SWE 363: Web Engineering & Development

Module 3-3

Graphics and Media in **HTML5**

Objectives

- ❑ Learn more about HTML5 graphics and media

Outline

- ❑ Graphics in HTML5
- ❑ Media Elements
- ❑ HTML5 Geolocation

References

- *Web Development and Design Foundations with XHTML*, 5/e, Pearson Education Inc. 2009. Chapters 2 & 3.

- Some useful links with examples and other resources:
    - Hickson, I. (Eds.). (2011). HTML Living Standard. Retrieved from http://www.whatwg.org/specs/web-apps/current-work/multipage/
    - World Wide Web Consortium. (n.d.). HTML 5 Tutorial. Retrieved from http://www.w3schools.com/html5/default.asp

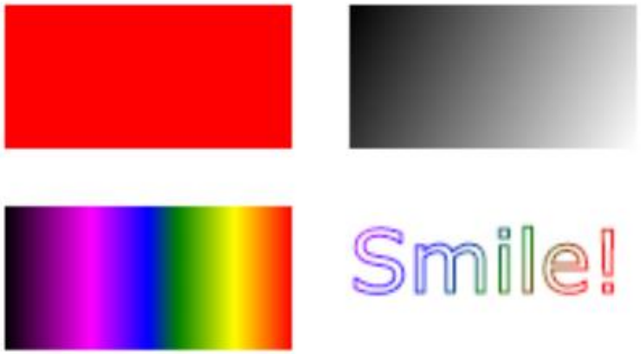
HTML Graphics

canvas Element

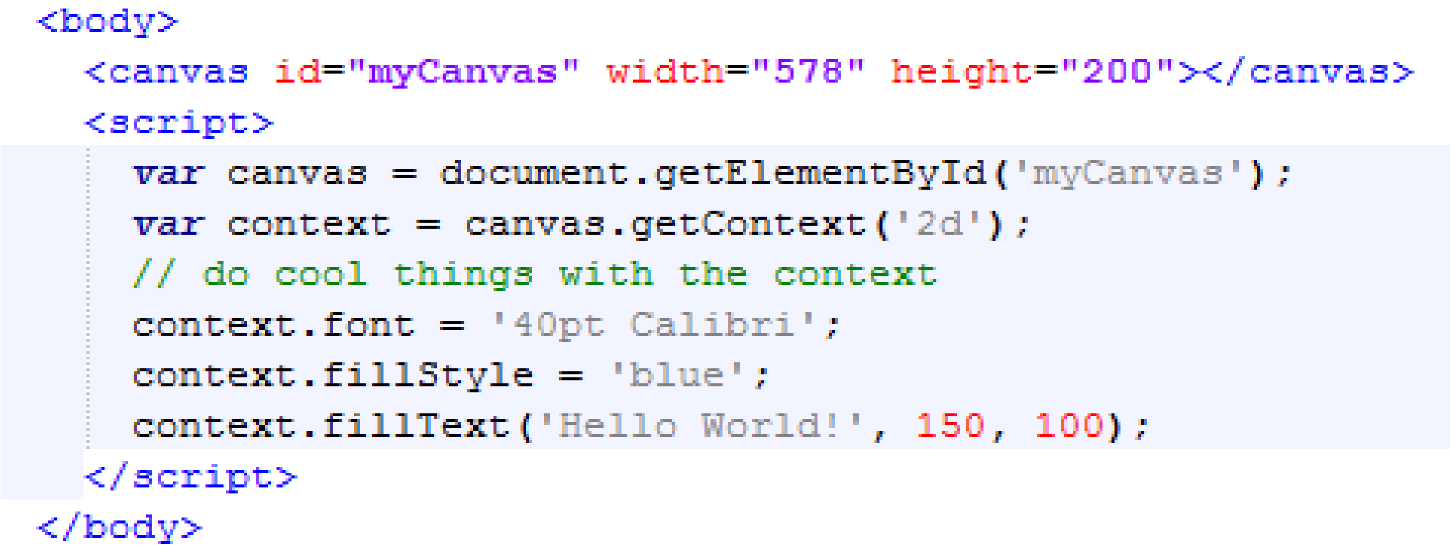
- The *<canvas> element* is used to draw graphics, on the fly, via scripting (usually JavaScript)

