

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

`main.js`

```
console.log("Hello World")
```

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Exercise #1

Create a simple HTML page and embed JavaScript to alert a user with “Welcome to NYCDA” when they load the page

Alert users with the same message, this time create a separate file for your JavaScript alert

Primitives

- string - Group of characters “Hello World” ‘Hello World’ `Hello ${name}`
- number - Integers and decimals (floats) - 7 12.34
- Boolean - true false
- undefined - Exists, but has not been given a value
- null - Absence of a value

Fundamental data types

Not objects

Immutable

Variables

const - Cannot be reassigned
let - Can be reassigned
var - DON'T USE!

```
const       myVariable       =          "Hello World";
  ^            ^               ^             ^
keyword      name          assignment       value
```

```
let year = 2018;
```

Key Ideas

Container to store values in

Can be assigned any primitive value, object, or function

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Naming Variables

- Cannot start with a number
- Cannot include operators or punctuation (except _)
- Cannot contain spaces
- Cannot use key words (new, window, open)
- Case sensitive

Conventions

camelCase (preferred style)

Name your variables *semantically*

Output commands

```
console.log(“Hello World")
// logs a value to the browser console

alert(“Welcome to my website!")
// displays value in popup window
```

Exercise #2

Create a variable called name and give it a value of your name

Create another variable called myAge and give it a value of your age

Use these variables to construct a string that says:
My name is (name) and I am (age) years old

Operators

Assignment	=
Arithmetic - plus, minus, divide, multiply, modulo (remainder)	+ - / * %
Comparison - equality, less/greater than	=== < >
Logical - and, or, not	&& || !

```
let year = 2018;
year + 1              // 2019
year === 2018         // true
year > 2000           // true
true || false         // true
true && false         // false
15 % 4                // 3
```

Key Ideas

Comparison operator returns boolean values

Arithmetic and logical operators return computed values

[Order of operations]

[Operators cheat sheet]

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Operators Contd.

```
“Hello” + “ World”      // “Hello World”
let year = 2018;
year += 2
year === 2018           // false
year === 2020           // true
year == “2020”          // true
year === “2020”          // false
year ++
year === 2021           // true
4 ** 2                  // 16
!true                   // false
```

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Truthey and falsey

Falsey Values:

- false
- 0 and -0
- "" and ''
- null
- undefined
- NaN (Not a number)

Everything else is truthey

```
!6          // false
!0          // true
```

Expressions

An expression is any piece of code that evaluates to a single value.

```
3 + 5       // 8

6 > 3       // true

const school = "NYCDA"
school + " is where we learn" // "NYCDA is where we learn"
```

Exercise # 3

Create a variable called mathOne and give it a value of 20

Create another variable called mathTwo and give it a value of 3

Create a variable mathSum that will be the sum of the first variables

Create another variable mathProduct that will be the product of the first two variables

Print mathSum and mathProduct to your developer console

Conditionals

```
let year = 2018;
if (year < 2018)  {
        console.log(“We are in the past”);
}else if (year > 2018) {
        console.log(“We are in the future”);
}else {
        console.log(“We are in the present”);
}
```

Key Ideas

Run the block from the first true condition

You can have any number of else if statements (including 0)

A single else statement is optional

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Arrays

Collection of data separated by commas. Zero Indexed.

```
const example =  [“I”,  “am”,  “an”,  “array];
                          0      1       2       3

example[1]   // ”am”
example[6]  // undefined

let ticTacToe = [
        ["x", "o", "x"],
        ["x", "x", "o"],
        ["o", "o", "x"]
]
ticTacToe[1][2] // x (second row, third column)
```

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Exercise #4

Create an array with the name of 5 of your classmates
Access the classmate in the 4th position of your array

Given the following multidimensional array:

```
[
  ["hello", "goodbye", "food"],
  ["something", "else", "here"],
  ["beans", "fruit", "veggies"]
]
```

Access the array and return the element that contains ‘beans’

Objects

```
const cat = {
        name:  “whiskers”,
        age:  3,
        toys:  [“ball”, “yarn”, “stuffed animal”],
        meow:  function() {
                console.log(“meeeooww”);
        }
}

cat[“age”]                  // (3)
cat.name = “tom”            // (“tom”)
cat.toys[0]                 // (“ball”)
```

Key Ideas

A set of key/value pairs

Keys must be unique to the object and can point to only one value

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Exercise #5

Create an object with name and eyeColor properties. Change the eye color to brown. Now add a hairColor property and change it to "blonde"

Create an object with your top 3 movies using the keys: topMovieOne, topMovieTwo, topMovieThree.

Assign some movie values to your keys!

Access your object and print out in the console the following string:
“My favorite movies are (topMovieOne) and (topMovieTwo), but I really enjoy (topMovieThree).”

Loops

```
for (let i = 0; i < 5; i++) {
        console.log(i);
}
```

```
let i = 0;
while(i < 5) {
        console.log(i);
        i++;
}
```

Key Ideas

Loops repeat an action until your condition is met

For loops repeat a set number of times, while loops may repeat a non previously determined number of times

Exercise #6

Write a conditional that checks if a variable is less than 10. If it is, alert the user that their variable is less than 10. If it is not, let the user know what the variable was and that it was greater than 10.

Write a program that evaluates two things: temperature and the status of an air conditioner (on or off). If the temperature is warmer than 80, and the air conditioner is off, log "turn the ac on!". If the temperature is warmer than 80 and the ac is on, log "this thing is broken!". If the temperature is colder than 60 and the air conditioner is on, log "brrr, turn this thing off". If the temperature is cooler than 80, and the ac is off, log "not worth the electricity. leave it off."

*Bonus

Use for loops to print out pluses starting with 10 of them down to one.

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