

CS 2033

Multimedia & Communications II

LECTURE 7 – JAVASCRIPT FORM VALIDATION

JavaScript recap

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► Display messages

- `alert("Hi");` // Pop-up
- `document.write("Hi");` // Write to site

► Variables

- `var a = "Hello";` // String
- `var b = 12;` // Integer
- `var c = 1.5;` // Float/Double
- `var d = false;` // Boolean

JavaScript recap

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▶ Arrays

- ▶ `var x = [4, 2, 1, 5];`
- ▶ `alert(x[0]);` `// Displays 4`
- ▶ `x[3] = 9;` `// Changes the 5 to 9`

▶ HTML element getters

- ▶ `getElementById(id)`
- ▶ `getElementsByTagName(tag)`
- ▶ `getElementsByClassName(class)`

JavaScript recap

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- ▶ Changing CSS styles
 - ▶ `mydiv.style.width = "200px";`
 - ▶ `mydiv.style.backgroundColor = "red";`
- ▶ Changing classes or ID
 - ▶ `mydiv.className = "redbox title";`
 - ▶ `mydiv.id = "maintitle";`
- ▶ Changing content
 - ▶ `mydiv.innerHTML = "New content";`

JavaScript recap

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- ▶ Event listeners
 - ▶ onclick, ondblclick
 - ▶ onmouseover, onmouseout
 - ▶ onfocus, onblur
 - ▶ onchange
 - ▶ onkeypress, onkeydown, onkeyup
 - ▶ onscroll
 - ▶ onload

JavaScript recap

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▶ Event listeners

▶ Inline (HTML)

▶ `<div id="x" onclick=" this.style.width = '300px'"></div>`

▶ In JavaScript

▶ `var x = document.getElementById("x");
x.addEventListener("click", function() {
 this.style.width = "300px" }
);`

JavaScript recap

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► Conditionals

```
► if (x < 10) {  
    alert("A");  
} else if (x > 30) {  
    alert("B");  
} else {  
    alert("C");  
}
```

JavaScript recap

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► Functions

- ```
function calculate(x, y, z) {
 var a = x - 2;
 var b = y * z;
 var result = (a+b) / (z-a)
 return result;
}
```
- ```
calculate(5, 2, 4);
```
- ```
var q = calculate(2, 3, 2);
```



# JavaScript recap

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## ► Loops

- ```
for (x = 0; x < 5; x++) {  
    document.write(x);  
}
```

- ```
var array = [5, 9, 2, 7, 6];
for (x = 0; x < array.length; x++) {
 document.write(array[x]);
}
```

# Form modifications

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- ▶ We've discussed web forms several times previously in the course.
- ▶ JavaScript is used to **modify** web forms dynamically.
- ▶ What is meant by modifying forms?
  - ▶ Hiding/showing fields
  - ▶ Changing the set of available options in a dropdown menu list
  - ▶ Automatically checking a series of checkboxes.

# Form modifications

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- ▶ Most of these modifications can be done with the JavaScript features you already know!
- ▶ i.e. changing a class or individual styles, using conditionals, loops, etc.
- ▶ For example, show/hide a form field by changing its *display* style.
  - ▶ `x.style.display = "none";`
  - ▶ `x.style.display = "block";`

# Form modifications

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- ▶ A new method that helps with this is the ability to create a new HTML element directly in JS.
- ▶ `document.createElement(type);`
- ▶ Adding a new element to the website is then done with `appendChild(element);`
- ▶ They can be added into a container or to the body itself.

# Form modifications

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- ▶ i.e. Add a new text input box into the "con" container.
- ▶ 

```
var x = document.createElement("input");
x.type = "text";
x.className = "contact";
x.id = "provinceBox";

var c = document.getElementById("con");
c.appendChild(x);
```

# Form validation

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- ▶ We can also use JavaScript to **validate** web forms.
- ▶ We previously looked at simple form validations using HTML attributes: *maxlength* and *required*.
- ▶ Now we can use JavaScript to have much more control over the form validation process.
- ▶ Conditionals are important here!



# Form validation

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- ▶ Form validation comes in a variety of types and complexity levels.
- ▶ Perform validation as the user types or selects data, or at the end when they submit it, or a combination.
- ▶ Add event listeners to run the validation accordingly.

# Form validation

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- ▶ For real-time validation:
  - ▶ Keyboard events: `keypress` / `onkeyup`
  - ▶ Blur (lose focus) event: `onblur`
- ▶ For submission-time validation:
  - ▶ Button click event: `onclick` / `onsubmit`

# Form validation

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- ▶ What are common criteria in the validation process for text?
  - ▶ Textbox left blank
  - ▶ Valid text length – over minimum or within a range
  - ▶ Type(s) of characters in text
  - ▶ Specific pattern (i.e. postal codes)

# Form validation

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- ▶ What are common criteria in the validation process for other inputs?
  - ▶ Radio / Dropdown list: was an option selected? Is the selected option valid?
  - ▶ Checkboxes: is there a limit/range of how many should be selected?