- The <canvas> element is only a container for graphics.
  - You must use a script to actually draw the graphics

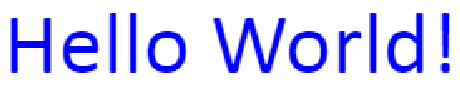
- Canvas has several methods for drawing paths, boxes, circles, text, and adding images



canvas Element..



```
<body>
  <canvas id="myCanvas" width="578" height="200"></canvas>
  <script>
    var canvas = document.getElementById('myCanvas');
    var context = canvas.getContext('2d');
    // do cool things with the context
    context.font = '40pt Calibri';
    context.fillStyle = 'blue';
    context.fillText('Hello World!', 150, 100);
  </script>
</body>
```



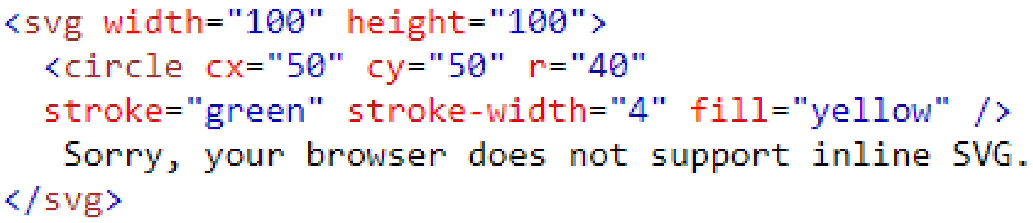
Hello World!

https://www.w3schools.com/html/html5_canvas.asp

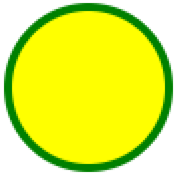
HTML5 *Inline SVG*

- ❑ SVG (Scalable Vector Graphics)
- ❑ SVG is used to define vector-based graphics for the web
- ❑ SVG defines the graphics in XML format
- ❑ SVG is a W3C recommendation

- ❑ *<svg> element* is a container for SVG graphics.
  - SVG has several methods for drawing paths, boxes, circles, text, and graphic images.



```
<svg width="100" height="100">
  <circle cx="50" cy="50" r="40"
  stroke="green" stroke-width="4" fill="yellow" />
   Sorry, your browser does not support inline SVG.
</svg>
```



Example https://www.w3schools.com/html/html5_svg.asp

HTML5 *Inline SVG..*

Example

```
<!DOCTYPE html>
        <html>
                <head>
                        <title>My Inline SVG</title>
                </head>
                <body>
                        <svg x="0px" y="0px" width="100px“  height="50px“
                                 viewBox="0 0 100 50" enable-background="new 0 0 100 50" xml:space="preserve">
                                <g>
                                   <polygon fill="#212121" points="0,46.334 32.5,22.833 54.5,39.834 79.333,19.333 74,14.5
                                   100,6.667 91.667,29.334 86.167,25
                                        55.5,50 32.167,29.334"/>
                                </g>
                                <g>
                                <polygon fill="#3EE02B" points="36.975,7 39.042,25.959 50,34.078 47.935,7"/>
                                 <polygon fill="#3EE02B" points="49,0 51.881,35.335 54.636,37.59 61.838,30.951
                                 59.208,0"/>
                                <polygon fill="#3EE02B" points="61.939,12.05 63.305,29.861 73,21.933 73,12"/>
                                </g>
                        </svg>
                </body>
        </html>
```

HTML5 *Inline SVG..*

- Advantages of using SVG over other image formats (like JPEG and GIF) are:
  - Graphics are defined in xml format which causes smaller file size
  - With Inline SVG technique you can put your graphics directly in your html source code, so there is no need to load any external files.
  - SVG image can be created and edited with any text editor
  - SVG image can be searched, indexed, scripted and compressed
  - SVG images are scalable
  - SVG images can be printed with high quality at any resolution
  - SVG images are zoomable

