

Module 4 Day 1

Client-side Scripting with JavaScript

What makes an application?

- Program Data

- ✓ Variables & .NET Data Types
- ✓ Arrays
- ✓ More Collections (list, dictionary, stack, queue)
- ✓ Classes and objects (OOP)

- Program Logic

- ✓ Statements and expressions
- ✓ Conditional logic (if)
- ✓ Repeating logic (for, foreach, do, while)
- ✓ Methods (functions / procedures)
- ✓ Classes and objects (OOP)
- ✓ Frameworks (MVC)

- Input / Output

- User
 - ✓ Console read / write
 - ✓ HTML / CSS
 - ❖ Front-end frameworks (HTML / CSS / JavaScript)
- Storage
 - ✓ File I/O
 - ✓ Relational database
 - ❑ APIs

Module 4

- No pairs exercises during Module 4
- Student_tutorial available most days, starting tonight
 - To enhance reading before lecture

Client-side Scripting

- What
 - Code executes in the browser
 - Interacts with the HTML of the page (the DOM)
 - **JavaScript** is the language all browsers understand
- Why
 - Validation on the client
 - Immediate response to the user
 - Fewer posts to the server
 - Page interaction
 - Show or hide sections of the page dynamically
 - Dynamically update portions of the page (no refresh / scroll to top)
 - Event responses (button push)

Client-side Responsibilities

- **HTML** provides the **content**
 - Server may dynamically generate the HTML
- **CSS** provides the **style**, or look-and-feel
 - Static style sheets usually provide the style
- **JavaScript** provides the **behavior** and user-interaction
 - Interacts with the HTML page, and may interact with the server

Variables

- let and const
- var – Do not use (best practice)
 - Allows multiple declarations without warning
 - Function scope (vs. block scope)
- Names
 - Usually camel-case in JavaScript
 - Const may be upper-case

Data Types

- Loosely typed
 - JavaScript infers the type from the value
 - Same variable can hold different types over time
- Number, String, Boolean, Object (includes array), undefined
- JavaScript does type coercion as necessary

Null vs. Undefined

- `null` is a value of type *Object*
- `undefined` is a value of type *undefined*
- `null` must be assigned. It means *nothing*.
- `undefined` occurs from the `"let var_name;"` statement
 - It also may be assigned
- `null !== undefined`, but `null == undefined`



Let's
Code

Strict and loose equality

- === vs. ==
- === means types and values are equal (strict equality)
- == means values are equal (loose equality)
 - Types are coerced
- !== and != are the "not equal" equivalents
- **Falsy** values:
 - When coerced to Boolean, value is false
 - false, 0, "", null, undefined, NaN
 - All other values are **Truthy**
- More craziness: <https://codeburst.io/javascript-double-equals-vs-triple-equals-61d4ce5a121a>

Let's
Code

Branching

- `if (condition) {
 // do something
}`
- `if (condition) {
 // do something
} else {
 // do something else
}`
- `if (condition1) {
 // do this
} else if (condition2) {
 // do that
} else {
 // do the other
}`
- **switch** also works

Loops

- `for (let i = 1; i <= 5; i++) {
 console.log("Hello World!");
}`
- while and do also exist
- No foreach!
 - (at least, not yet 😊)

Arrays

- `let scores = [];`
`let grades = [90, 80, 70];`
`scores[10] = 100;`
- Size is changeable!
 - `scores.length` gives the number of elements
- Functions:
 - `push`, `pop` (end of array)
 - `unshift`, `shift` (beginning of the array)
 - `indexOf`, `lastIndexOf` (finds an element)



Let's
Code

Objects

- { } denotes an object
- Key : value pairs, separated by commas

```
const person = {  
  firstName: "Bill",  
  lastName: "Lumbergh",  
  age: 42,  
  employees: [  
    "Peter Gibbons",  
    "Milton Waddams",  
    "Samir Nagheenanajar",  
    "Michael Bolton"  
  ]  
};
```

Let's
Code

Functions (think methods)

- **function** keyword
- Function name
 - Usually camel-case
- No return type
- Parameter names
 - No type defined
- **return** statement



Let's
Code


Built-in Functions

- String methods

- https://www.w3schools.com/js/js_string_methods.asp
- [https://developer.mozilla.org/en-US/docs/Web/JavaScript/Guide/Text formatting](https://developer.mozilla.org/en-US/docs/Web/JavaScript/Guide/Text_formatting)

- Numbers, Math and Dates

- [https://developer.mozilla.org/en-US/docs/Web/JavaScript/Guide/Numbers and dates](https://developer.mozilla.org/en-US/docs/Web/JavaScript/Guide/Numbers_and_dates)
- https://www.w3schools.com/js/js_number_methods.asp
- https://www.w3schools.com/js/js_math.asp
- https://www.w3schools.com/js/js_dates.asp



Let's
Code

JavaScript vs C#

	JavaScript	C#
Variables	let age = 35; • Also, const, var (don't use)	int age = 35;
Data Types	Number, String, Boolean, Symbol, Object, null, undefined	int, short, long, float, decimal, single, double, string bool...
Strings	Single or double quotes	Double quotes
Undefined data type	"undefined" is both a datatype, and a value	Not applicable
String interpolation (template literals)	`My name is \${firstname} \${lastname}`	\$"My name is {firstname} {lastname}"
Equality Comparison	==, ===, !=, !==	==, !=
Array	Size can change Multiple types Directly address even new elements	Size fixed and set when allocated Single data type Must address in-bounds
Functions / methods	function myFunction(param1)	public int myMethod(string param1)