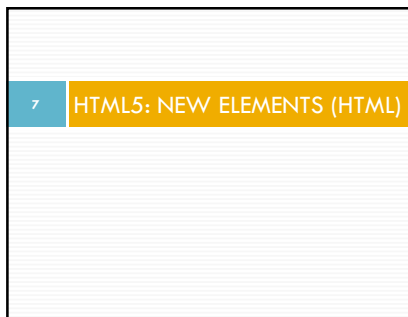## HTML 5

HTML5

Bálint Pál Tóth

Beginning

- World Wide Web Consortium (W3C) + Web Hypertext Application Technology Working Group (WHATWG).
  - WHATWG deals with web based forms and apps,
  - W3C with XHTML 2.0.
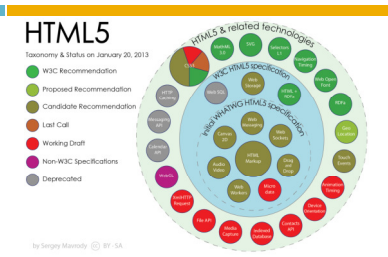 - 2006 they decided to introduce HTML 5.

Main features of HTML5:
- Mobile
- Robost
- open

---

7 | HTML5: NEW ELEMENTS (HTML)

History

- 1991 HTML
- 1994 HTML 2
- 1996 CSS 1 + JavaScript
- 1997 HTML 4
- 1998 CSS 2
- 2000 XHTML 1
- *2002* Tableless Web Design
- *2005* AJAX
- *2009* HTML 5

Where is it heading?

HTML5

Taxonomy & Status on January 20, 2013

- W3C Recommendation
- Proposed Recommendation
- Candidate Recommendation
- Last Call
- Working Draft
- Non-W3C Specifications
- Deprecated

by Sergey Mavrody (cc) BY-SA

New elements

Some interresting HTML5 elements:
- Content aware elements (semantic web): *article, footer, header, nav, section.*
- New form elements: *calendar, date, time, email, url, search*
- Canvas for drawing.
- Video and audio elements.
- Better local storage.
- WebSocket: „real time" communications.

Introduction

- HTML5 is the new version of HTML, XHTML, and HTML DOM.
- Last official HTML version was released in 1999. Things change.
- HTML5 is under development.
- Newer browsers support it.
- **NOT OFFICIAL!**
- **Mobile user interfaces.**
- HTML5 elements
  - HTML: text, content, tags
  - JavaScript: interactions and interactivity
  - Cascading Style Sheets: appereence

Tools, IDE

- TextPad, TextWrangler, NotePad, NP++, Chrome, Firefox
  - Paid: Dreamweaver.
- Compatible browsers: HTML5 is not official, there isn't complete compatibility.
  - Firefox
  - Chrome és Safari
  - IE9+

New elements

Lot of things changed since HTML 4.01.

Tag	Description
`<article>`	Specifies independent, self-contained content, could be a news-article, blog post, forum post, or other articles which can be distributed independently from the rest of the site.
`<aside>`	For content aside from the content it is placed in. The aside content should be related to the surrounding content
`<bdi>`	For text that should not be bound to the text-direction of its parent elements
`<command>`	A button, or a radiobutton, or a checkbox
`<details>`	For describing details about a document, or parts of a document
`<summary>`	A caption, or summary, inside the details element
`<figure>`	For grouping a section of stand-alone content, could be a video
`<figcaption>`	The caption of the figure section
`<footer>`	For a footer of a document or section, could include the name of the author, the date of the document, contact information, or copyright information
`<header>`	For an introduction of a document or section, could include navigation
`<hgroup>`	For a section of headings, using `<h1>` to `<h6>`, where the largest is the main heading of the section, and the others are sub-headings

New elements

\<mark\>	**For text that should be highlighted**
\<meter\>	For a measurement, used only if the maximum and minimum values are known
\<nav\>	**For a section of navigation**
\<progress\>	The state of a work in progress
\<ruby\>	For ruby annotation (Chinese notes or characters)
\<rt\>	For explanation of the ruby annotation
\<rp\>	What to show browsers that do not support the ruby element
\<section\>	**For a section in a document. Such as chapters, headers, footers, or any other sections of the document**
\<time\>	**For defining a time or a date, or both**
\<wbr\>	Word break. For defining a line-break opportunity.