Difference between SVG & Canvas

Canvas	**SVG**
✓ Canvas draws 2D graphics, on the fly (with a JavaScript). ✓ Resolution dependent ✓ No support for event handlers ✓ Poor text rendering capabilities ✓ You can save the resulting image as .png or .jpg ✓ Well suited for graphic-intensive games	✓ SVG is a language for describing 2D graphics in XML. ✓ Resolution independent ✓ Support for event handlers ✓ Best suited for applications with large rendering areas (Google Maps) ✓ Slow rendering if complex (anything that uses the DOM a lot will be slow) ✓ Not suited for game applications

https://www.w3schools.com/html/html5_svg.asp

Media Elements

- One of the awesome parts of HTML5 is that it allows browsers to natively play audio and video files.
  - No need for a plugin (Flash, Java), building complicated custom JavaScript solutions

- By using the <audio> or <video> elements, you simply specify a source file (the same way you do for <img>) and the browser takes everything else for you.
  - It is possible change various attributes: whether the media file should loop, preload, and/or autoplay; and whether controls will be displayed (play button, forward, pause, etc.).

Media Elements..

- ❑ HTML5 provides a simple way to include videos and audio clips in web pages

Tag	Description
<audio>	Defines sound content
<video>	Defines a video or movie
<source>	Defines multiple media resources for <video> and <audio>
<embed>	Defines a container for an external application or interactive content (a plug-in)
<track>	Defines text tracks for <video> and <audio>

HTML5 Audio

- ❑ HTML5 provides a standard for plying audio files
- ❑ Supported file formats for the <audio> element: MP3, Wav, and Ogg

<audio> - Define sound content

<source> - Defines multiple sources for the audio element

```
<audio src=“sound.ogg" autoplay>
   Your browser does not support the audio element.
</audio>
```

```
<audio controls="controls“>
   Your browser does not support the audio element.
   <source src="foo.wav" type="audio/wav">
</audio>
```

Source: https://www.w3schools.com/tags/tag_audio.asp

HTML5 Audio..

Attribute	Value	Description
autoplay	autoplay	Specifies that the audio will start playing as soon as it is ready
controls	controls	Specifies that audio controls should be displayed (such as a play/pause button etc)
loop	loop	Specifies that the audio will start over again, every time it is finished
muted	muted	Specifies that the audio output should be muted
preload	auto metadata none	Specifies if and how the author thinks the audio should be loaded when the page loads
src	*URL*	Specifies the URL of the audio file

Source: https://www.w3schools.com/tags/tag_audio.asp

HTML5 Video

- Three file formats are supported for the <video> element:
  - MP4,
  - WebM and
  - Ogg

<video> - Define a video

<source> - Defines multiple sources for the video element

<track> - Defines text tracks in media players

Source: https://www.w3schools.com/tags/tag_video.asp

HTML5 Video..

Attribute	Value	Description
autoplay	autoplay	Specifies that the video will start playing as soon as it is ready
controls	controls	Specifies that video controls should be displayed (such as a play/pause button etc).
height	*pixels*	Sets the height of the video player
loop	loop	Specifies that the video will start over again, every time it is finished
muted	muted	Specifies that the audio output of the video should be muted
poster	*URL*	Specifies an image to be shown while the video is downloading, or until the user hits the play button
preload	auto metadata none	Specifies if and how the author thinks the video should be loaded when the page loads
src	*URL*	Specifies the URL of the video file
width	*pixels*	Sets the width of the video player

Source: https://www.w3schools.com/tags/tag_video.asp

HTML5 Geolocation

- ❑ The geolocation API allows the user to provide their location to web applications if they so desire.
  - ▪ For privacy reasons, the user is asked for permission to report location information.

