

Esri Developer Summit in Europe

London



AL Laframboise / Andy Gup

Speed Bump

By Dave Coverly

DIGITAL CREATORS
SPEEDBUMP.COM
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9.10

IT SAYS, "THIS FILM
HAS BEEN FORMATTED TO
FIT YOUR PHONE."



Reponsive Libraries

And

User Interface Frameworks

Web Mobile Design

Key Considerations



Mobile Devices

Are different...

- § Physical device
- § Screen size
- § Button size

User

Interactions

Are different...

- § Touch
- § Orientation
- § Keyboard
- § Voice

User

Expectations

Are different...

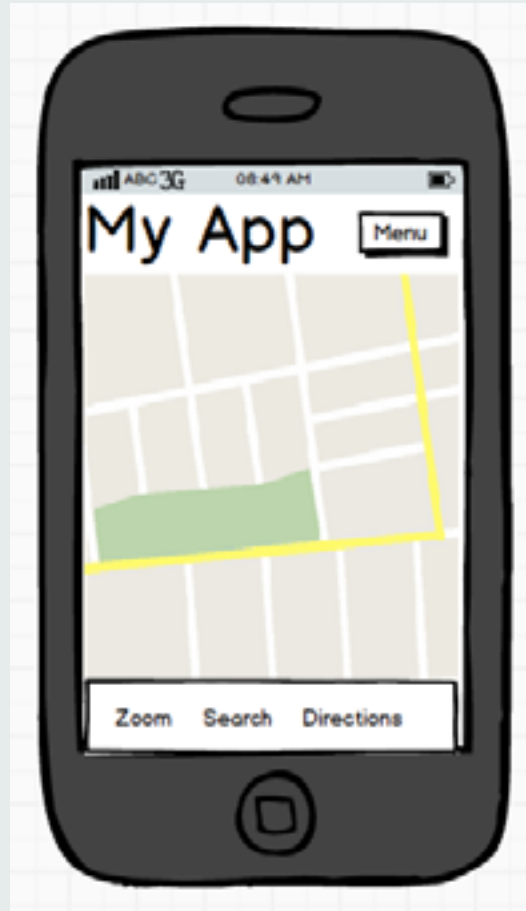
§ App to work like an app

§ Websites to work like an app

Design Patterns

Need to be different!

Think mobile first!



320px

Responsive Design



Responsive Design

§ Single web app that works *well* across a variety of devices/screen sizes

§ Re-use content and software

§ Considers

§ Device limitations

§ User's behavior



mediaqueri.es



Responsive Design Components

1. Fluid Grid System
2. Media Queries
3. HTML5, CSS & JavaScript

Fluid Grid System

§ Layout adapts to different screen sizes

§ Based on percentages

§ 12 column / 960px

Fluid Grid System



Media Queries

- § Detect device screen size and orientation
- § Apply CSS at specific break points
- § Typical: 480px, 768px, 1024px, 1280px

```
@media only screen and (max-device-width:480px) {  
  
    /* Custom css styles */  
    body {  
        font-size: 0.5em;  
    }  
    #titleArea{  
        display: none;  
    }  
}
```


HTML5 & CSS3

HTML5

- § Meta tags
- § Input types (text, dates...)

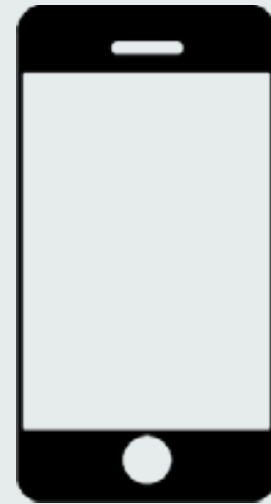
CSS3

- § Selectors, transitions

JavaScript

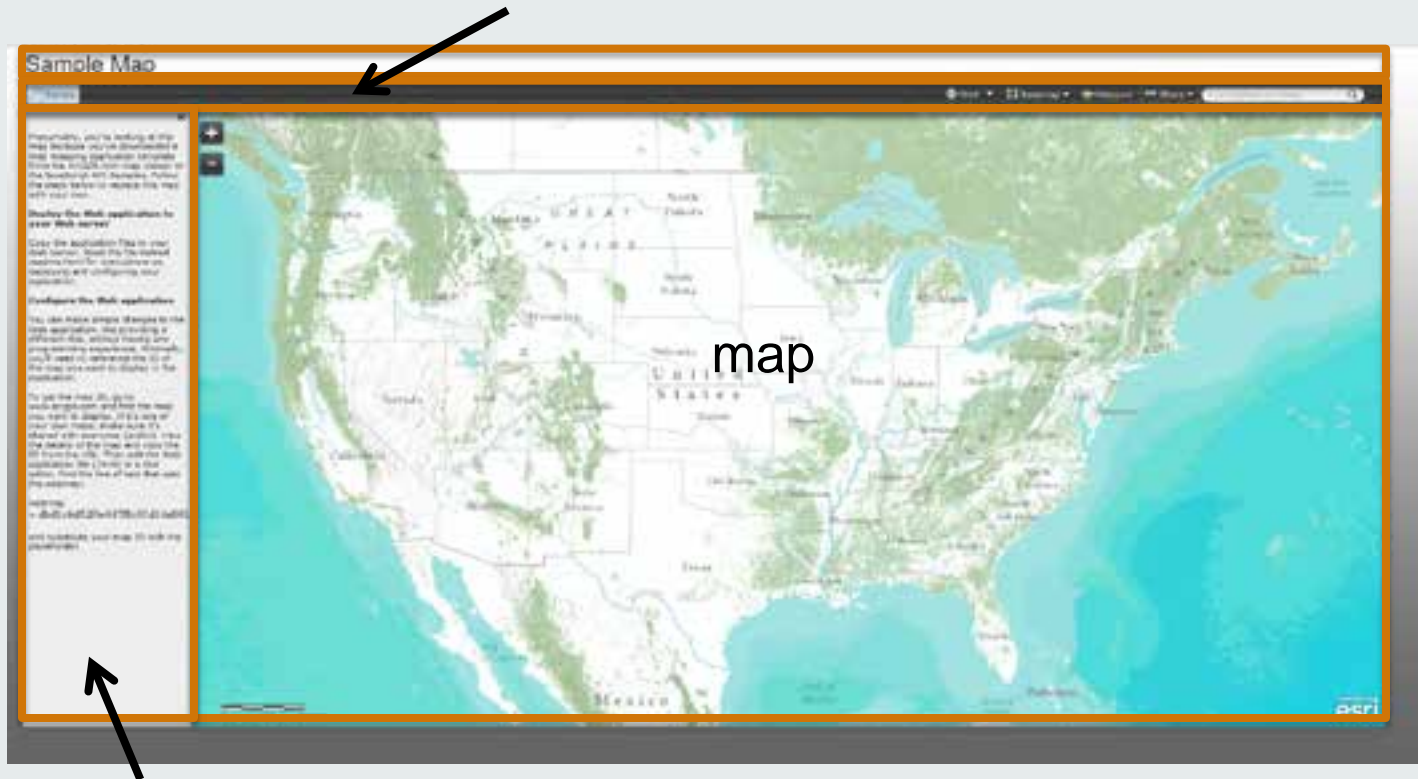
- § Touch events
- § Geolocation, localStorage, websockets, appcache....