# Form validation

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- ▶ We won't go through every type of validation. Some are far too advanced for this course.
- ▶ We'll focus on the commonly used and simple types of validation.
- ▶ The first step is to get the user's input in the form as a variable. Then we can examine it for validation.

# Form validation

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- ▶ Access an input field normally: get element(s) by ID/class/tag.
- ▶ Then use dot notation to retrieve the value of that element.
  - ▶ For text, password, and textarea, use *element.value*
  - ▶ For radio buttons and checkboxes, use *element.checked*



# Form validation

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- For select dropdown menus, use *element.selectedIndex* to get the array index and *element.options* to get the array of options.

```
var opts = dd.options;
var si = dd.selectedIndex;
var sel = opts[si];
alert(sel.index + ", " + sel.text);
```

# Form validation

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- ▶ Checking if a textbox is left empty.
  - ▶ Compare the text to "" (quotation marks with nothing in between)
    - ▶ if (`name == ""`) {  
    // Empty.  
} else {  
    // Not empty.  
}

# Form validation

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- ▶ Checking if the entered text is long enough (in characters).
  - ▶ Examine the number of characters in the string variable using `.length`
    - ▶ if (`name.length < 5`) {  
    // Too short.  
} else {  
    // Long enough.  
}

# Form validation

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- ▶ More specific criteria like character types or patterns require that we examine individual characters.
- ▶ Loops are important to iterate over a string or a list of items.
- ▶ For these validation criteria, we can loop over the input string and check the characters at each slot.

# Form validation

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- ▶ Checking the character types within a string can be complex.
- ▶ One basic option to check if the entire string is a number or not is with the built-in `isNaN()` function (checks if value is Not a Number).
- ▶ `isNaN(34) = isNaN(2.5) = false`
- ▶ `isNaN("abc") = isNaN("B7") = true`

# Form validation

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- ▶ Before we continue with the form validation, let's look more at **strings**.
- ▶ Strings are just arrays of characters; only one character can be placed in each slot. Recall that positions start at 0 from the leftmost slot.

▶ `var course = "CS2033";`

|   |   |   |   |   |   |
|---|---|---|---|---|---|
| C | S | 2 | 0 | 3 | 3 |
| 0 | 1 | 2 | 3 | 4 | 5 |

▶ `var msg = "HELLO WORLD";`

|   |   |   |   |   |   |   |   |   |   |    |
|---|---|---|---|---|---|---|---|---|---|----|
| H | E | L | L | O |   | W | O | R | L | D  |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |



# Form validation

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- ▶ Like other arrays, access each of the characters with a for-loop.
- ▶ `var msg = "HELLO WORLD";`

```
for (var i = 0; i < msg.length; i++) {
 // Examine character at position i
}
```

# Form validation

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- ▶ Examining a character usually means comparing it to another value or a range of values.
- ▶ One option is to get the value directly from the string at position *i* and use that value for the analysis.
  - ▶ 

```
var char = msg[i];
if (char == "W") {
}
```

# Form validation

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- ▶ Instead of getting the character value itself in the loop, you could get its ASCII code for analysis.
  - ▶ `var code = msg.charCodeAt(i);`
  - ▶ `if (code >= 65 && code <= 90) {`  
`}`
  - ▶ Look up ASCII code charts for the ranges (65 to 90 is capital letters).

# Form validation

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- ▶ When using loop-based analysis, create a Boolean flag for "success".
- ▶ Default value depends on situation.
- ▶ Change its value to true or false as needed in the loop.
- ▶ At the end, check its final value to see if the overall string is valid or invalid.

# Form validation

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- ▶ i.e check if text contains only letters
- ▶ 

```
var success = true;
for (var i = 0; i < str.length; i++) {
 if (isLetter(str[i]) == false) {
 success = false;
 }
}
if (success == true) { ... }
else { ... }
```

# Form validation

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- ▶ Some user input is complex and difficult to analyze using these simple approaches.
- ▶ Another option is to use **regular expressions** (regex).
- ▶ Check if a user-typed string follows a specific pattern or template.



# Form validation

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- ▶ For example, consider an email address.
  - ▶ Username/custom text
  - ▶ @ (at symbol)
  - ▶ Domain name
  - ▶ . (dot symbol)
  - ▶ Extension (top level domain)
- ▶ i.e. bsarlo@uwo.ca

# Form validation

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- ▶ Patterns/templates are encoded using specific characters/symbols.
- ▶ For an email address, the regex is:  
`.+@.+\.+`
- ▶ Can you read this?
- ▶ <https://www.debuggex.com/cheatsheet/regex/javascript>