



Designing Interactive Systems II

Computer Science Graduate Programme SS 2010

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Review: Mobile Window Systems

• Android

- Reasons for fast growth?
- Sharing application components
- Activities, Services, Broadcast Receivers, Content Providers

• iPhone

- Advantage of the iPhone OS Architecture?
- Multitasking in iOS 4?
- Tracking touches?

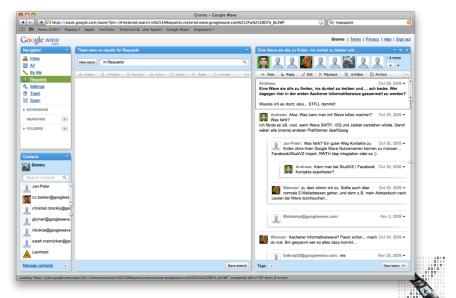
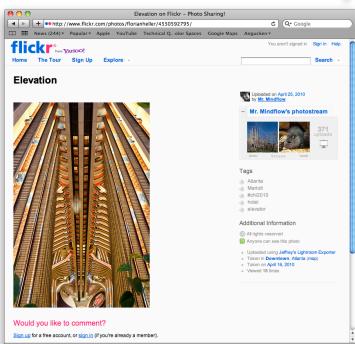
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Web 2.0



Example: I.0

• Google Maps w/o Java Script

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Example: 2.0

- Google Maps

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Origin



- Tim O'Reilly and Dale Dougherty at Web 2.0 conference (2004)
- Successful (post dotcom) companies are similar
- Web 2.0 captures this difference

1.0 vs 2.0

double
click



Google AdSense

Kodak Gallery



flickr®

msn
Hotmail



Google Mail

ENCYCLOPÆDIA
Britannica
eb.com



WIKIPEDIA
Die freie Enzyklopädie

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Meme map

- Tagging, not taxonomy
- Rich User Experiences
- Participation
- Enabling the long tail
- Radical Decentralization
- Radical Trust

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I. Web as platform



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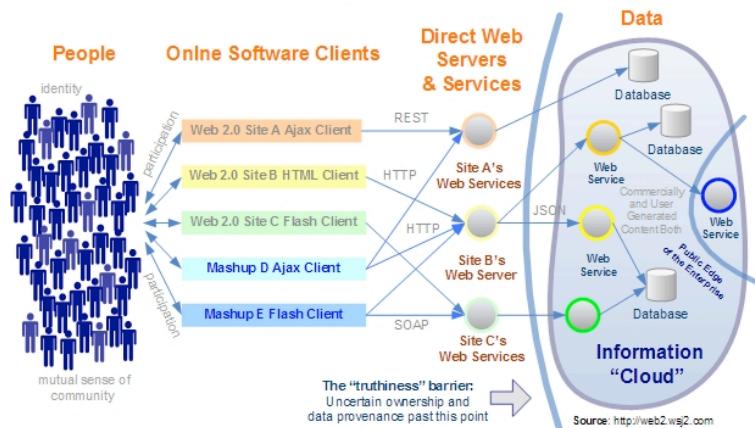
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2. Harnessing Collective Intelligence

The Web 2.0 Architecture of Participation:
"People in the Machine Nurture the Cloud"



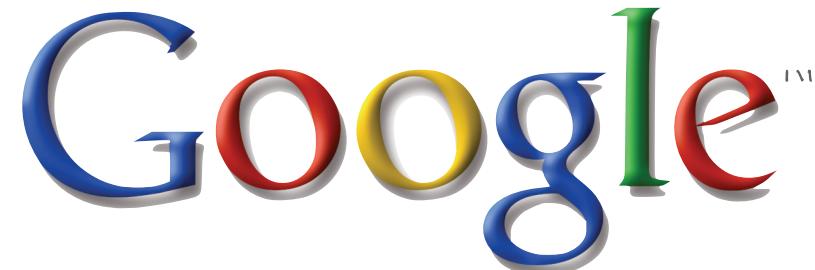
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I. The Web as a platform