How does
responsive
work?

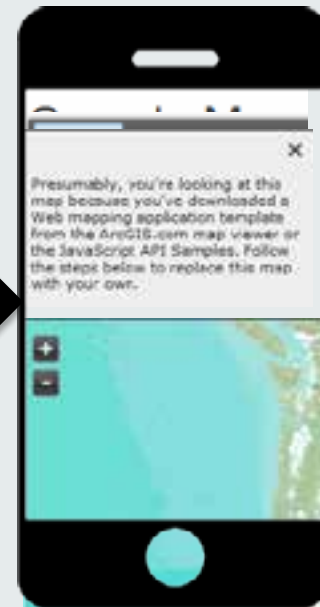
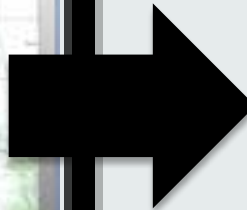


Typical “full-view” Mapping App

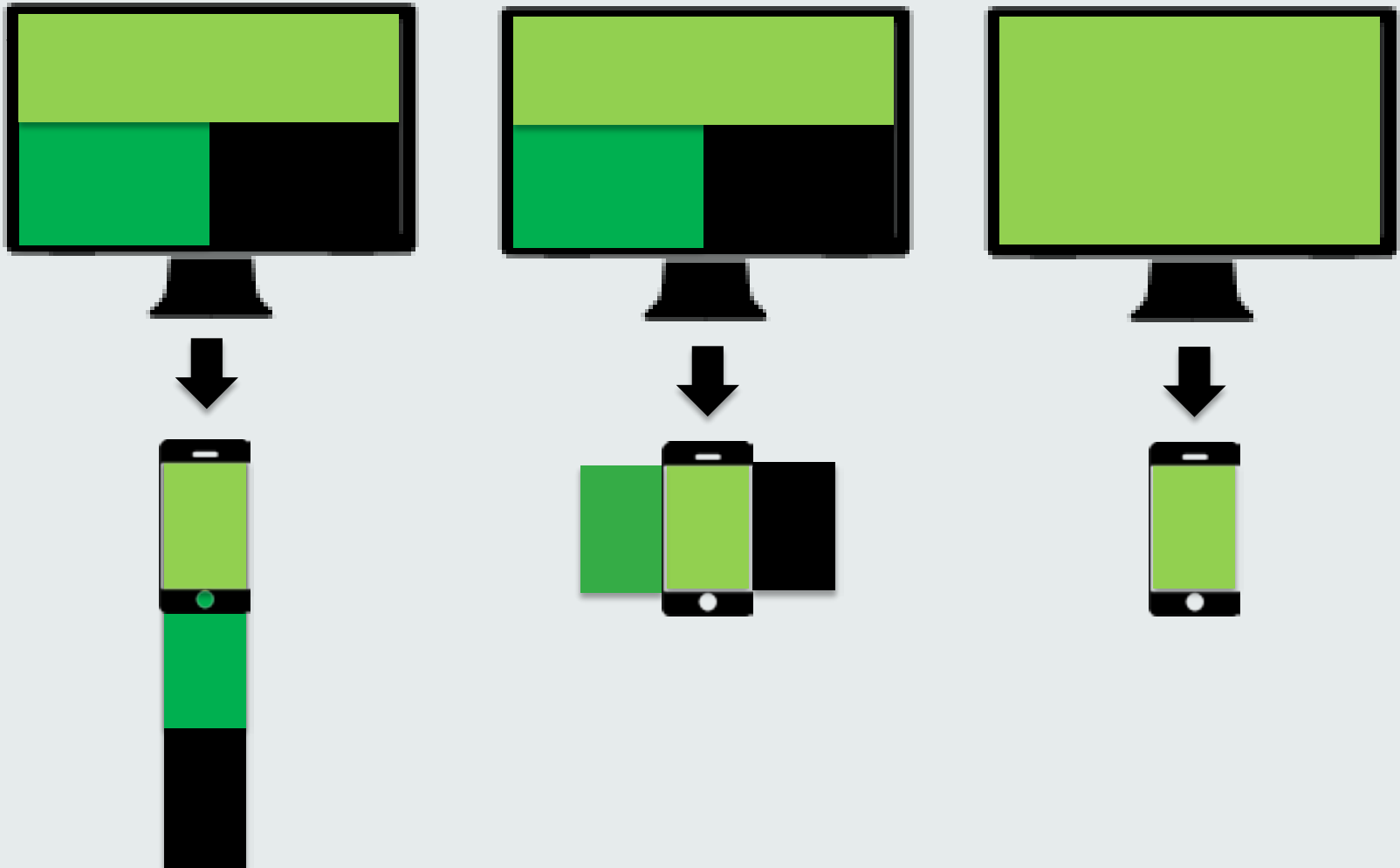
3 Row – 2 Column



Default Behavior



Responsive Grid Layouts



Large: 3 Rows - 3 Columns



\geq 1280px

Medium: 2 Columns



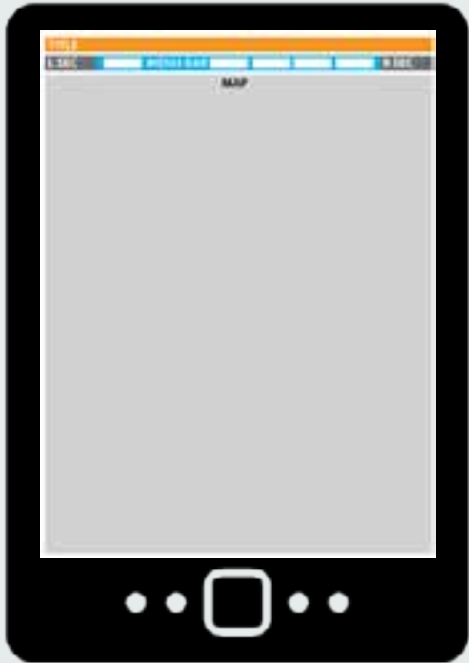
1024 - 1280px

Medium: 2 Columns



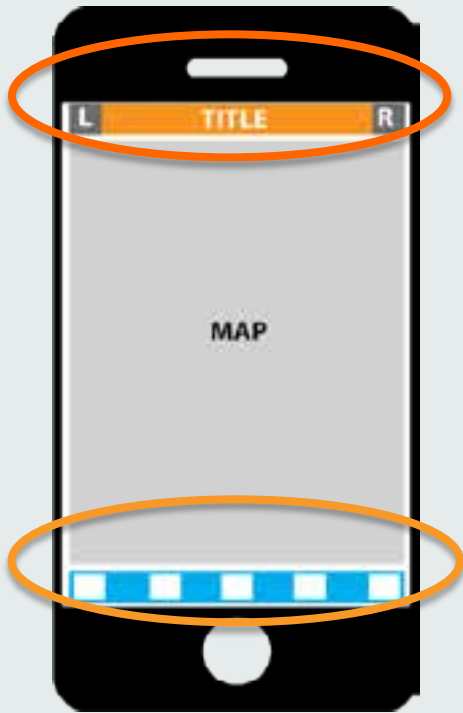
1024 - 1280px

Small: Single Column