New canvas element

- Example:
  - http://hakim.se/experiments/html5/blob/03/

Video and audio

- Before HTML5 video and audio playback is not standardized.
- Mostly we use plug-ins for video (pl. Flash), and for audio (pl. Soundcloud). It can cause compatibility issues.
- New element of HTML5 for standardized VIDEO playback:
  - \<video\>

New media elements

Tag	Description
\<audio\>	**For multimedia content, sounds, music or other audio streams**
\<video\>	**For video content, such as a movie clip or other video streams**
\<source\>	**For media resources for media elements, defined inside video or audio elements**
\<embed\>	**For embedded content, such as a plug-in**
\<track\>	**For text tracks used in mediaplayers**

New form elements

\<Datalist\>: for recommended input

```
<input list="browsers">
<datalist id="browsers">
    <option value="Internet Explorer">
    <option value="Firefox">
    <option value="Chrome">
    <option value="Opera">
    <option value="Safari">
</datalist>
</input>
```

Video

- Video formats

Browser	MP4	WebM	Ogg
Internet Explorer	YES	NO	NO
Chrome	YES	YES	YES
Firefox	YES	YES	YES
Safari	YES	NO	NO
Opera	YES (from Opera 25)	YES	YES

```
<video width="320" height="240" controls="controls">
    <source src="movie.mp4" type="video/mp4" />
    <source src="movie.ogg" type="video/ogg" />
    Your browser does not support the video tag.
</video>
```

New canvas element

\<canvas\>: graphics, animation

HTML5:

```
<canvas id="example" width="200" height="200"> The browser doesn't support HTML5.</canvas>
```

JavaScript:

```
var example = document.getElementById('example');
var context = example.getContext('2d');
context.fillStyle = "rgb(255,0,0)";
context.fillRect(30, 30, 50, 50);
```

New INPUT attributes

Type	Description
tel	The input value is of type telephone number
search	The input field is a search field
url	The input value is a URL
email	The input value is one or more email addresses
datetime	The input value is a date and/or time
date	The input value is a date
month	The input value is a month
week	The input value is a week
time	The input value is of type time
datetime-local	The input value is a local date/time
number	The input value is a number
range	The input value is a number in a given range
color	The input value is a hexadecimal color, like #FF8800
placeholder	Specifies a short hint that describes the expected value of an input field

Audio

- Audio formats

Browser	MP3	Wav	Ogg
Internet Explorer	YES	NO	NO
Chrome	YES	YES	YES
Firefox	YES	YES	YES
Safari	YES	YES	NO
Opera	YES	YES	YES

```
<audio controls="controls">
    <source src="song.ogg" type="audio/ogg" />
    <source src="song.mp3" type="audio/mpeg" />
    Your browser does not support the audio element.
</audio>
```

LocalStorage, SessionStorage

```
<script type="text/javascript">
if (localStorage.pagecount){
localStorage.pagecount=Number(localStorage.pagecount) +1;
} else {
localStorage.pagecount=1;
}
document.write("Visits "+ localStorage.pagecount + " time(s).");
</script>
```

HTML5: Mobile

- Separating HTML, JS and CSS it is possible to design and implement different *content, interactions and appereance* on different platforms.
- Interoperability:
  - Element. Eg. <canvas>
  - Attribute. Eg. multple file select
  - Style. Eg. oppacity
- Responsive layouts (later)

HTML5: Robust

- Wide variety of APIs
- Geolocation:

```
<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>
```
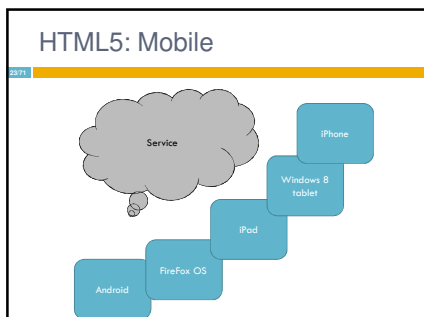
LocalStorage, SessionStorage

```
<script type="text/javascript">
if (sessionStorage.pagecount)
 {
 sessionStorage.pagecount=Number(sessionStorage.pagecount) +1;
 }
else
 {
 sessionStorage.pagecount=1;
 }
document.write("Visits "+sessionStorage.pagecount+" time(s) this
session.");
</script>
```

