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HTML5 Bis

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What is New in HTML5?

- The DOCTYPE declaration for HTML5 is very simple:

```
<!DOCTYPE html>
```

- The character encoding (charset) declaration is also very simple:

```
<meta charset="UTF-8">
```

The default character encoding in HTML5 is UTF-8.

New HTML5 Elements

The most interesting new HTML5 elements are:

- New **semantic elements** like <header>, <footer>, <article>, and <section>.
- New **attributes of form elements** like number, date, time, calendar, and range.
- New **graphic elements**: <svg> and <canvas>.
- New **multimedia elements**: <audio> and <video>.

New HTML5 API's

The most interesting new API's (Application Programming Interfaces) in HTML5 are:

- HTML Geolocation
- HTML Drag and Drop
- HTML Local Storage
- HTML Application Cache
- HTML Web Workers
- HTML SSE

Tip: HTML Local storage is a powerful replacement for cookies.

Removed Elements in HTML5

The following HTML4 elements have been removed in HTML5:

Removed Element	Use Instead
<acronym>	<abbr>
<applet>	<object>
<basefont>	CSS
<big>	CSS
	CSS
<dir>	
<font>	CSS
<frame>	
<frameset>	
<noframes>	
<strike>	CSS, <s>, or <del>
<tt>	CSS

HTML Timeline

- The W3C **HTML5** recommendation was released **28 October 2014**.
- W3C also published an **HTML 5.1** Candidate Recommendation on **21 June 2016**.

New Semantic/Structural Elements

HTML5 offers new semantic elements that define the different parts of a web page:

- <article>
- <aside>
- <details>
- <figcaption>
- <figure>
- <footer>
- <header>
- <main>
- <mark>
- <nav>
- <section>
- <summary>
- <time>

HTML5 <section> Element

The <section> element defines a section in a document.

According to W3C's HTML5 documentation: "A section is a thematic grouping of content, typically with a heading."

A home page could normally be split into sections for introduction, content, and contact information.

```
<section>
  <h1>WWF</h1>
  <p>The World Wide Fund for Nature (WWF) is....</p>
</section>
```

HTML5 <article> Element

- The <article> element specifies independent, self-contained content.
- An article should make sense on its own, and it should be possible to read it independently from the rest of the web site.
- Examples of where an <article> element can be used:
  - Forum post
  - Blog post
  - Newspaper article

```
<article>
  <h1>What Does WWF Do?</h1>
  <p>WWF's mission is to stop the degradation of our planet's natural environment,
  and build a future in which humans live in harmony with nature.</p>
</article>
```

Nesting <article> in <section> or Vice Versa?

The <article> element specifies independent, self-contained content.

The <section> element defines section in a document.

Can we use the definitions to decide how to nest those elements? No, we cannot!

So, on the Internet, you will find HTML pages with <section> elements containing <article> elements, and <article> elements containing <sections> elements.

You will also find pages with <section> elements containing <section> elements, and <article> elements containing <article> elements.

Example for a newspaper: The sport articles in the sport section, may have a technical section in each article.

HTML5 <header> Element

The <header> element specifies a header for a document or section.

The <header> element should be used as a container for introductory content.

You can have several <header> elements in one document.

The following example defines a header for an article:

```
<article>
  <header>
    <h1>What Does WWF Do?</h1>
    <p>WWF's mission:</p>
  </header>
  <p>WWF's mission is to stop the degradation of our planet's natural environment,
  and build a future in which humans live in harmony with nature.</p>
</article>
```

HTML5 <footer> Element

The <footer> element specifies a footer for a document or section.

A <footer> element should contain information about its containing element.

A footer typically contains the author of the document, copyright information, links to terms of use, contact information, etc.

You may have several <footer> elements in one document.

```
<footer>
  <p>Posted by: Hege Refsnes</p>
  <p>Contact information: <a href="mailto:someone@example.com">
  someone@example.com</a>.</p>
</footer>
```

HTML5 <nav> Element

The <nav> element defines a set of navigation links.

