



Module 4 Day 4

Event Handling

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

Event-Driven Programming

- The browser recognizes when "anything" happens on a page
 - Mouse click, mouse over, input field change, form submit, and on and on...
 - These are all *events*
- Every event occurs (is *triggered*) on a *target* (DOM) element
 - The event is "published"
- Our JS code "asks" to be notified for specific events
 - This is called "subscribing to an event", or
 - Adding an event listener
- An *event listener* is JS code that we write (a function)
- This is called an *event-driven interface*
 - The user determines the flow

Subscribing to an Event

- `element.addEventListener(eventName, eventHandlerFunction)`

```
// We got an element to subscribe to. Hook up the events.  
element.addEventListener('mousemove', (ev) => {  
  |   LogEvent(ev);  
});
```

Events

← W/K → EVENTS

- MouseEvent
 - click, dblclick, mouseover, mouseout, mousemove
- KeyboardEvent
 - keypress, keyup, keydown
- Event
 - change (input, select or textarea), submit (form), reset (form)
- FocusEvent
 - focus, blur

Event Object

Event type	Properties
Event	target (an element), type (e.g., 'click', 'blur') preventDefault() method
UIEvent : Event	Parent event for mouse, keyboard, focus and other event types. No properties of interest to us at this time
MouseEvent : UIEvent	clientX, clientY, shiftKey , altKey, ctrlKey, button
KeyboardEvent : UIEvent	key, shiftKey , altKey, ctrlKey, repeat https://developer.mozilla.org/en-US/docs/Web/API/KeyboardEvent/key/Key_Values
FocusEvent : UIEvent	No fun properties

Let's
Code

Page Loading Sequence

- Browser reads the page and starts processing elements top-down
 - As it is read, browser builds the DOM
 - Page also may start to render
- When a `<script>` tag is encountered, the browser stops other processing and runs the script
- When entire page is read and the DOM is built, `document.DOMContentLoaded` is triggered
- Browser continues to get external files (CSS, IMG) to complete the page
- When all external content has been loaded, `window.load` is triggered
- <https://javascript.info/onload-ondomcontentloaded>
- <https://www.innoq.com/en/blog/loading-javascript/>



Demo

Adding Event Handlers (Listeners)

- Add a handler to `document.DOMContentLoaded` event
 - This event fires when the HTML has been downloaded and parsed
 - Meaning all DOM elements exist in the tree
 - Page will not have rendered yet
 - External resources (css, jpg) may not have been downloaded yet
 - This code should be in global scope (not within another function)
- In that handler, add other handlers

```
document.addEventListener("DOMContentLoaded", () => {  
    // Register all of your event listeners here  
});
```

Let's
Code

Event Bubbling (Propagation)

- An event is triggered on some source element
- Browser looks for event handler on the element, invokes if found
- Then it looks for event handler on the element's parent, invokes if found
- And so on, up to the window object
- If you want to change this and stop the bubbling, call `event.stopPropagation()`



Let's
Code

Preventing Default

- Anchors `<a>` and Submit buttons `<input type="submit">` have default behavior
 - Anchor navigates to a URL when clicked
 - Form posts to server when submitted
 - Clicking a checkbox toggles the checked state of the control
- You may want to override their behavior
 - E.g., use an anchor to hide a section
- To prevent the default behavior from happening, call `event.preventDefault()`
- NOTE: `preventDefault` does not stop propagation