HTML5: Mobile

HTML5: Robust

- Multitouch:

```
<script>
google.ui.FastButton.prototype.handleEvent = function(event) {
switch (event.type) {
  case 'touchstart': this.onTouchStart(event); break;
  case 'touchmove': this.onTouchMove(event); break;
  case 'touchend': this.onClick(event); break;
  case 'click': this.onClick(event); break;
} };
</script>
```

21 HTML5: MOBILE

24 HTML5: ROBUST

HTML5: Robust

- Orientation:

```
<script>
window.addEventListener('deviceorientation',
function(event) {
var alpha = event.alpha;
var beta = event.beta;
var gamma = event.gamma;
// Do something
}, false);
</script>
```

http://www.html5rocks.com/en/tutorials/device/orientation/deviceorientationsample.html

HTML5: Robust

- Speech recognition:

```
<input type="text" x-webkit-speech />
```

- Camera capture:

```
<input type="file" name="file" accept="image/*"
capture="camera" />
```

HTML5: Robust

- File API: Drag-out (to desktop):

```
<a href="src/star.mp3" draggable="true"
class="dragout" data-
downloadurl="MIMETYPE:FILENAME:ABSOLUTE_URI_TO_FILE"
>download</a>

var files = document.querySelectorAll('.dragout');
for (var i = 0, file; file = files[i]; ++i) {
  file.addEventListener('dragstart', function(e) {
    e.dataTransfer.setData('DownloadURL', this.dataset.downloadurl);
  }, false);
}
```

HTML5: OPENED

- Built on standards
- Different implementations on different browsers.
  - Speed.
  - Functions.
- JQuery Mobile
- Sencha Touch
- iUI
- Zepto.js

HTML5: Robust

- Drag and drop:

```
document.addEventListener('dragstart', function(event) {
  event.dataTransfer.setData('text', 'Customized text');
  event.dataTransfer.effectAllowed = 'copy';
}, false);
```

HTML5: Robust

- 2D and 3D graphics: <canvas>
- WebSocket: real-time communications (instead of AJAX)
- Offline (cache)

HTML5: OPENED

- Modernizr.js: HTML5 compatibility check

```
<script>if (Modernizr.canvas)
{
    alert("This browser supports HTML5 canvas!");
} else {
    alert("no canvas :(");
}</script>

<script>Modernizr.load({
  test: Modernizr.inputtypes.date,
  nope:['http://ajax.googleapis.com/ajax/libs/jquery/1.4.4/jquery.min.js','http://ajax.googlea
pis.com/ajax/libs/jqueryui/1.8.7/jquery-ui.min.js', 'jquery-ui.css'],
  complete: function () {
    $('input[type=date]').datepicker({
      dateFormat: 'yy-mm-dd'
    });
  }
});
</script>
```

HTML5: Robust

- File API: Drag-in (from desktop):

```
document.querySelector('#dropzone').addEventListener('drop',
function(e) {
  var reader = new FileReader();
  reader.onload = function(evt) {
    document.querySelector('img').src = evt.target.result;
  };

  reader.readAsDataURL(e.dataTransfer.files[0]);
}, false);
```

33 HTML5: OPENED

HTML5: OPENED

- Polyfill.js: HTML5 alternative for older browsers

```
<script> $.webshims.polyfill('mediaelement'); </script>
<video width="480" height="360" controls="controls">
    <source src="Video.mp4" type="video/mp4">
    <source src="Video.webm" type="video/webm">
</video>
```

HTML5: OPENED

- JavaScript → Native code

```
loadURL("javascript: updataScore("+score+");");
```

- Native code → JavaScript

```
class JsObject {
    @JavascriptInterface
    public String toString() { return "injectedObject"; }
}
webView.addJavascriptInterface(new JsObject(), "injectedObject");
webView.loadData("", "text/html", null);
webView.loadUrl("javascript:alert(injectedObject.toString())");
```

Creating the structure 1/2

```
<!doctype html>
<html>
<head>
    <title>Page title</title>
</head>
<body>
    <header>
        <h1>Page title</h1>
    </header>
    <nav>
        <!-- Navigation -->
    </nav>
```

Introduction

```
<section id="intro">
    <header>
        <h2>Hello HCI!</h2>
    </header>
    <p>Lorem ipsum dolor sit amet, consectetur adipisicing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua. Ut enim ad minim veniam, quis nostrud exercitation ullamco laboris nisi ut.</p>
</section>
```