Not all links of a document should be inside a <nav> element. The <nav> element is intended only for major block of navigation links.

```
<nav>
  <a href="/html/">HTML</a> |
  <a href="/css/">CSS</a> |
  <a href="/js/">JavaScript</a> |
  <a href="/jquery/">jQuery</a>
</nav>
```

HTML5 <aside> Element

The <aside> element defines some content aside from the content it is placed in (like a sidebar).

The aside content should be related to the surrounding content.

```
<p>My family and I visited The Epcot center this summer.</p>

<aside>
  <h4>Epcot Center</h4>
  <p>The Epcot Center is a theme park in Disney World, Florida.</p>
</aside>
```

HTML5 <figure> and <figcaption> Elements

The purpose of a figure caption is to add a visual explanation to an image.

In HTML5, an image and a caption can be grouped together in a <figure> element:

Fig.1 - The Pulpit Rock, Norway.

```
<figure>
  <img src="pic_mountain.jpg" alt="The Pulpit Rock" width="304" height="228">
  <figcaption>Fig1. - The Pulpit Rock, Norway.</figcaption>
</figure>
```

The <img> element defines the image, the <figcaption> element defines the caption.

Why Semantic Elements?

With HTML4, developers used their own id/class names to style elements: header, top, bottom, footer, menu, navigation, main, container, content, article, sidebar, topnav, etc.

This made it impossible for search engines to identify the correct web page content.

With the new HTML5 elements (<header> <footer> <nav> <section> <article>), this will become easier.

According to the W3C, a Semantic Web: "Allows data to be shared and reused across applications, enterprises, and communities."

HTML5 Canvas

The HTML <canvas> element is used to draw graphics on a web page.

The graphic below is an example of <canvas>. It shows four elements: a red rectangle, a gradient rectangle, a multicolor rectangle, and a multicolor text.

What is HTML Canvas?

The HTML <canvas> element is used to draw graphics, on the fly, via JavaScript.

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

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

Canvas Examples

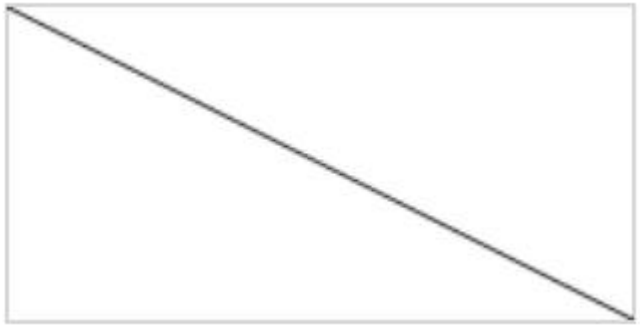
A canvas is a rectangular area on an HTML page. By default, a canvas has no border and no content.

The markup looks like this:

```
<canvas id="myCanvas" width="200" height="100"></canvas>
```

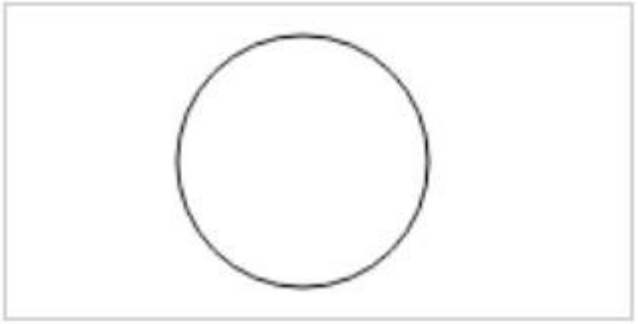
Note: Always specify an id attribute (to be referred to in a script), and a width and height attribute to define the size of the canvas. To add a border, use the style attribute.

Draw a Line



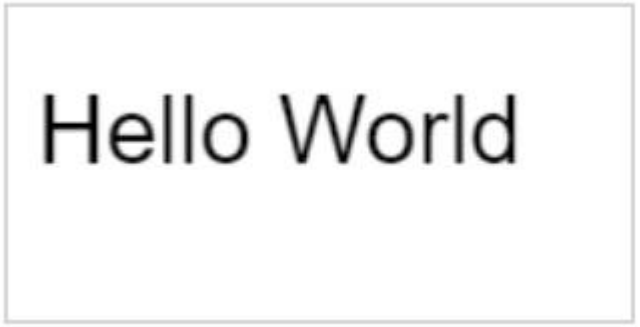
```
var c = document.getElementById("myCanvas");
var ctx = c.getContext("2d");
ctx.moveTo(0,0);
ctx.lineTo(200,100);
ctx.stroke();
```