- ❑ Geolocation works by scanning common sources of location information which include the following:
  - ▪ Global Positioning System (GPS) – Most Accurate
  - ▪ Network Signals - IP address, RFID, WiFi and Bluetooth MAC addresses
  - ▪ GSM/CDMA cell IDs
  - ▪ User Input

- ❑ All of the latest versions of Chrome, Firefox, IE, Safari and Opera can use the geolocation feature of HTML5

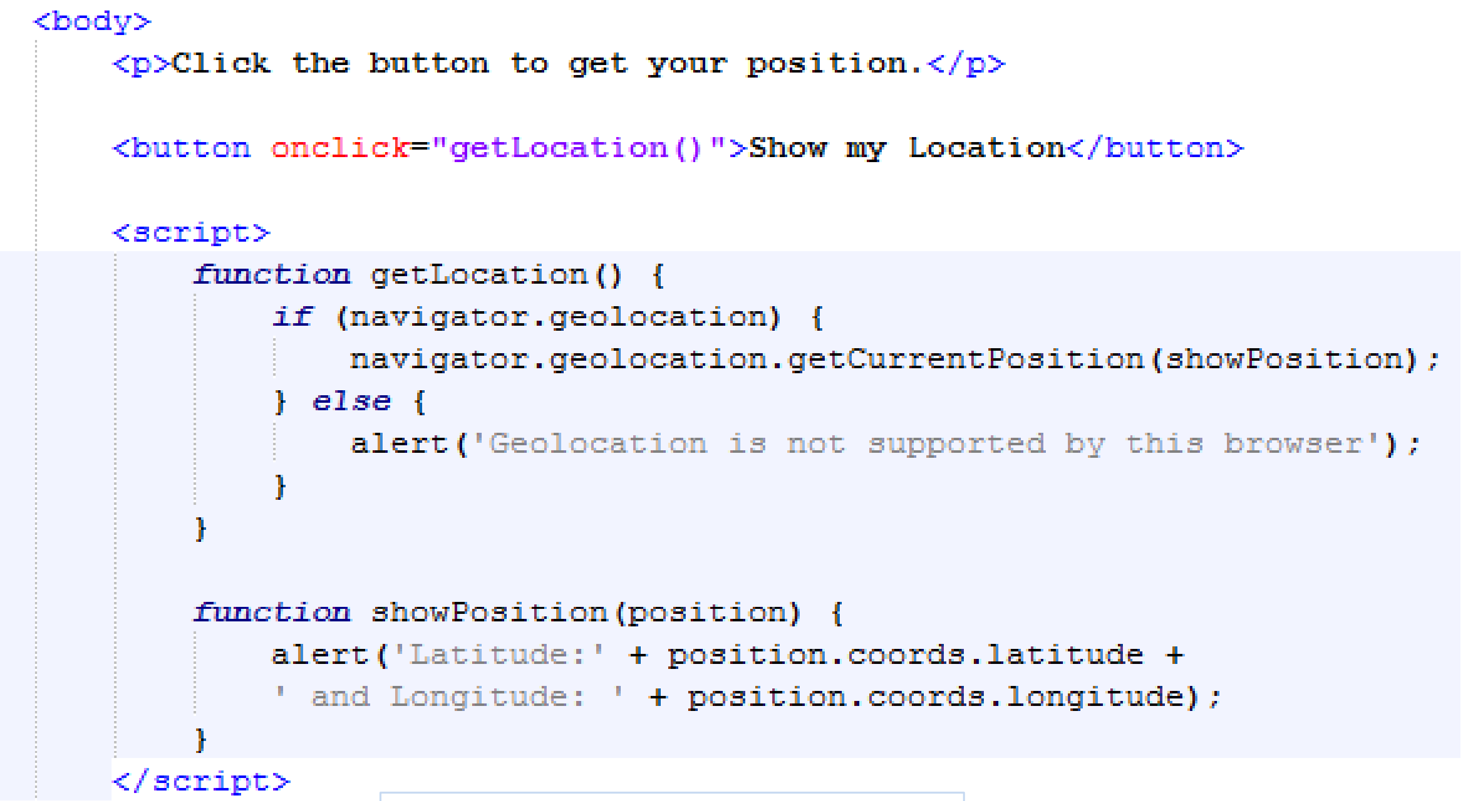
HTML5 Geolocation..