HTML5+CSS3: EXAMPLE
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A simple layout

Creating the structure 2/2

```
    <section id="intro">
        <!-- Introduction -->
    </section>
    <section>
        <!-- Main content area -->
    </section>
    <aside>
        <!-- Sidebar -->
    </aside>
    <footer>
        <!-- Footer -->
    </footer>

</body>
</html>
```
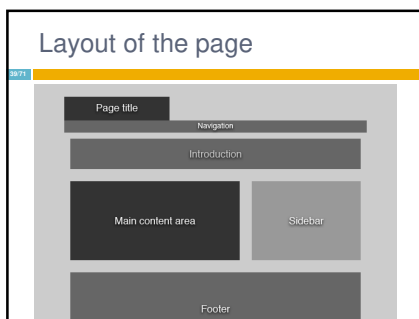
Content

```
<section>
    <article class="blogPost">
        <header>
            <h2>HCI HTML5</h2>
            <p>Posted on <time datetime="2013-11-10T23:31:45+01:00">Nov 10th 2013</time> by <a href="#">Balint Toth</a> - <a href="#comments">3 comments</a></p>
        </header>
        <p>Lorem ipsum dolor sit amet, consectetur adipiscing elit. euismod tellus eu orci imperdiet nec rutrum lacus blandit. Cras nibh, sodales ultricies elementum vel, fermentum id tellus. metus odio, ultricies eu pharetra dictum, laoreet id odio...</p>
    </article>
</section>
```

Layout of the page

Navigation (menu)

```
<nav>
    <ul>
        <li><a href="#">Blog</a></li>
        <li><a href="#">About</a></li>
        <li><a href="#">Archive</a></li>
        <li><a href="#">Contact</a></li>
        <li class="subscribe"><a href="#">RSS</a></li>
    </ul>
</nav>
```

Comments

```
<section id="comments">
    <header>
        <h3>Comments</h3>
    </header>
    <article>
        <header>
            <a href="#">Gipsz Jakab</a> on <time datetime="2013-11-11T23:35:20+01:00">November 11th 2013 at 23:35</time>
        </header>
        <p>Lorem ipsum dolor sit amet, consectetur adipisicing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua. Ut enim ad minim veniam, quis nostrud exercitation ullamco laboris nisi ut.</p>
    </article>
    ...
    ...
</section>
```

Comment Form 1/2

```html
<form action="#" method="post">
    <h3>Post a comment</h3>
    <p>
        <label for="name">Name</label>
        <input name="name" id="name" type="text" required />
    </p>
    <p>
        <label for="email">E-mail</label>
        <input name="email" id="email" type="email" required />
    </p>
    <p>
        <label for="website">Website</label>
        <input name="website" id="website" type="url" />
    </p>
```

CSS: intro

```css
#intro h2, #intro p {
    position: relative;
    z-index: 9999;
    ...
}
#intro img {
    ...
    -moz-border-radius: 22px;
    -webkit-border-radius: 22px;
}
```

CSS: Blog post

```css
.blogPost div {
    -moz-column-count: 2;
    -webkit-column-count: 2;

    -moz-column-gap: 22px;
    -webkit-column-gap: 22px;
}

.blogPost img {
    ...
    -webkit-box-shadow: 3px 3px 7px #777;
}
```

Comment Form 2/2

```html
    <p>
        <label for="comment">Comment</label>
        <textarea name="comment" id="comment" required></textarea>
    </p>
    <p><input type="submit" value="Post comment" /></p>
</form>
```

CSS: content

CSS: box-shadow

CSS: intro

```css
#intro {
    ...

    -webkit-background-size: 100%;
    -o-background-size: 100%;
    -khtml-background-size: 100%;

    -moz-border-radius: 22px;
    -webkit-border-radius: 22px;
}
```

CSS: content

```css
#content {
    display: table;
}

#mainContent {
    display: table-cell;
    padding-right: 22px;
    ...
}
aside {
    display: table-cell;
    width: 300px;
    background: url("images/sidebar_background.png") top left;
}
```

CSS: comments

```css
#comments {
    ...
    border-top: 1px solid #d7d7d7;
}
#comments article {
    ...
    display: table;
}
#comments article:nth-child(odd) {
    ...
}
```

HTML5 3D

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HTML5 3D

CSS3 (Chrome, Safari, Firefox):
-webkit-transition: -webkit-transform 2s linear;
-webkit-transform-style: preserve-3d;