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3. Data is the next Intel

- Web 2.0 sites have sophisticated databases with valuable information.
- Open APIs for non-commercial use.
- Google Maps API
<http://www.google.com/apis/maps/>

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4. End of the software cycle

- Software must be maintained on a daily basis
- **Real-time DIA cycle**
- Users are treated as co-developers
 - Perpetual beta



5. Software above the level of single device

- Web offers a common point for many different devices.
- PC as mediator between web and mobile device
- Leverage the power of the Web platform
 - Web becomes invisible



5. Lightweight Programming Models

- **Simplicity in APIs**
- Generates new interesting applications of software
- Barrier to entry is **low**



6. Rich User Experience

- Full scale applications
- Fluid movements are appealing
- (Re)implementation on the web vs. specialized desktop applications



Exercise

- Thinking of the design principles we've just discussed, think of a website that demonstrates properties of Web 2.0. Provide examples where this site uses these properties. Be prepared to discuss them.
 - Web as a platform
Harnessing Collective Intelligence
Data is the next Intel
End of the software cycle
Lightweight programming models

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Enhanced Image Loading

- Photosynth and Seadragon

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Tag Clouds

2007-01-23: State of the Union Address

George W. Bush (2001-)

abandon accountable affordable afghanistan africa allied ally anbar armed army baghdad bales challenges chamber chaos choices civilians coalition commanders commitment confident confront congressman constitution corps debates deduction deficit deliver democratic deploy dikenbe diplomacy disruptions earmarks economy einstein elections eliminates expand extremists falling faithful families freedom fuel funding god haven ideology immigration impose insurgents iran iraq islam julie lebanon love madam marine math medicare moderation neighborhoods nuclear offensive palestinian payroll province pursuing qaeda radical regimes resolve retreat riemann sacrifices science sectarian senate september shia stays strength students succeed sunni tax territories terrorists threats uphold victory violence violent war washington weapons wesley

1996-01-23: State of the Union Address

Bill Clinton (1993-2001)

abandon agreement americorps applaud applies assault balancing ban bipartisan biss borders borders bureaucracy bureaucratic campaign chamber chip citizenship classroom cleaner college commit comprehensive covenant crime criminals dean deficit democrats earn economic education employers enact endanger endured environmental expand freedom fundamental gaining gangs global god gore heroes hiring illegal immigrants incomes invest lifetime lobbyists love mccaffrey media medicaid medicare nuclear oklahoma owe partnership pension polluters pregnancy prosperity punish renew republicans resolve richard risks safer stabilize strength students succeed synagogues tax teach teachers teen teenagers terrorists threatens toxic treaty undermine unemployment values veterans vetoed violence violent war washington weapons welfare workplace

- wordle.com

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AJAX

- Asynchronous JavaScript + XML
- What is Ajax?
 - Standards (W3C) using XHTML & CSS
 - Dynamic Display and Interaction using the Document Object Model (DOM)
 - Asynchronous data retrieval: XMLHttpRequest
 - JavaScript is the glue

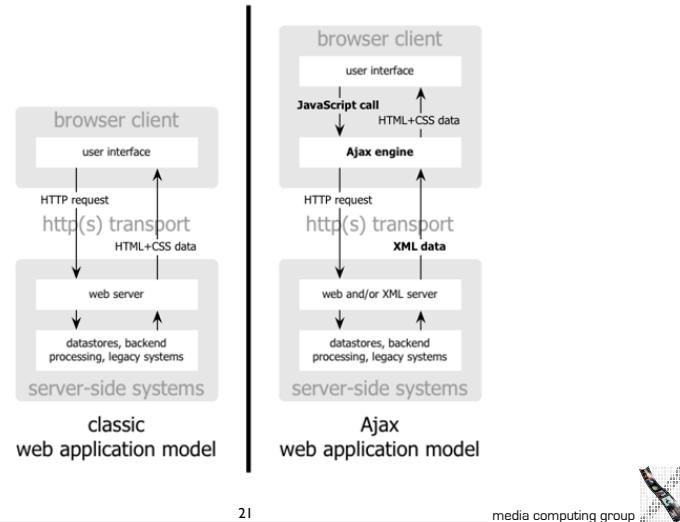
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Architecture



