JavaScript
Introduction

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What is JavaScript?

- A lightweight, interpreted, object-oriented language
- A scripting language for Web pages
- Runs on the client side of the web
  - Widely used for controlling web page behavior
- Supports object-oriented, imperative, and functional programming styles
- Basic syntax is similar to Java, C++ and C#
- A dynamic scripting language
  - Runtime object construction, variable parameter lists
- Used in many non-browser environments as well
  - Node.js, MongoDB, Apache CouchDB

What is JavaScript?

- JavaScript functions are first-class citizens
  - Functions can be passed as arguments to other functions
  - Functions can be returned as values from other functions
  - Functions can be assigned to variables

- Implementation of ECMAScript standard
- Latest version – ES2017 – 8th Edition
- First created by Brendan Eich at Netscape in 1995

- JavaScript Implementations
  - SpiderMonkey – Mozilla Firefox
  - V8 – Google Chrome
  - Chakra – Microsoft IE and Edge
  - JavaScriptCore – Apple Safari
  - Rhino – Written in Java, typically used in Java apps

Datatypes

- JavaScript is a loosely typed language
- It has following data types
  - Number
  - String
  - Boolean
  - Null
  - Undefined
  - Symbol

- Number type
  - The double-precision 64-bit binary value
  - No specific type for integers
  - E.g., 9 (whole number), 4.5 (fractional), -20 (negative)

Datatypes

- String type
  - Used to represent textual data
  - E.g. "Hello world", "25"

- Boolean type
  - Represents a logical entity and can have two values: true, and false

- Null type
  - Has exactly one value: null

- Undefined type
  - A variable that has not been assigned a value has the value undefined

Datatypes - Examples

- Numbers
  - 4
  - 9.3
  - -10

  - // Math
  - 4 + 10
  - 1/5

  - // Modulo
  - 10 % 3
  - 24 % 2
  - 15 % 11

- Strings
  - "Hello world"
  - 'This is a string'

  - Concatenation
    - "New" + "Delhi"

  - Escape Characters
    - "He said \"My name is Hari\" "
    - "This is backslash: \\"

  - length property
    - "hello world".length

  - Accessing individual characters
    - "hello"[0]

Variables

- Containers in which we can store values
- A named location for storing a value

- Syntax

```
var yourVariableName = yourValue;
```

- Examples

```
var name = 'Hari';
var age = 25;
var isEmployed = true;

'Hello there ' + name;
age + 40 + 10
```

```
var num = 10;
num = 'Twenty';

var name = 'Hari';
name = 'Krish';
```

Null & Undefined

- Both are values that variables can have
- Mean nothingness

- Variables that are declared but not initialized are 'undefined'

```
var name;
var age;
```

- 'null' is explicitly nothing (set by the programmer)

```
var nextStation = 'MG Road';
nextStation = null;
```

Built-in Methods

- clear()
  - Clear developer console window in Chrome

- console.log()
  - Outputs a message to the Web Console
  - Useful for testing purposes
    ```
    console.log(message);
    ```

  - 'message' is a string or object
    - **_Note_**: When testing this method, be sure to have the console view visible

Built-in Methods

- window.alert()
  - Displays an alert dialog with a specified message and an OK button

    ```
    window.alert(message);
    ```

  - 'message' is
    - an optional string of text you want to display in the alert dialog, or,
    - an object that is converted into a string and displayed

  - Note
    - Do not overuse this method, as it prevents the user from accessing other parts of the page until the dialog box is closed

Built-in Methods

- window.prompt()
  - Displays a dialog with an optional message prompting the user to input some text

  ```
  result = window.prompt(message, default);
  ```

  - 'result' is a string containing the text entered by the user, or null
  - 'message' is a string of text to display to the user. This parameter is optional and can be omitted if there is nothing to show in the prompt window
  - 'default' is a string containing the default value displayed in the text input field. It is an optional parameter

Built-in Methods

- window.confirm()
  - Displays a modal dialog with an optional message and two buttons, OK and Cancel

    ```
    result = window.confirm(message);
    ```

  - 'message' is the optional string to be displayed in the dialog.
  - 'result' is a boolean value indicating whether OK or Cancel was selected (true means OK)

Including JavaScript in HTML

- <script> tag
  - Within a HTML file, <script> tag can be used to embed or refer JavaScript code

```
<script>
alert('Hello, welcome to JavaScript programming!');
</script>
```

  - Scripts can be placed in the <body>, or in the <head> section of an HTML page, or in both
  - Placing scripts at the bottom of the <body> element improves the display speed, because script compilation slows down the display

Including JavaScript in HTML

- External JavaScript
    - Scripts can also be placed in external JavaScript files
    - JavaScript files have the file extension .js
    - To use an external script, specify the name of the script file in the 'src' (source) attribute of <script> tag

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

    - To add several script files to one page - use several script tags
    - The path to script file can be absolute or relative path

    - ***<u>Benefits</u>***
        - Code reuse
        - Separation of HTML and JavaScript code
        - Better maintainability
        - Better performance if JavaScript file is cached

Q & A

- Thank you!