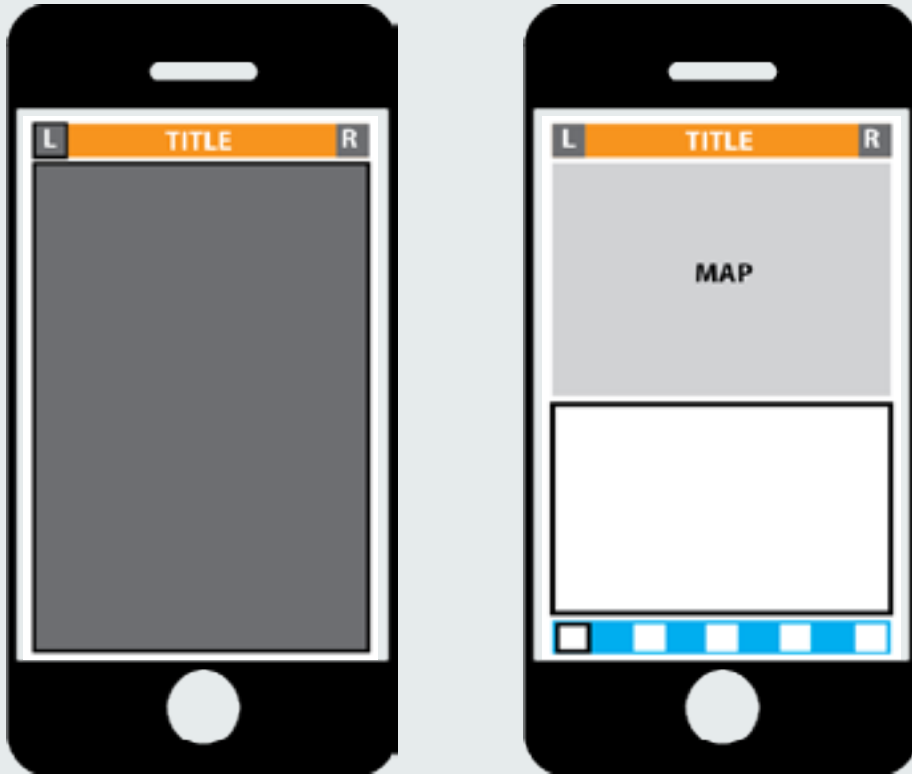
768 - 1024px

Extra Small: 1 Column, Minimized



= < 768px

Extra Small: Windowing



= < 768px

Responsive HTML5 Application



github.com/esri/responsive-map-js

ami.responsivedesign.is

Responsive Frameworks



Responsive Web Frameworks

§ Bootstrap 3

§ Foundation 3

§ Skeleton

§ YAML 4

www.getbootstrap.com

Bootstrap-map-js

- § Bootstrap ver 3 framework
- § Responsive map
- § Resize and re-center
- § Pop-ups, widgets
- § Touch
- § CSS Styles