-webkit-transform: rotateY(90deg) translateZ(200px);

CSS3 (IE, Opera):
-moz-transition: -moz-transform 2s linear;
-moz-transform-style: preserve-3d;

-moz-transform: rotateY(90deg) translateZ(200px);

HTML5 3D: Rotating cube

```
<div class="face four">
    New forms of navigation are fun.
</div>
<div class="face five">
    Rotating 3D cube
</div>
<div class="face six">
    <img src="http://www.multiplemayhemmamma.com/wp-content/uploads/2013/03/home-alone.jpg"/>
</div>
</div>
```

HTML5 3D

Project <canvas> element into 2D:

scale=focalLength/(z+focalLength)

JavaScript:

```
var point3D    =   {x: 100, y: 133, z: 230};
var focalLength =  1000;
var scale      =   focalLength/(point3D.z+focalLength);
var point2D    =   {x: point3D.x*scale, y: point3D.y*scale};
```

HTML5 3D

· Demo: rotating cube

HTML5 3D: Rotating cube

```
#cube .one {
    -webkit-transform: rotateX(90deg) translateZ(200px);
    -moz-transform: rotateX(90deg) translateZ(200px);
}

#cube .two {
    -webkit-transform: translateZ(200px);
    -moz-transform: translateZ(200px);
}

#cube .three {
    -webkit-transform: rotateY(90deg) translateZ(200px);
    -moz-transform: rotateY(90deg) translateZ(200px);
}
```

HTML5 3D

D: Focal length

Source: adobe.com

HTML5 3D: Rotating cube

```
<div id="cube">
    <div class="face one">
        One face
    </div>
    <div class="face two">
        Up, down, left, right
    </div>
    <div class="face three">
        Lorem ipsum dolor sit amet, consectetur adipisicing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua. Ut enim ad minim veniam, quis nostrud exercitation ullamco laboris nisi ut aliquip ex ea commodo consequat.
    </div>
```

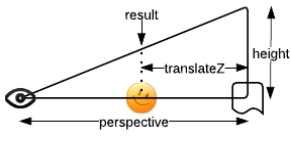## HTML5 3D: Rotating cube

```
#cube .four {
    -webkit-transform: rotateY(180deg) translateZ(200px);
    -moz-transform: rotateY(180deg) translateZ(200px);
}

#cube .five {
    -webkit-transform: rotateY(-90deg) translateZ(200px);
    -moz-transform: rotateY(-90deg) translateZ(200px);
}

#cube .six {
    -webkit-transform: rotateX(-90deg) translateZ(200px);
    -moz-transform: rotateX(-90deg) translateZ(200px);
}
```

HTML5 3D: Rotating cube

$$scale = \frac{perspective}{perspective - translateZ}$$

HTML5 3D: Rotating cube

```
var xAngle = 0, yAngle = 0;
$('body').keydown(function(evt) {
    switch(evt.keyCode) {
        case 37: // left
            yAngle -= 90;
            break;
        case 38: // up
            xAngle += 90;
            break;
        case 39: // right
            yAngle += 90;
            break;
```

Examples and demo

Examples
http://www.jqmgallery.com/
https://github.com/html5rocks/slides.html5rocks.com
Demo
www.jquerymobile.com
http://www.opera.com/developer/tools/mini/

HTML5 3D: Rotating cube

```
#experiment {
    -webkit-perspective: 800;
    -webkit-perspective-origin: 50% 50%;

    -moz-perspective: 800;
    -moz-perspective-origin: 50% 50%;
}
```

HTML5 3D: Rotating cube

```
        case 40: // down
            xAngle -= 90;
            break;
    };

    document.getElementById('cube').style[prop] = "rotateX("+xAngle+"deg)
rotateY("+yAngle+"deg)";
});
```

HTML5 3D: Rotating cube

```
var props = 'transform WebkitTransform MozTransform OTransform msTransform'.split(' '),
    prop,
    el = document.createElement('div');

for(var i = 0, l = props.length; i < l; i++) {
    if(typeof el.style[props[i]] !== "undefined") {
        prop = props[i];
        break;
    }
}
```

HTML 3D

WebGL
Khronos Group (Apple, Google, Mozilla, Opera)
3D library with the help of <canvas>.

- Example:
  - http://www.kevs3d.co.uk/dev/
  - http://www.ro.me