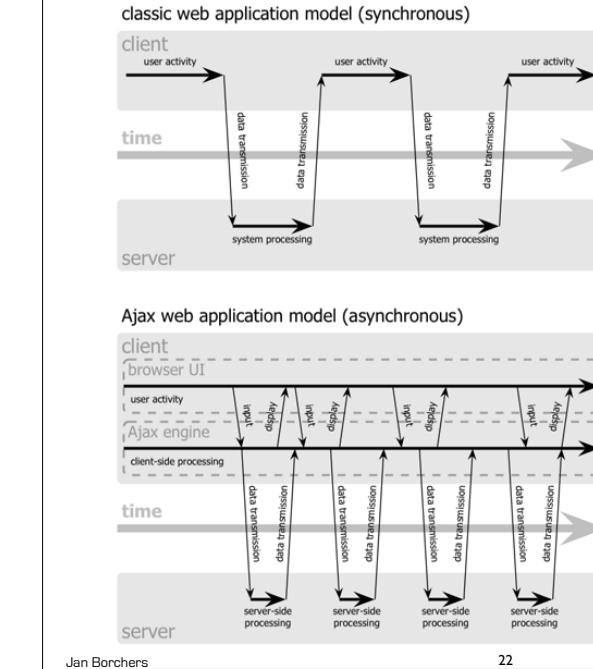
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Interaction Model



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AJAX: Implications

- High Interactivity: Rich Applications.
- Usability?
 - Expert Users (coders).
 - How will this affect the Long Tail?
 - Accessibility not being considered
 - Changed Web behavior

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Google Web Toolkit (GWT)

- Build AJAX apps in Java
 - <http://code.google.com/webtoolkit/>
- GWT takes care of client-server communication

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Developing for the GWT

- Using Java
 - Known development process
 - Easy to understand concepts ([events](#), [listeners](#))
 - Simple distinction between [server](#) and [client](#) side code
 - Translation into [high performance](#) AJAX code
- Abstraction of complex processes
 - Image Caching
 - Remote Calls

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Prototype JS + Script.aculo.us

- Object-oriented browser-independent JavaScript Framework ([PrototypeJS](#))
- User Interface Widgets and Effects ([Scriptaculous](#))
- <http://www.prototypejs.org> + <http://script.aculo.us>

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Model-View-Presenter

- Strict decoupling of Model and View
 - Contrast to MVC



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Cappuccino



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What is Cappuccino

- Application development framework
- Build web-based applications
- Introduces new language: Objective J
- Two frameworks: AppKit and Foundation

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From Web to Desktop

- Mozilla Prism
- NativeHost
- MS Office Live
- iWork.com
- eyeOS
- Chrome OS



iWork.com



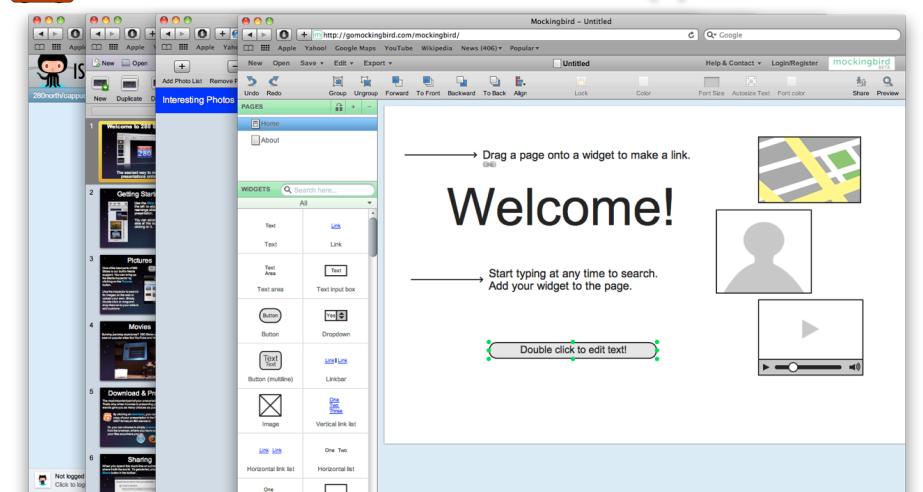
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Cappuccino