Step 1: Get bootstrap-map-js

github.com/Esri/bootstrap-map-js

Step 2: Create a page

```
<!DOCTYPE html>
<html>
  <head>
    <title>Bootstrap 101 Template</title>
    <meta name="viewport" content="width=device-width, initial-
scale=1.0">
    <!-- Bootstrap -->
    <link href="../../assets/css/bootstrap.min.css" rel="stylesheet"
media="screen">
  </head>
  <body>

    <h1>Hello, world!</h1>

    <!-- jQuery (for Bootstrap's JavaScript plugins) -->
    <script src="../../assets/js/jquery.js"></script>
    <!-- Include all plugins or individual files as needed -->
    <script src="../../assets/js/bootstrap.min.js"></script>
  </body>
</html>
```

Step 2: Create a page

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<!DOCTYPE html>
<html>
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    <title>Bootstrap 101 Template</title>
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    <h1>Hello, world!</h1>

    <!-- jQuery (for Bootstrap's JavaScript plugins) -->
    <script src="../../assets/js/jquery.js"></script>
    <!-- Include all plugins or individual files as needed -->
    <script src="../../assets/js/bootstrap.min.js"></script>
  </body>
</html>
```

Step 3: Style map div

```
<!-- ArcGIS css -->  
<link rel="stylesheet" type="text/css"  
href="http://js.arcgis.com/3.7/js/esri/css/esri.css">
```

```
<!-- Bootstrap-map-js css -->
```

```
<link rel="stylesheet" type="text/css" href="../../src/css/bootstrapmap.css">
```

```
<style type="text/css">  
  #mapDiv {  
    min-height: 100px;  
    max-height: 1000px;  
  }  
</style>
```

Step 3: Style map div

```
<!-- ArcGIS css -->
<link rel="stylesheet" type="text/css"
href="http://js.arcgis.com/3.7/js/esri/css/esri.css">

<!-- Bootstrap-map-js css -->
<link rel="stylesheet" type="text/css" href="../../src/css/bootstrapmap.css">

<style type="text/css">
  #mapDiv {
    min-height: 100px;
    max-height: 1000px;
  }
</style>
```

Step 4: Add a responsive map

```
<div class="container">
  <div id="mapDiv"></div>
</div>
...
<script src="http://js.arcgis.com/3.7compact"></script>
<script>
  <!-- Load Bootstrap Map - responsive map -->
  require(["esri/map",
    "../../src/js/bootstrapmap.js",
    "dojo/domReady!"],
    function(Map, BootstrapMap) {
      <!-- Get a reference to the ArcGIS Map -->
      var map = BootstrapMap.create("mapDiv",{
        basemap:"national-geographic",
        center:[-122.45,37.77],
        zoom:12
      });
    });
</script>
```

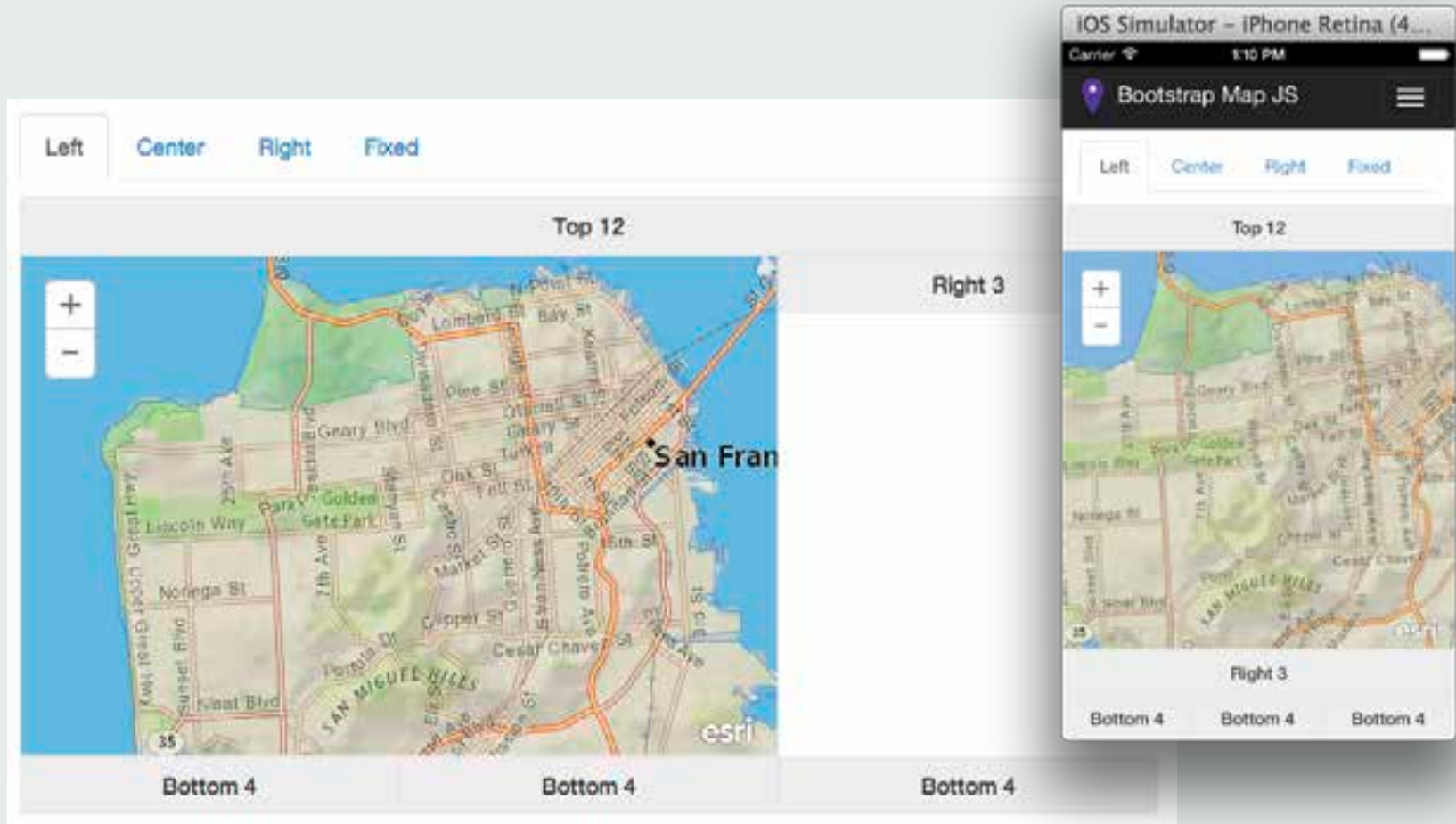
Step 4: Add a responsive map

