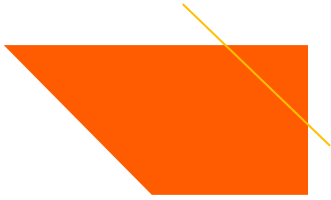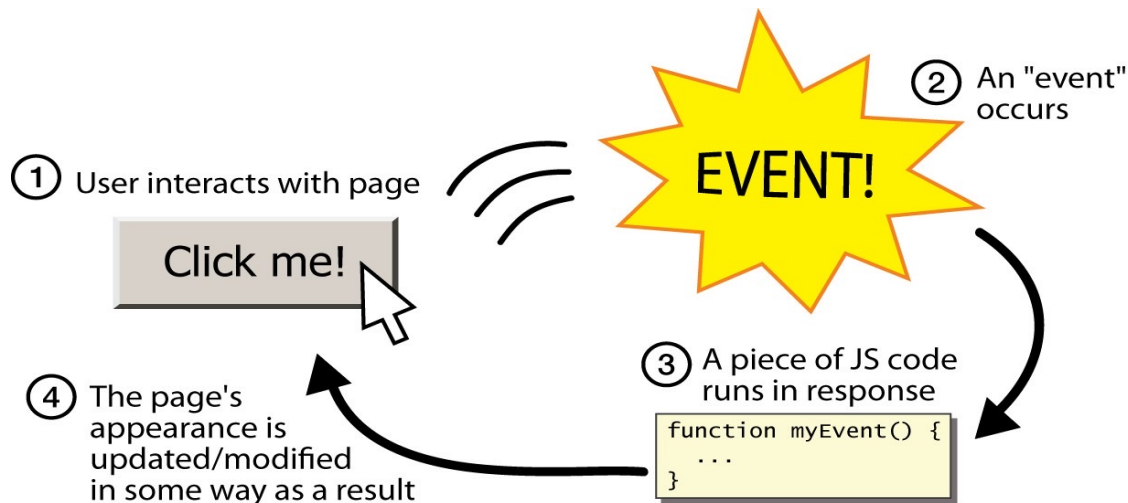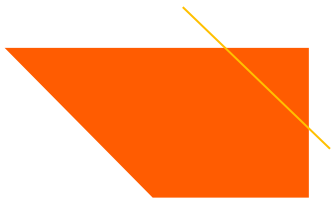# Web Application Development

COSI 152A

Event-driven Programming

Event-driven programming

- JavaScript programs have no main. They respond to browser and user actions called events.

  - designed as a language to effectively respond to browser and DOM events

- Event-driven programming is writing programs driven by events

① User interacts with page

Click me!

② An "event" occurs

EVENT!

③ A piece of JS code runs in response

```
function myEvent() {
   ...
}
```

④ The page's appearance is updated/modified in some way as a result

Responsive HTML controls

- To make a responsive UI control:

  1. choose the control (e.g. button) and event (e.g. mouse click) of interest

  2. write a JavaScript function to run when the event occurs

  3. attach the function to the event on the control

```
1. <button>Click me!</button>


2. function myFunction(){
       alert("Button is clicked!");
   }


3. <button  onclick="myFunction();">Click  me!</button>
   <element attributes onclick="function();">...
```

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Event handlers

- JavaScript functions can be set as event handlers

  - when you interact with the element, the function will execute

  - onclick is just one of many HTML event attributes we'll use

```
function myFunction(){
    alert("Button is clicked!");
}
```

- For more events visit here.

- Popping up an alert window is disruptive and annoying

  - a better user experience would be to have the message appear on the page...

  - but **HOW?**

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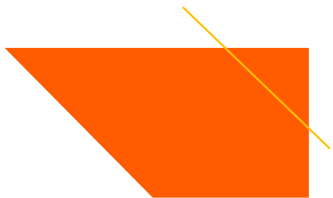
Document Object Model (DOM)

- The DOM is an API and JavaScript programmers use it to conveniently access and manipulate the HTML elements in code.

- We can examine elements' state

  - e.g., see whether a box is checked

- We can change state

  - e.g., insert some new text into a div

- We can change styles

  - e.g., make a paragraph red

DOM element objects

- Every element on the HTML page has a corresponding DOM object

- To access and modify the attributes of the DOM object:

```
objectName.attributeName = value;
```

HTML
```
<p>
  Look at this octopus:
  <img src="octopus.jpg" alt="an octopus" id="icon01" />
  Cute, huh?
</p>
```

DOM Element Object

Property	Value
tagName	"IMG"
src	"octopus.jpg"
alt	"an octopus"
id	"icon01"

JavaScript
```
var icon = document.getElementById("icon01");
icon.src = "kitty.gif";
```

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Accessing elements

- document.getElementById returns the DOM object for an element with a given id.