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Objective J

- Strict superset of JavaScript
- Compiled at runtime in the browser
- Adds inheritance,message calls, delegation
- Undo/Redo manager, Layer-backed views

```
- (void)applicationDidFinishLaunching:(CPNotification)aNotification
{
    var theWindow = [[CPWindow alloc]
                    initWithFrame:CGRectMakeZero()
                    styleMask:CPBorderlessBridgeWindowMask],
        contentView = [theWindow contentView];
    [theWindow orderFront:self];
}
```

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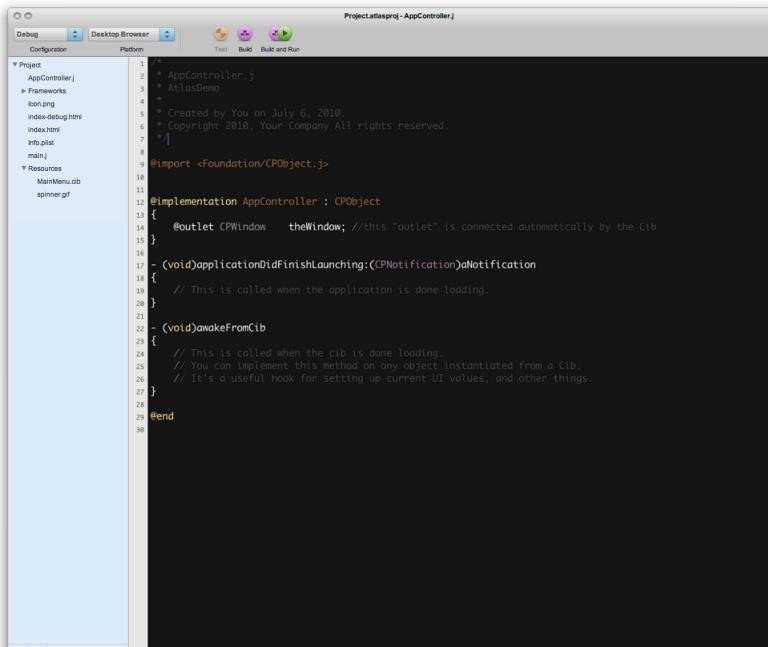


Cappuccino Demo

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The screenshot shows the Cappuccino IDE interface. The title bar says "Projectatlasproj - AppController.j". The menu bar includes "Debug", "Desktop Browser", "Configuration", "Frameworks", "Icon.png", "index-debug.html", "index.html", "Info.plist", "Main.m", "Resources", "MainMenu.cib", and "Spinner.gif". The main area is a code editor with the following content:

```
1 // AppController.j
2 // AtlasDemo
3 //
4 // Created by You on July 6, 2010.
5 // Copyright 2010, Your Company All rights reserved.
6 //
7 // This is called when the application is done loading.
8 //
9 // This is called when the cib is done loading.
10 // You can implement this method on any object instantiated from a Cib.
11 // It's a useful hook for setting up current UI values, and other things.
12
13 @implementation AppController : CPObject
14 {
15     IBOutlet CPWindow *theWindow; // this "outlet" is connected automatically by the Cib
16 }
17 - (void)applicationDidFinishLaunching:(CCPNotification)aNotification
18 {
19     // This is called when the application is done loading.
20 }
21 - (void)awakeFromCib
22 {
23     // This is called when the cib is done loading.
24     // You can implement this method on any object instantiated from a Cib.
25     // It's a useful hook for setting up current UI values, and other things.
26 }
27
28 #end
```

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Atlas (beta)