Draw a Circle



```
var c = document.getElementById("myCanvas");
var ctx = c.getContext("2d");
ctx.beginPath();
ctx.arc(95,50,40,0,2*Math.PI);
ctx.stroke();
```

Draw a Text




```
var c = document.getElementById("myCanvas");
var ctx = c.getContext("2d");
ctx.font = "30px Arial";
ctx.fillText("Hello World",10,50);
```

Stroke Text


```
var c = document.getElementById("myCanvas");
var ctx = c.getContext("2d");
ctx.font = "30px Arial";
ctx.strokeText("Hello World",10,50);
```

Draw Linear Gradient

```
var c = document.getElementById("myCanvas");
var ctx = c.getContext("2d");

// Create gradient
var grd = ctx.createLinearGradient(0,0,200,0);
grd.addColorStop(0,"red");
grd.addColorStop(1,"white");

// Fill with gradient
ctx.fillStyle = grd;
ctx.fillRect(10,10,150,80);
```

HTML5 SVG

What is SVG?

- SVG stands for Scalable Vector Graphics
- SVG is used to define graphics for the Web
- SVG is a W3C recommendation

The HTML <svg> element is a container for SVG graphics.

SVG has several methods for drawing paths, boxes, circles, text, and graphic images.

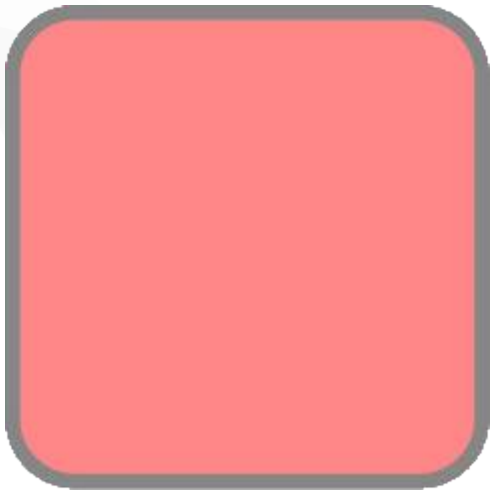
SVG Circle

```
<!DOCTYPE html>
<html>
<body>

<svg width="100" height="100">
  <circle cx="50" cy="50" r="40" stroke="green" stroke-width="4" fill="yellow" />
</svg>

</body>
</html>
```

SVG Rectangle

```
<svg width="400" height="100">
  <rect width="400" height="100" style="fill:rgb(0,0,255);stroke-
width:10;stroke:rgb(0,0,0)" />
</svg>
```

SVG Rounded Rectangle



```
<svg width="400" height="180">
  <rect x="50" y="20" rx="20" ry="20" width="150" height="150"
  style="fill:red;stroke:black;stroke-width:5;opacity:0.5" />
</svg>
```

SVG Polygon (Star)

```
<svg width="300" height="200">
  <polygon points="100,10 40,198 190,78 10,78 160,198"
  style="fill:lime;stroke:purple;stroke-width:5;fill-rule:evenodd;" />
</svg>
```

SVG Logo


```
<svg height="130" width="500">
  <defs>
    <linearGradient id="grad1" x1="0%" y1="0%" x2="100%" y2="0%">
      <stop offset="0%"   style="stop-color:rgb(0,255,255);stop-
opacity:1" />
      <stop offset="100%" style="stop-color:rgb(0,0,255);stop-
opacity:1" />
    </linearGradient>
  </defs>
  <ellipse cx="100" cy="70" rx="85" ry="55" fill="url(#grad1)" />
  <text fill="#ffffff" font-size="45" font-family="Verdana"
  x="65" y="86">PW</text>
Sorry, your browser does not support inline SVG.
</svg>
```

Differences Between SVG and Canvas

SVG is a language for describing 2D graphics in XML.

Canvas draws 2D graphics, on the fly (with a JavaScript).

SVG is XML based, which means that every element is available within the SVG DOM. You can attach JavaScript event handlers for an element.