```
<div class="container">
  <div id="mapDiv"></div>
</div>
...
<script src="http://js.arcgis.com/3.7compact"></script>
<script>
  <!-- Load Bootstrap Map - responsive map -->
  require(["esri/map",
    "../src/js/bootstrapmap.js",
    "dojo/domReady!"],
  function(Map, BootstrapMap) {
    <!-- Get a reference to the ArcGIS Map -->
    var map = BootstrapMap.create("mapDiv",{
      basemap:"national-geographic",
      center:[-122.45,37.77],
      zoom:12
    });
  });
</script>
```


github.com/esri/bootstrap-map-js

A quick look inside...

Bootstrap Fluid Grid CSS



Bootstrap Fluid Grid CSS

```
<div class="col-xs-12 col-sm-8">
```

Define Column



Device Size

**Number of
Columns**

Dynamic column widths

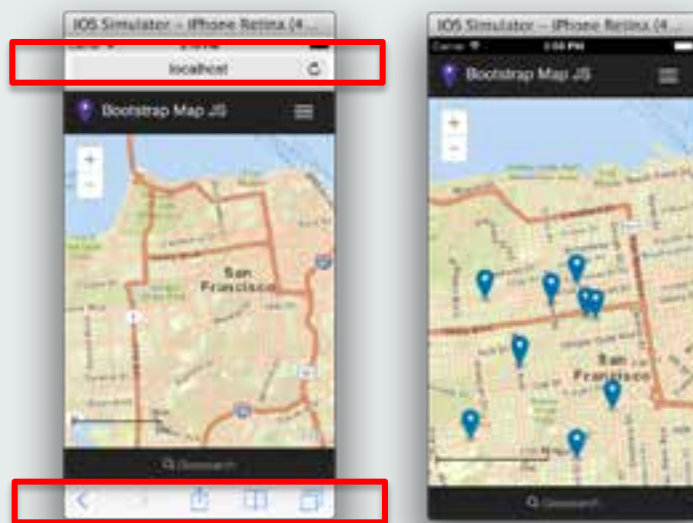
```
<div class="row">
  <div class="col-xs-12 col-sm-12 col-lg-12">
    <h5>Top 12</h5>
  </div>
</div>
<div class="row">
  <div class="col-xs-12 col-sm-8 col-lg-9">
    <!-- Bootstrap-map-js -->
    <div id="mapDiv1"></div>
  </div>
  <div class="col-xs-12 col-sm-4 col-lg-3">
    <h5>Right 3</h5>
  </div>
</div>
<div class="row">
  <div class="col-xs-4"><h5>Bottom 4</h5></div>
  <div class="col-xs-4"><h5>Bottom 4</h5></div>
  <div class="col-xs-4"><h5>Bottom 4</h5></div>
</div> >
```

Dynamic visibility

```
<div class="page-header" hidden-xs >
  <div class="row">
    <div class="col-xs-9"><h2>Windows</h2>
      <p class="lead">Show modal & responsive pop-ups.</p>
    </div>
    <div class="col-xs-3">
      <button . . .>Show Window</button>
    </div>
  </div>
</div>
```

Viewport behavior

```
// Optimize for mobile - prevent scaling on pinch
<meta name="viewport" content="width=device-width,
  initial-scale=1.0, maximum-scale=1.0, user-scalable=no">
// Safari iOS - apps only
<meta name="apple-mobile-web-app-capable" content="yes">
<meta name="apple-mobile-web-app-status-bar-style"
content="black">
// Chrome for Android - NEW!
<meta name="mobile-web-app-capable" content="yes">
```



Map: Scroll without pan

```
// Set touch behavior
createMap: function() {
    var options = {smartNavigation:false};
    var map = new Map(mapDiv,options);
    map.on('load', this.setTouchBehavior);
    return map;
},

setTouchBehavior: function() {
    this.disableScrollWheelZoom();
},
```


Map: Auto-resizing

```
// Responsive resize
var resizeWin function() {
    var w = window.innerWidth;
    if (w != this._w) {
        this._w = w;
        var b = document.body.clientHeight;
        var mh = this._mapDiv.clientHeight;
        var ms = this._calcSpace(this._map);
        var mh1 = mh - ms;
        var room = w - b;
        var mh2 = room + mh1;
        style.set(this._mapDivId, {
            "height": mh2+"px"});
    }
}

on(window, "resize", lang.hitch(this, resizeWin));
```

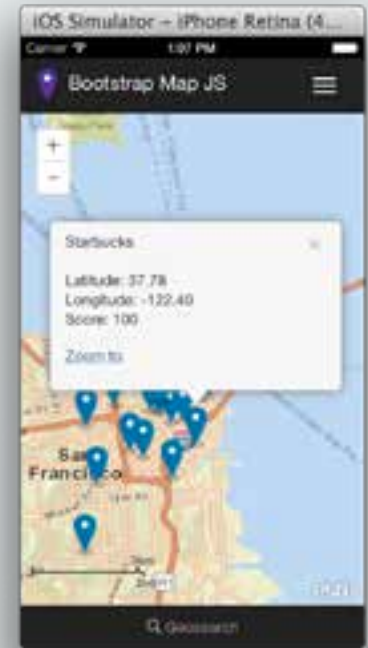
Map: Auto-recentering