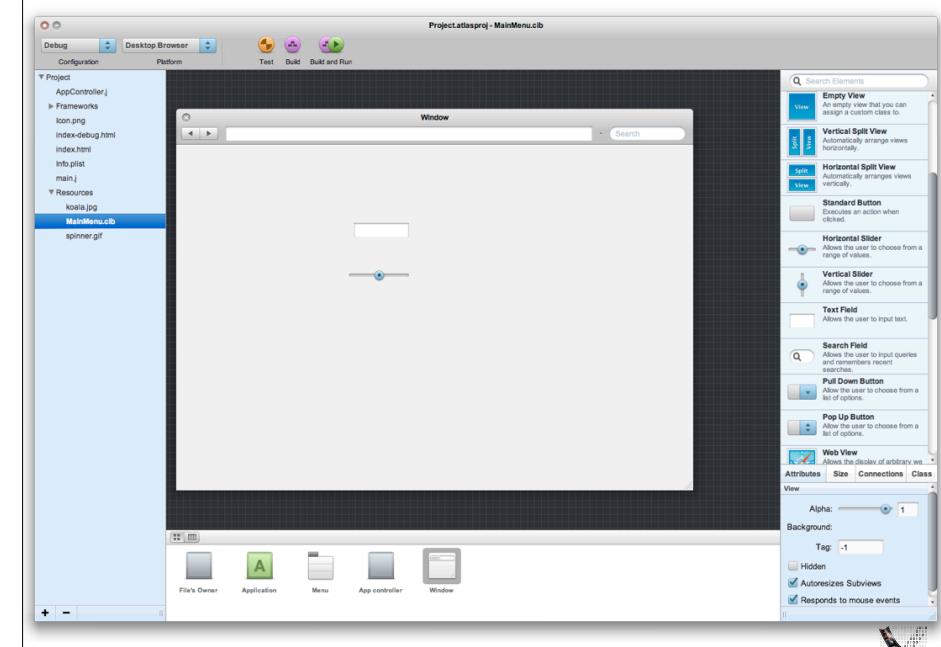
- Cappuccino IDE
- Written in Cappuccino
- Code editor
- Interface builder
- Standalone application for OS X



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The screenshot shows the Atlas IDE interface. The title bar says "Projectatlasproj - MainMenu.cib". The menu bar includes "Debug", "Desktop Browser", "Configuration", "Frameworks", "Icon.png", "index-debug.html", "index.html", "Info.plist", "Main.m", "Resources", "Koala.jpg", and "Spinner.gif". The main area shows a window with a horizontal slider. A sidebar on the right lists various UI components with descriptions:

- Empty View
- Split View
- Vertical Split View
- Horizontal Slider
- Vertical Slider
- Text Field
- Search Field
- Pull Down Button
- Pop Up Button
- Web View

The bottom pane shows a library with icons for "File's Owner", "Application", "Menu", "App controller", and "Window".

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Atlas Demo

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Evolution of Web Technologies

- HTML 1991
- HTML 2 1992
- CSS + JS 1996
- HTML 4 1997
- CSS 2 1998
- XHTML 1 2000
- AJAX 2005
- HTML 5 2009

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HTML 5

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New JavaScript Selectors

Finding elements by class (DOM API)

```
var element = document.getElementById('section1');
element.focus();

var elements = document.getElementsByTagName('div');
elements[0].focus();

var elements = document.getElementsByClassName('section');
elements[0].focus();
```

Finding elements by CSS syntax (Selectors API)

```
var elements = document.querySelectorAll("ul li:nth-child(odd)");

var elements = document.querySelectorAll("table.test > tr > td");
```

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Web Storage

```
// use localStorage for persistent storage
// use sessionStorage for per tab storage
textarea.addEventListener('keyup', function () {
  window.localStorage['value'] = area.value;
  window.localStorage['timestamp'] = (new Date()).getTime();
}, false);
textarea.value = window.localStorage['value'];
```