In SVG, each drawn shape is remembered as an object. If attributes of an SVG object are changed, the browser can automatically re-render the shape.

Canvas is rendered pixel by pixel. In canvas, once the graphic is drawn, it is forgotten by the browser. If its position should be changed, the entire scene needs to be redrawn, including any objects that might have been covered by the graphic.

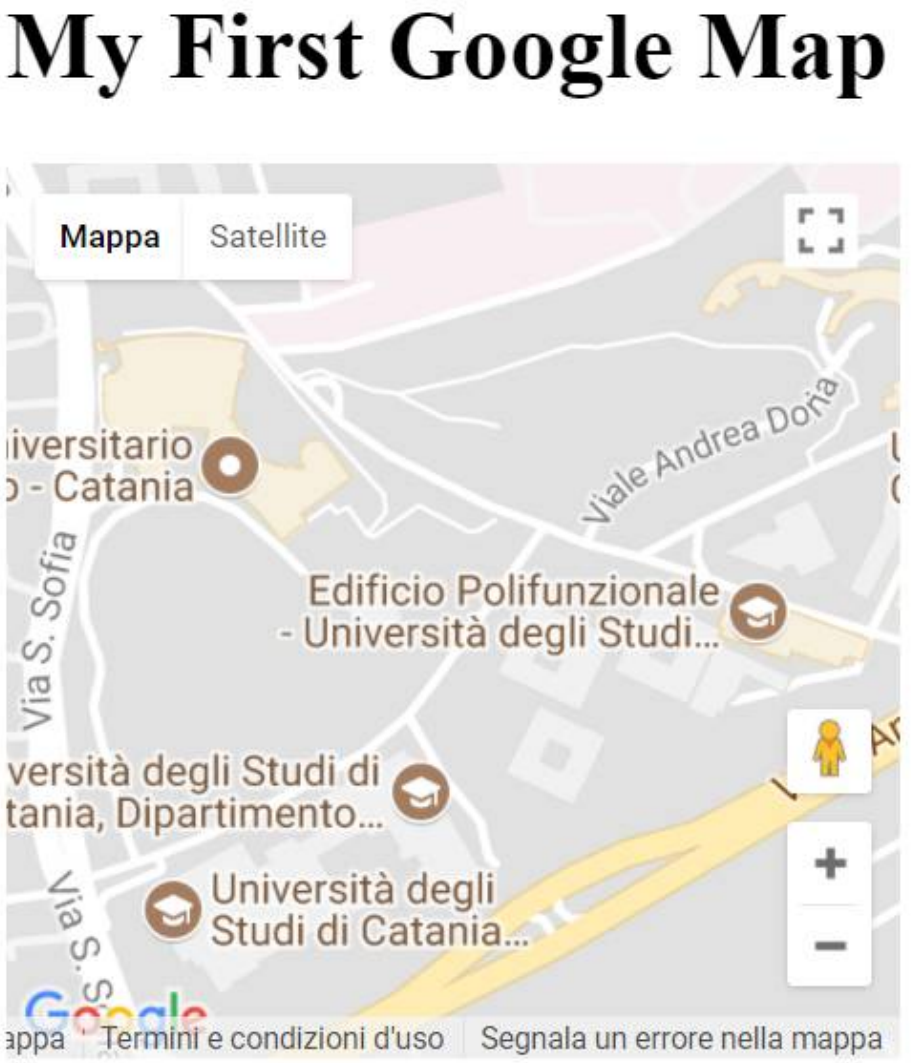
Comparison of Canvas and SVG

The table below shows some important differences between Canvas and SVG:

Canvas	SVG
• 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	• 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

HTML Google Maps

Google Maps allows you to display maps on your web page:



HTML5 features

HTML Media

- HTML5 Video
- HTML5 Audio

```
<video width="400" controls>
  <source src="mov_bbb.mp4" type="video/mp4">
  <source src="mov_bbb.ogg" type="video/ogg">
  Your browser does not support HTML5 video.
</video>
```

HTML APIs

- HTML Geolocation
- HTML Drag/Drop
- HTML Web Storage
- HTML Web Workers
- HTML SSE

