HTML5 and JavaScript Games Programming

Week 3

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HTML and CSS

- Hypertext Markup Language (HTML) is a markup language for describing web documents (W3Schools.com)
- HTML consists of contents wraps in tags

  <tagname>contents</tagname>
- Cascading Style Sheets (CSS) is a stylesheet which determine how the elements will be displayed

https://www.youtube.com/watch?v=9gTw2EDkaDQ : HTML5 Basic

https://www.youtube.com/watch?v=YcApt9RgiT0 : HTML5 Text

https://www.youtube.com/watch?v=CGSdK7FI9MY : HTML5 Image

https://www.youtube.com/watch?v=dDn9uw7N9Xg : HTML5 Semantics

https://www.youtube.com/watch?v=CPcS4HtrUEU : CSS

JavaScript – Introduction

- **JavaScript is not Java**
- JavaScript is considered to be the most popular programming language
- JavaScript can be placed in the <body> and the <head> sections of an HTML page and in between <script> and </script> tag
- JavaScript can be called from another file

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

JavaScript – Introduction

```
<!DOCTYPE html>
<html>
<body>

<h1>Hello World</h1>
<p>This is first paragraph.</p>

<script>
window.alert("Hello World");
</script>

</body>
</html>
```

```
<!DOCTYPE html>
<html>
<body>

<h1>Hello World</h1>
<p>My First Paragraph</p>

<p id="printhere"></p>

<script>
document.getElementById("printhere").innerHTML = "Hello
World";
</script>

</body>
</html>
```

JavaScript - Operations

```
var addNum = 5 + 4.50;                          // 9.5
var mulNum = 5 * 4.50;                          // 22.5
var subNum = 5 - 4.50;                          // 0.5
var divNum = 6 / 3;                             // 2
var Num = 5 % 3;                                // 2
var comString = “Combine ” + 3 + “ ’strings’”;  // Combine 3 ‘strings’

divNum++                                        // 3
divNum--                                        // 1
```

JavaScript – Data Types

```
Number:     var myNum1 = 1; typeof myNum1 ;          // “number”
            var myNum2 = 3.14; typeof myNum2 ;       // “number”
            var myNum3 = 2e-3; typeof myNum3 ;       // “number”
            var myNum4 = 5 * “f”;                    // NaN
String:     var myStr1 = “Foot”; typeof myStr1 ;     // “string”
            var myStr2 = ‘Ball at 10pm’; typeof myStr2 ;// “string”
            var myStr3 = myStr1 + myStr2 ;           // “FootBall at 10pm”
Boolean:    var myBool1 = true; typeof myBool1 ;     // boolean
```

JavaScript – Data Types Errors

- var total = myNum2 + myNum100;

  “ReferenceError: myNum100 is not defined” : the variable does not exist

- typeof myNum100;

  “undefined”: the variable does not exist

- To check if a variable is exist:

  if(typeof myNum100 !==)

JavaScript - Converting

parseInt : convert string to integer

```
parseInt(”3 88 25”);          // 3
parseInt(“52.325”)            // 52
```

parseFloat : convert integer to string

```
parseFloat(“52.325”)          // 52.325
```

toString() : convert integer to string

```
var num = 77;
var n = num.toString();       // 77
```

isNaN: function to check if the value is not a valid number

```
isNaN(123)                    // false
isNaN(parseInt(‘xyz123’))     // true
```

JavaScript - Operators

var x=5;

Comparison Operators

== : equal to	if(x == 8	//false
!= : not equal	if(x != 8)	// true
> : greater than	if(x > 8)	// false
< : less than	if(x == 8)	// true
===: equal value and equal type	if(x === 5)	// true
	if(x === '5')	// false
!==: equal value or equal type	if(x !== 5)	// false
	if(x !== '5')	// true
	if(x !== 8)	// true

Logical Operators

&& : and	if(x >1 && x<6)	// true
|| : or	if(x >1 || x<4)	// true

JavaScript - Array

```
var coursesArr = [”course1", ”course2", ”course3"];
coursesArr.push(“course4”);      // [”course1", ”course2", ”course3”,”course4”]
coursesArr.pop();                // [”course1", ”course2", ”course3”]
coursesArr [4] = “course5”;      // adding or assigning a value to the array
coursesArr [1];                  // course2
delete coursesArr [1];           // [”course1",”undefined”, ”course3”]

//loop and print array elements
for (index = 0; index < coursesArr .length; index++) {
    text = coursesArr[index];
}
```

JavaScript - Math

Math.Round() : rounds a number to the nearest integer:

```
Math.round(8.4)          // 8
Math.round(8.5)          // 9
```