```
// Auto-center map
var recenter = function(extent, width, height) {
    this._map.__resizeCenter =
        this._map.extent.getCenter();
    var timer = function() {
        this._map.centerAt(this._map.__resizeCenter);
    }

    setTimeout(lang.hitch(this, timer), this._delay);
}

on(window, "resize", lang.hitch(this, recenter));
```

Popups: Smart touch



```
// Smart-center popup
var updatePopup = function(obj) {
  var infoW = obj._map.infoWindow;
  updateTitle(infoW);
  obj._repositionInfoWin(infoW.features[0]);
}
```

```
on(this._map.graphics, "click", lang.hitch(this,
  function(){
    updatePopup(this);
  }));
```

Tip: Listen for onTouchStart and onClick

Using Media Queries

```
/* Extra small devices (phones, up to 480px) */  
@media (max-width: 480px) {  
  .map { height: 100px; }  
}
```

```
/* Small devices (tablets, 768px and up) */  
@media (min-width: 768px) {  
  .map { height: 200px; }  
}
```

```
/* Medium devices (desktops, 992px and up) */  
@media (min-width: 992px) {  
  .map { height: 300px; }  
}
```

```
/* Large devices (large desktops, 1200px and up) */  
@media (min-width: 1200px) {  
  .map { height: 400px; }  
}
```

Other Tips and Tricks

§ Watch for `.container` CSS

§ Remove all `:hover` states

§ Listen for *onTouchStart* and *click* to avoid 300ms delay

github.com/esri/bootstrap-map-js

Final Notes

- § Write code once
- § Write is “responsively”
- § Make your maps responsive
- § Know your device
- § Know you user

Don't re-invent the wheel!



JavaScript User Interface (UX) Frameworks

Andy Gup



dōjō

embedjs

What is a JavaScript UX framework?

Mimic native look-and-feel

Mimic native development patterns

Cross-platform

Can be used with PhoneGap and Titanium

Why use JavaScript UX framework?



Mimic Native

Missouri Department of Health & Senior Services

Jay Nixon, Governor
Gail Vasterling, Acting Director

Search Health Search

Healthy Living Senior & Disability Services Licensing & Regulations Disaster & Emergency Planning Data & Statistics Online Services