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Web SQL, Application Cache

```
//Web SQL
var db = window.openDatabase("Database Name", "Database Version");
db.transaction(function(tx) {
  tx.executeSql("SELECT * FROM test", [], successCallback, errorCallback);
});

//Application Cache API
<html manifest="cache-manifest">
window.applicationCache.addEventListener('checking', updateCacheStatus, false);

CACHE MANIFEST

# version 1
CACHE:
/html5/src/refresh.png
/html5/src/logic.js
/html5/src/style.css
/html5/src/background.png
```

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Web Workers

```
//main.js:
var worker = new Worker('extra_work.js');
worker.onmessage = function(event) { alert(event.data); };

//extra_work.js:
// do some work; when done post message.
postMessage(some_data);
```

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Web Sockets

```
var socket = new WebSocket(location);
socket.onopen = function(event) {
  socket.postMessage("Hello, WebSocket");
}
socket.onmessage = function(event) { alert(event.data); }
socket.onclose = function(event) { alert("closed"); }
```

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Drag'n'Drop , Geolocation

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

//Geolocation
if (navigator.geolocation) {
  navigator.geolocation.getCurrentPosition(function(position) {
    var lat = position.coords.latitude;
    var lng = position.coords.longitude;
    var options = { position: new google.maps.LatLng(lat, lng) }
    var marker = new google.maps.Marker(options);
    marker.setMap(map);
  });
}
```

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HTML5 Audio & Video

```
<audio src="sound.mp3" controls></audio>
document.getElementById("audio").muted = false;

<video src='movie.mp4' autoplay controls></video>
document.getElementById("video").play();
```



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HTML5 Graphics

```
<canvas id="canvas" width="838" height="220"></canvas>

<script>
var canvasContext = document.getElementById("canvas").getContext("2d");
canvasContext.fillRect(250, 25, 150, 100);

canvasContext.beginPath();
canvasContext.arc(450, 110, 100, Math.PI * 1/2, Math.PI * 3/2);
canvasContext.lineWidth = 15;
canvasContext.lineCap = 'round';
canvasContext.strokeStyle = 'rgba(255, 127, 0, 0.5)';
canvasContext.stroke();
</script>
```



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Typography with CSS

```
/* Loading fonts */
@font-face {
  font-family: 'LeagueGothic';
  src: url(LeagueGothic.otf);
}

@font-face {
  font-family: 'Droid Sans';
  src: url(Droid_Sans.ttf);
}

/* Text Wrapping */
div {
  text-overflow: ellipsis;
}

/* Text Columns */
-webkit-column-count: 4;
-webkit-column-rule: 1px solid #bbb;
-webkit-column-gap: 2em;
```

The quick brown fox...

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Opacity, HSL, Rounded Corners

```
/* Opacity */
color: rgba(255, 0, 0, 0.88);
background: rgba(0, 0, 255, 0.80);

/* HSL Color Model */
color: hsla(128,75%, 33%, 1.00);

/* Rounded Corners */
border-radius: 39px;
```

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CSS Transitions

```
/* Transitions */
#box {
    -webkit-transition: margin-left 1s ease-in-out;
}

/* Transforms */
-webkit-transform: rotateY(45deg);
-webkit-transform: scaleX(25deg);
-webkit-transform: translate3d(0, 0, 90deg);
-webkit-transform: perspective(500px)
```

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CSS Animations

```
@-webkit-keyframes pulse {
from {
    opacity: 0.0;
    font-size: 100%;
}
to {
    opacity: 1.0;
    font-size: 200%;
}
}
div {
    -webkit-animation-name: pulse;
    -webkit-animation-duration: 2s;
    -webkit-animation-iteration-count: infinite;
    -webkit-animation-timing-function: ease-in-out;
    -webkit-animation-direction: alternate;
}
```

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Conclusion

- It's good usability to make interfaces more reactive.
 - Web 2.0 approach offers tricks to provide it in a faster way
- Offers a richer experience in the web browser
- It's a continuum (Desktop Application versus Web Browser vs. hosting data online for mobile access)
 - "Computing in the Cloud"
- Still have basic usability issues in websites
 - Jeff Johnson: Web Bloopers

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