

# WEB230: JavaScript 1

## Module 6: Handling Events

### Events

- events are interactions with our page
- often initiated by the user
- we can't predict when they will happen

### Event Handlers

- JavaScript code that runs when an event occurs
- written as a function
- this function is passed to a method

### Events and DOM Nodes

- every DOM Element node can have events associated with it
- use `.addEventListener()`
- first argument is the event name such as 'click'
- second argument is a callback function (the event handler)

```
const button = document.querySelector('button');
button.addEventListener('click', function() {
  alert('Button clicked.');
```

### Deleting an Event Handler

- use a named callback function
- this provides a function reference that we can pass to `.removeEventListener()`

```
const button = document.querySelector('button');
function once() {
  alert('Done.');
```

```
  button.removeEventListener('click', once);
}
```

```
button.addEventListener('click', once);
```

### Event Objects

- callback functions can accept a parameter called the event object
- this object has information about the event
  - for example, which element was clicked on
- properties and methods vary depending on the type of event
- this parameter is usually called `event` or simply `e`

## Keyboard Events

- `keydown` and `keyup` events
- `keydown` will repeat if held
- `event.key` holds a string with the value that the key would type
- boolean properties for modifier keys:
  - `event.shiftKey`
  - `event.ctrlKey`
  - `event.altKey`
  - `event.metaKey` (Windows key or Mac Command key)
- event occurs on element that has focus (or `document.body`)
- if you want to capture all keystrokes, use `window.addEventListener()`
  - `window` is optional since it is the global object
- Note: the `keypress` event is deprecated

## Key Event Properties

- `event.key` (String) The key value of the key represented by the event. If the value has a printed representation, this attribute's value is the same as the `char` attribute. Otherwise, it describes the key.
- `event.code` (String) Holds a string that identifies the physical key being pressed. The value is not affected by the current keyboard layout or modifier state, so a particular key will always return the same value.

```
document.body.addEventListener('keydown', function(event) {  
  console.log('Key pressed:', event.key);  
});
```

- `event.repeat` (Boolean) `true` if the key is being held down such that it is automatically repeating
  - can be used to avoid repeatedly running the event handler

```
document.body.addEventListener('keydown', function(event) {  
  if (event.repeat) { return; }  
  console.log('Key pressed:', event.key);  
});
```

## Mouse Clicks

- `mousedown`, `mouseup`, `click`, and `dblclick` events
- `event.clientX` and `event.clientY` properties give exact location
- `event.button` takes into account user customization
  - 0: Main button pressed, usually the left button or the un-initialized state
  - 1: Auxiliary button pressed, usually the wheel button or the middle button (if present)
  - 2: Secondary button pressed, usually the right button
  - 3: Fourth button, typically the Browser Back button
  - 4: Fifth button, typically the Browser Forward button

## Mouse Button Event Order

1. mousedown
2. mouseup
3. click
4. dblclick - if applicable
  - dblclick will repeat the previous three twice

## Mouse Motion

- mousemove event every time the mouse moves
- mouseover or mouseout event equivalent to CSS :hover

## Scroll Events

- scroll event when page scrolls
- fired every time the page is scrolled
- window.scrollX and window.scrollY for scroll position

## Focus Events

- focus and blur
- when an element is selected it has focus
- when it loses focus a blur event is fired
- most often used with forms
- does not propagate

## Load Event

- load event fires on the window object when the window finishes loading
- often used to schedule initialization actions that require the DOM
- element that load external files, such as images, also have a load event

## Script Execution Timeline

- no two scripts can run at the same time
- each script (or function) will wait for others to finish
- web workers provide a way to do something while other things run

## Setting Timers

- setTimeout to run a function after an amount of time
- schedules a function to be called in a specified amount of time
- clearTimeout can be used to cancel it
- setInterval and clearInterval is similar but repeats every specified time interval

```
const button = document.querySelector('button');
const list = document.querySelector('ul');
let interval;
button.addEventListener('click', function(event){
  if(interval) {
    clearInterval(interval);
  } else {
    interval = setInterval(function(){
      let item = document.createElement('li');
      item.textContent = 'New item';
      list.appendChild(item);
    }, 1000);
  }
});
```

## Script Execution Timeline

- no two scripts can run at the same time
- each piece of code (often functions) will wait for others to finish
- web workers provide a way to do something while other things run

## The event Objects

- event handlers can accept a parameter called the event object
- this object has information about the event
  - for example, which element was clicked on
  - which button or key was pressed
- properties and methods vary depending on the type of event
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- `mousedown`, `mouseup`, `click`, and `dblclick` events
- if you need the location of the mouse click you can use `event.clientX` and `event.clientY` properties
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## Mouse Button Event Order

1. `mousedown`
2. `mouseup`
3. `click`

4. `dblclick` - if applicable
  - `dblclick` will repeat the previous three times

## Mouse Motion

- `mousemove` event every time the mouse moves
- `mouseover` or `mouseout` event equivalent to CSS `:hover`
- there are also `drag` events when moving objects

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const button = document.querySelector('button');
const list = document.querySelector('ul');
let interval;
button.addEventListener('click', function(event){
  if(interval) {
    clearInterval(interval);
  } else {
    interval = setInterval(function(){
      let item = document.createElement('li');
      item.textContent = 'New item';
      list.appendChild(item);
    }, 1000);
  }
});
```

## Propagation

- if an event occurs on a child element it will trigger the event handler on the parent element
- if both have handlers the more specific one runs first
- `event.stopPropagation()` method on the event object can stop this

## Delegation

- an event handler can be placed on the parent element to handle the events on child elements

## target Property

- most events have an `event.target` property
- this is the element that the event occurred on
- often used to delegate event handling to parent element

## Default Actions

- some element have default actions
  - such as a form being submitted to a server or a link being followed
- the event handler runs before the default action
- `event.preventDefault()` method can stop the default action

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    }, 1000);
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```

## Summary

- event handlers make it possible to detect and react to external events
- each event has a type - eg. 'click'
- events *propagate* to their parent elements
  - `event.stopPropagation()`
- some elements have default actions
  - `event.preventDefault()`
- only one piece of JavaScript can run at once

## Reference

- [MDN Events \(https://developer.mozilla.org/en-US/docs/Web/Events\)](https://developer.mozilla.org/en-US/docs/Web/Events)