Local WIC Providers

Home » Healthy Living » Healthy Families » WIC » Local WIC Providers

- MOWINS
- WIC Updates
- WIC Foods
- Food Package Training Materials (2009)
- Breastfeeding, Fit WIC and Nutrition
- Resources & Publications
- Forms
- Data & Statistical Reports
- Training
- WIC Participant Eligibility
- Locations
- Policies and Procedures
- Related Links
- Frequently Asked Questions
- WIC Vendors Home
- WIC Families Home
- Non-Discrimination Statement
- WIC Clinic Posters **New!**
- 2014 State Plan **New!**

This page is intended for use by the staff of local WIC...

Healthy Living

- Environmental Factors
- Chronic Diseases
- Communicable Diseases
- Healthy Families
- Organ/Tissue Donation and Registry
- Women, Infants & Children (WIC)
- Genetic Disease & Early Childhood
- Food Programs
- Wellness & Prevention
- Local Public Health Agencies

Desktop

gis.dhss.mo.gov/Website/mobileWIC/WIC.html

Find WIC Services

- WIC offices and satellite
- Stores that accept WIC
- Enter a starting address
- Use my current location
- Change Search Distance

Current Location

1561 W 3rd Ave
Broomfield, CO 80020

Location accurate within 24000 meters of the address listed. Last Updated: 11/1/2013 10:05:06 AM

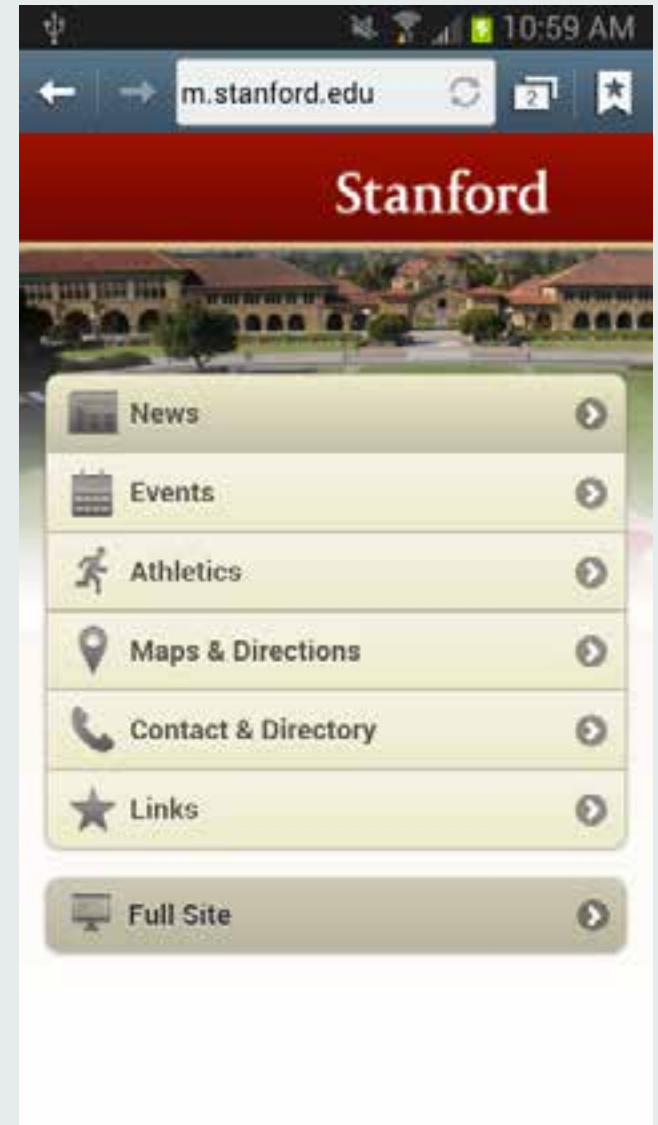
Missouri WIC Program

Phone

Mimic Native



Desktop

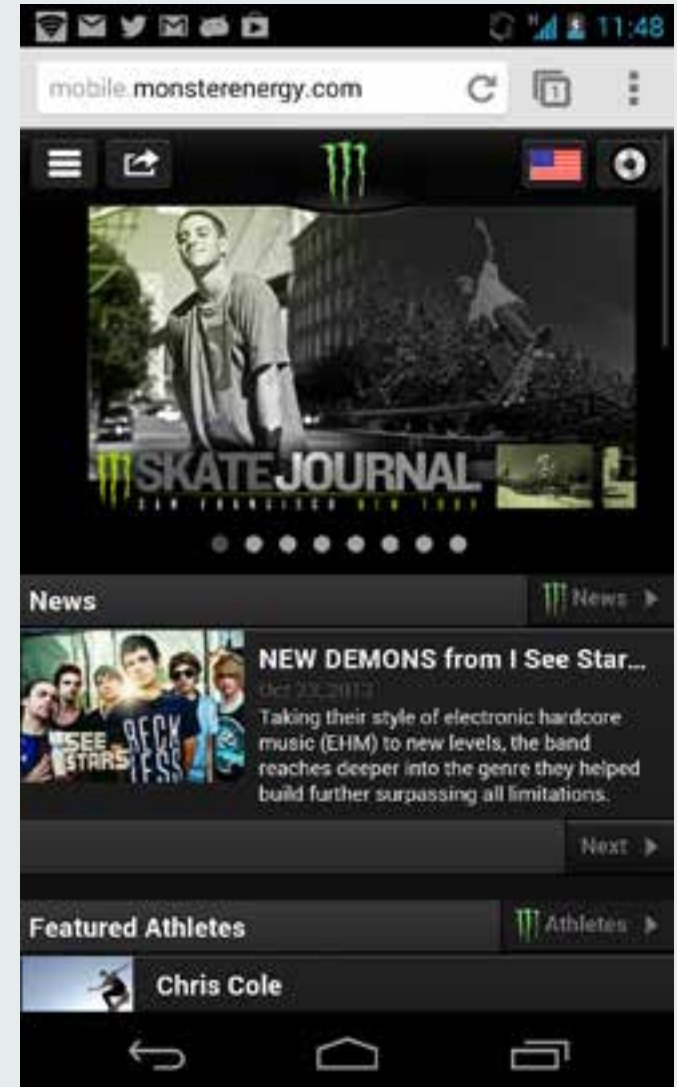


Phone

Mimic Native



Desktop



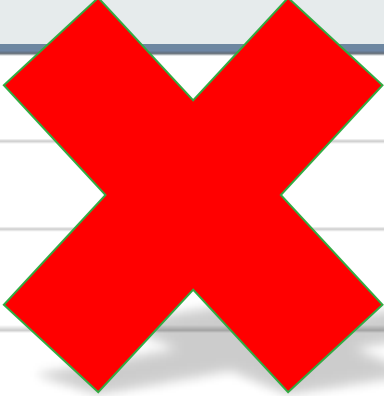
Phone

Mobile device detection

Server-side detection (Fast)

Client-side device detection
(Slower)

Desktop view of a mobile web page



WIC offices and satellite >

Stores that accept WIC >

Enter a starting address >


Use my current location >

Change Search Distance >

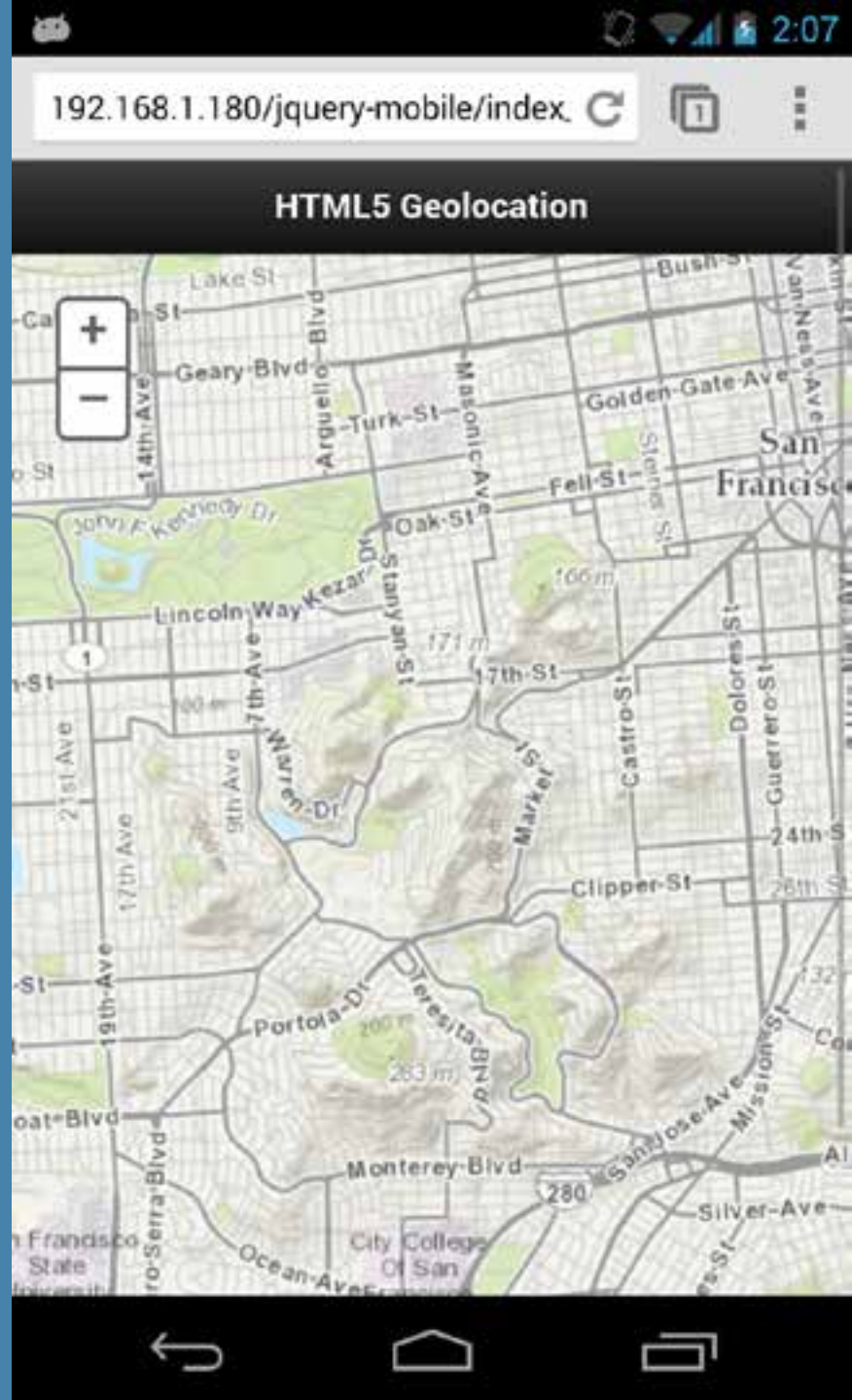
Current Location

1561 W 3rd Ave
Broomfield, CO 80020

Location accurate within 24000 meters
of the address listed. Last Updated: 11/1/2013 10:05:06 AM

 Missouri WIC Program

Single Page Map



Single Page View

Page structure

Apply CSS, roles and themes

Single Page Map - HTML