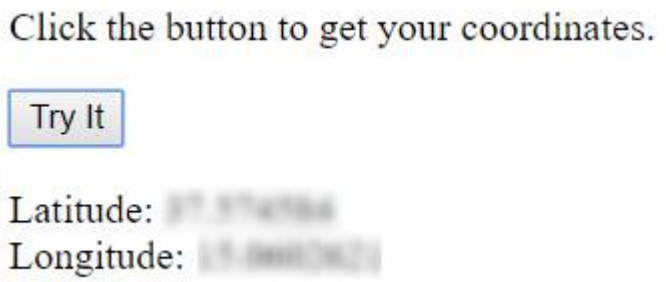
HTML5 Geolocation

Locate the User's Position

The HTML Geolocation API is used to get the geographical position of a user.

Since this can compromise privacy, the position is not available unless the user approves it.

```
<script>
var x = document.getElementById("demo");
function getLocation() {
    if (navigator.geolocation) {
        navigator.geolocation.getCurrentPosition(showPosition);
    } else {
        x.innerHTML = "Geolocation is not supported by this browser.";
    }
}
function showPosition(position) {
    x.innerHTML = "Latitude: " + position.coords.latitude +
    "<br>Longitude: " + position.coords.longitude;
}
</script>
```



HTML5 Drag and Drop

Drag and drop is a very common feature. It is when you "grab" an object and drag it to a different location.

In HTML5, drag and drop is part of the standard: Any element can be draggable.

HTML5 Web Storage

What is HTML Web Storage?

With web storage, web applications can store data locally within the user's browser.

Before HTML5, application data had to be stored in cookies, included in every server request. Web storage is more secure, and large amounts of data can be stored locally, without affecting website performance.

Unlike cookies, the storage limit is far larger (at least 5MB) and information is never transferred to the server.

Web storage is per origin (per domain and protocol). All pages, from one origin, can store and access the same data.

HTML Web Storage Objects

HTML web storage provides two objects for storing data on the client:

window.localStorage - stores data with no expiration date

window.sessionStorage - stores data for one session (data is lost when the browser tab is closed)

The localStorage Object

The localStorage object stores the data with no expiration date. The data will not be deleted when the browser is closed, and will be available the next day, week, or year.

```
// Store
localStorage.setItem("lastname", "Smith");
// Retrieve
document.getElementById("result").innerHTML = localStorage.getItem("lastname");
```

Example explained:

Create a localStorage name/value pair with name="lastname" and value="Smith"
Retrieve the value of "lastname" and insert it into the element with id="result"

The localStorage Object

The example above could also be written like this:

```
// Store
localStorage.lastname = "Smith";
// Retrieve
document.getElementById("result").innerHTML = localStorage.lastname;
```

The syntax for removing the "lastname" localStorage item is as follows:

```
localStorage.removeItem("lastname");
```

Note: Name/value pairs are always stored as strings. Remember to convert them to another format when needed!

```
localStorage.clickcount = Number(localStorage.clickcount) + 1;
```

The sessionStorage Object

The sessionStorage object is equal to the localStorage object, except that it stores the data for only one session. The data is deleted when the user closes the specific browser tab.

The following example counts the number of times a user has clicked a button, in the current session:

```
if (sessionStorage.clickcount) {
    sessionStorage.clickcount = Number(sessionStorage.clickcount) + 1;
} else {
    sessionStorage.clickcount = 1;
}
document.getElementById("result").innerHTML = "You have clicked the button " +
sessionStorage.clickcount + " time(s) in this session.";
```

HTML5 Web Workers

A web worker is a JavaScript running in the background, without affecting the performance of the page.

What is a Web Worker?

When executing scripts in an HTML page, the page becomes unresponsive until the script is finished.

A web worker is a JavaScript that runs in the background, independently of other scripts, without affecting the performance of the page. You can continue to do whatever you want: clicking, selecting things, etc., while the web worker runs in the background.

```
function startWorker() {
    if(typeof(Worker) !== "undefined") {
        if(typeof(w) == "undefined") {
            w = new Worker("demo_workers.js");
        }
        w.onmessage = function(event) {
            document.getElementById("result").innerHTML = event.data;
        };
    } else {
        document.getElementById("result").innerHTML = "Sorry, your
browser does not support Web Workers...";
    }
}
```

Fine