- Some great uses of Geolocation
  - Public transportation websites
  - Taxi and other transportation websites
  - Calculate shipping costs on an Ecommerce site
  - Travel agency websites
  - Real estate websites
  - Online gaming
  - Local headlines and weather on their front page.
  - Job postings can automatically include commute times
  - The possibilities are endless!

Source: https://www.udemy.com/learn-html5-programming-from-scratch

HTML5 Geolocation..

Example

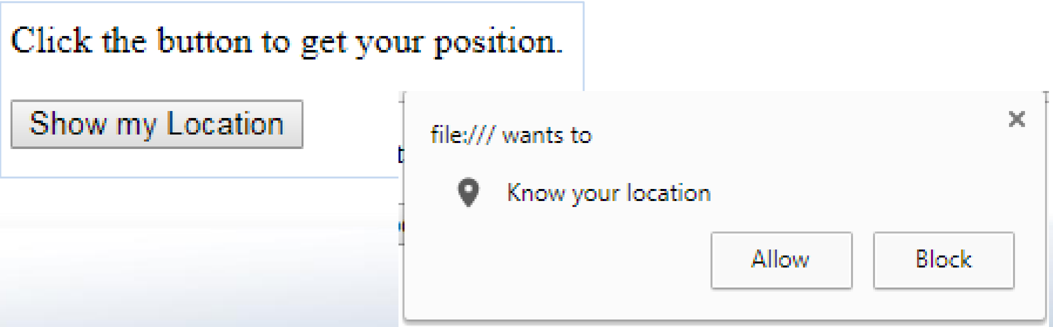


```
<body>
    <p>Click the button to get your position.</p>

    <button onclick="getLocation()">Show my Location</button>

    <script>
        function getLocation() {
            if (navigator.geolocation) {
                navigator.geolocation.getCurrentPosition(showPosition);
            } else {
                alert('Geolocation is not supported by this browser');
            }
        }

        function showPosition(position) {
            alert('Latitude:' + position.coords.latitude +
            ' and Longitude: ' + position.coords.longitude);
        }
    </script>
</body>
```



Click the button to get your position.

file:/// wants to

Know your location

HTML5 Geolocation..

- ❑ The getCurrentPosition() method returns an object on success.

Property	Returns
coords.latitude	The latitude as a decimal number
coords.longitude	The longitude as a decimal number
coords.accuracy	The accuracy of position
coords.altitude	The altitude in meters above the mean sea level
coords.altitudeAccuracy	The altitude accuracy of position
coords.heading	The heading as degrees clockwise from North
coords.speed	The speed in meters per second
timestamp	The date/time of the response

- The latitude, longitude and accuracy properties are always returned.
- The other properties are returned if available

HTML5 Geolocation..

- ❑ We can present location info to the user in 2 ways - geodetic and civil
  1. The geodetic way of describing position refers directly to latitude and longitude.
  2. The civic representation of location data is a more human readable and understandable format.

- ❑ Each attribute/param has both a geodetic representation and a civic representation

Attribute	Geodetic	Civic
Position	59.3, 18.6	Stockholm
Elevation	10 meters	4th floor
Heading	234 degrees	To the city center
Speed	5 km / h	Walking
Orientation	45 degrees	North-East

HTML5 Geolocation..

Method	Description
getCurrentPosition()	This method retrieves the current geographic location of the user.
watchPosition()	This method retrieves periodic updates about the current geographic location of the device.
clearWatch()	This method cancels an ongoing watchPosition call.

Source: https://www.tutorialspoint.com/html5/html5_geolocation.htm

HTML5 Validation and Browser Support

- ❑ Validating Your HTML5 Code:

  http://validator.w3.org/

  http://html5.validator.nu/

- ❑ The HTML5 Test website (http://html5test.com): scores each browser based on its support for the latest features of these evolving standards.

- ❑ You can also check sites such as http://caniuse.com/ for a list of features covered by each browser.

- ❑ Why validation is required?
  - https://validator.w3.org/docs/why.html
  - https://www.htmlvalidator.com/htmlval/whyvalidate.html