- Browser automatically updates the screen when a DOM object is changed.

- The **value** property changes the text in most form controls.

```javascript
const name = document.getElementById("someId");


<button onclick="changeText();">Click me!</button>
<input id="output" type="text" value="replace me" />

function changeText(){
 const textbox = document.getElementById("output");
 textbox.value = "Hello, world!";
}
```

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Accessing elements
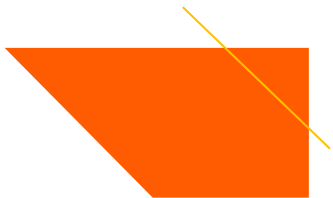
- innerHTML property can change the text inside most elements.

```html
<button onclick="swapText();">Click me!</button>
<span id="output2">Hello</span>
<input id="textbox2" type="text" value="Goodbye" />

function swapText() {
 var span = document.getElementById("output2");
 var textBox = document.getElementById("textbox2");
 var temp = span.innerHTML;
 span.innerHTML = textBox.value;
 textBox.value = temp;
}
```

DOM object properties

Property	Description	Example
tagName	element's HTML tag	mainDiv.tagName is "DIV"
className	CSS classes of element	mainDiv.className is "foo bar"
innerHTML	Content in element	mainDiv.innerHTML is "\n <p>Hello…
src	URL target of an image	icon.src is "greatwall.jpg"

```html
<div id="main" class="foo bar">
  <p>Hello, <em>very</em> happy to see you!</p>
  <img id="icon" src="greatwall.jpg" alt="GREAT WALL" />
</div>
```

```javascript
const mainDiv = document.getElementById("main");
const icon = document.getElementById("icon");
```

DOM properties for form control

Property	Description	Example
value	the text/value chosen by the user	sid.value could be "1234567"
checked	whether a box is checked	fresh.checked is true
disabled	whether a control is disabled (boolean)	fresh.disabled is false
readOnly	whether a text box is read-only	sid.readOnly is false

```html
<input id="sid" type="text" size="7" maxlength="7" />

<input id="fresh" type="checkbox" checked="checked" />
```

```javascript
Freshman?
const sid = document.getElementById("sid");
const fresh = document.getElementById("fresh");
```

Abuse of innerHTML

- innerHTML can inject arbitrary HTML content into the page

- However, this is prone to bugs and errors and is considered poor style

  - innerHTML not part of DOM standard

- Best practice: inject plain text only

  - Do not use innerHTML to inject HTML tags

```javascript
// bad style!
var paragraph = document.getElementById("welcome");
paragraph.innerHTML = '<p>text and <a href="page.html">link</a></p>';
```
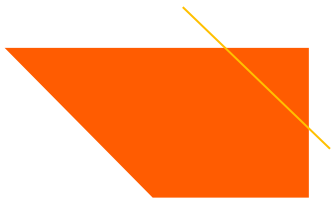
DOM elements style properties

- Contains same properties as in CSS, but with camelCasedNames

  - examples: backgroundColor, borderLeftWidth, fontFamily

Property	Description
style	Let you set any CSS style property for an element

```
<button id="clickme">Color Me</button>

document.getElementById("clickme").addEventListener("click", changeColor);
function changeColor() {
 const clickMe = document.getElementById("clickme");
 clickMe.style.color = "red";
}
```

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Common DOM styling errors

- Don't forget to write .style when setting styles

```
var clickMe = document.getElementById("clickme");
clickMe.color = "red";
clickMe.style.color = "red";
```
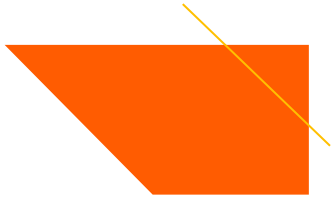
- Style properties are capitalized likeThis   not like-this

```
clickMe.style.fontSize="14pt";     clickMe.style.font-size="14pt";
```

- Style properties must be set as strings, often with units at the end

```
clickMe.style.width = 200;
clickMe.style.width = "200px";
clickMe.style.padding = "0.5em";
```

- Write exactly the value you would have written in the CSS, but in quotes

Thank You!