Math.Ceil() : rounds a number **up** to the nearest integer

```
Math.ceil(8.7);          // returns 9
```

Math.Floor() : rounds a number **down** to the nearest integer

```
Math.floor(8.7);         // returns 8
```

Math.Random() : returns a random number between 0 (inclusive), and 1 (exclusive)

JavaScript - Conditions

```
if (condition1) {
    block of code to be executed if condition1 is true
} else if (condition2) {
    block of code to be executed if the condition1 is false and condition2 is true
} else {
    block of code to be executed if the condition1 is false and condition2 is false
}
```

```
switch(expression) {
    case n:
        code block
        break;
    case n:
        code block
        break;
    default:
        default code block
}
```

JavaScript - Loops

```
for (i = 0; i < 5; i++) {
    text += "The number is " + i + "<br>";
}
```

```
while (i < 10) {
    text += "The number is " + i;
    i++;
}
```

```
do {
    text += "The number is " + i;
    i++;
}
while (i < 10);
```

JavaScript - Functions

```
function randomInt(xmin,xmax) {
        return Math.floor( Math.random() * (xmax - xmin) + xmin );
}

function compareDateToNow(theyear,themonth,thedate) {
        var today, someday, text;
        today = new Date();
        someday = new Date();
        someday.setFullYear(theyear, themonth, thedate);
        if (someday > today) {
            document.getElementById("demo").innerHTML = "Today is after January 14, 2100.";
        } else {
            document.getElementById("demo").innerHTML = "Today is before January 14, 2100.";
        }
}
```

JavaScript - Events

onchange : An HTML element has been changed

onclick : The user clicks an HTML element

onmouseover : The user moves the mouse over an HTML element

onmouseout : The user moves the mouse away from an HTML element

onkeydown : The user pushes a keyboard key

onload : The browser has finished loading the page

JavaScript - Debugging

```
try {
    alert("Welcome guest!");
}
catch(err) {
    document.getElementById("demo").innerHTML = err.message;
}
```

- Writing into the browser console, using **console.log()**
- Debugging using breakpoint (https://developer.chrome.com/devtools/docs/javascript-debugging)

Jquery - Introduction

- JQuery simplifies the use of Javascript on website
- The jQuery library contains the following features:
  - HTML/DOM manipulation
  - CSS manipulation
  - HTML event methods
  - Effects and animations
  - AJAX
- To use JQuery:
  - Download JQuery library and include it on the website
  - Use Content Delivery Network (CDN)

```
<head>
<script
src="https://ajax.googleapis.com/ajax/libs/jquery/1.11.3/jquery.min.js"></script>
</head>
```

JQuery - Syntax

- Basic syntax is: **$(*selector*).*action*()**
  - A $ sign to define/access jQuery
  - A (*selector*) to "query (or find)" HTML elements
  - A jQuery *action*() to be performed on the element(s)
- $(this).hide() - hides the current element.
- $("p").hide() - hides all <p> elements.
- $(".test").hide() - hides all elements with class="test".
- $("#test").hide() - hides the element with id="test".

JQuery - Events

$(document).ready(): Executed when the document is fully loaded

Click(): attach an event handler function to an HTML element which is executed when the user clicks on the HTML element

Mouseenter(): attach an event handler function to an HTML element which is executed when the mouse is over the element

http://api.jquery.com/category/events/

JQuery - Effects

hide() and show(): hide and show an HTML Element

Toggle(): toggle between the hide() and show() methods

fadein() and fadeout(): fadein function is used to fade in a hidden element and fadeout function is used to fade out a visible element

slideToggle(): toggles between the slideDown() and slideUp()

http://api.jquery.com/category/effects/

JQuery - Example

```
<!DOCTYPE html>
<html><head>
<script
src="https://ajax.googleapis.com/ajax/libs/jquery/1.11.3/jquery.min.js
"></script>
<script>
    $(document).ready(function(){
        $("#flip").click(function(){
            $("#panel").slideToggle("slow");
        });
    });
</script></head>
<body>
    <div id="flip">Click to slide the panel down or up</div>
    <div id="panel">Hello world!</div>
</body></html>
```

Resources

- W3CSchool
- https://jquery.com/
- Benedetti, R., Cranley, R. (2011). Head First Jquery, O'Reilly
- Hawkes, R. (2011). Foundation HTML5 Canvas for Games and Entertainment. Friendsof
- Andrew, R. (2012). CSS3 Anthology: Take Your Site to New Heights. Sitepoint
- Tittel, E., Minnick, C. (2013). Beginning HTML5 and CSS3 For Dummies. John Willey and Sons
- Stefanov, S., Sharma, K. C. (2013). Object-Oriented JavaScript. 2nd Ed. Packt Publishing