```
<div data-role="page" id="home">
```

```
//Header
```

```
<div data-theme="a" data-role="header"  
  data-position="fixed">
```

```
<h3>HTML5 Geolocation</h3>
```

```
</div>
```

```
//Map
```

```
<div data-role="content">
```

```
<div id="mapDiv"></div>
```

```
</div>
```

```
</div>
```

Single Page Map - HTML

```
<div data-role="page" id="home">
```

```
//Header
```

```
<div data-theme="a" data-role="header"  
  data-position="fixed">
```

```
  <h3>HTML5 Geolocation</h3>
```

```
</div>
```

```
//Map
```

```
<div data-role="content">
```

```
  <div id="mapDiv"></div>
```

```
</div>
```

```
</div>
```

Single Page Map - HTML

```
<div data-role="page" id="home">  
  //Header  
  <div data-theme="a" data-role="header"  
    data-position="fixed">  
    <h3>HTML5 Geolocation</h3>  
  </div>  
  
  //Map  
  <div data-role="content">  
    <div id="mapDiv"></div>  
  </div>  
</div>
```

Single Page Map - CSS

```
html,body, div[data-role ="page"] {  
    height: 100%;  
    width: 100%;  
    margin: 0px;  
    padding: 0px;  
}  
.ui-header{  
    margin: 0px !important;  
    padding: 0px !important;  
    float: left;  
}  
.ui-content{  
    height: 100%;  
    width: 100%;  
    margin: 0px;  
    padding: 0px;  
}  
#mapDiv {  
    position: absolute;  
    background-color: #EEEEDD;  
    height: 100%;  
    width: 100%;  
    padding: 0px;  
    z-index: 0;  
    left: 0px;  
}
```

Single page app – **App** Life Cycle

1. Load CSS
2. Load jQuery
3. Load jQuery Mobile
4. Load HTML
5. Load ArcGIS API for JavaScript

Single page app – **Map** Life Cycle

1. jQuery “**pageinit**” event
2. ArcGIS JS API - **dom/domReady!**
3. Instantiate the Map
4. On map “**load**” event
5. Add additional layers or start GPS

Single Page Map

Code layout

```
html>

  http-equiv="Content-Type" content="text/html; charse
  name="viewport" content="width=device-width, initial
e>Basic jQuery Mobile Map</title>

data-role="page" id="home">

div data-theme="a" data-role="header" data-position="
  <h3>HTML5 Geolocation</h3>
/div>

div data-role="content">
  <div id="mapDiv"></div>
/div>
>

Load the library and CSS references for ArcGIS API fo
rel="stylesheet" type="text/css" href="http://js.arcg
pt type="text/javascript" src="http://js.arcgis.com/3
rel="stylesheet" href="http://code.jquery.com/mobile
pt type="text/javascript" src="//ajax.googleapis.com/
pt type="text/javascript" src="http://code.jquery.com

style type="text/css">
html, body, div[data-role = "page"] {
  height: 100%;
  width: 100%;
  margin: 0px;
  padding: 0px;

i-header{
  margin: 0px !important;
  padding: 0px !important;
  float: left;

ui-content{
  height: 100%;
  width: 100%;
  margin: 0px;
  padding: 0px;
```

Use Case - Recenter the map



Use jquery-mobile-map-js library!

```
var helper =  
    new jQueryHelper( map );
```

<http://github.com/esri/jquery-mobile-map-js>

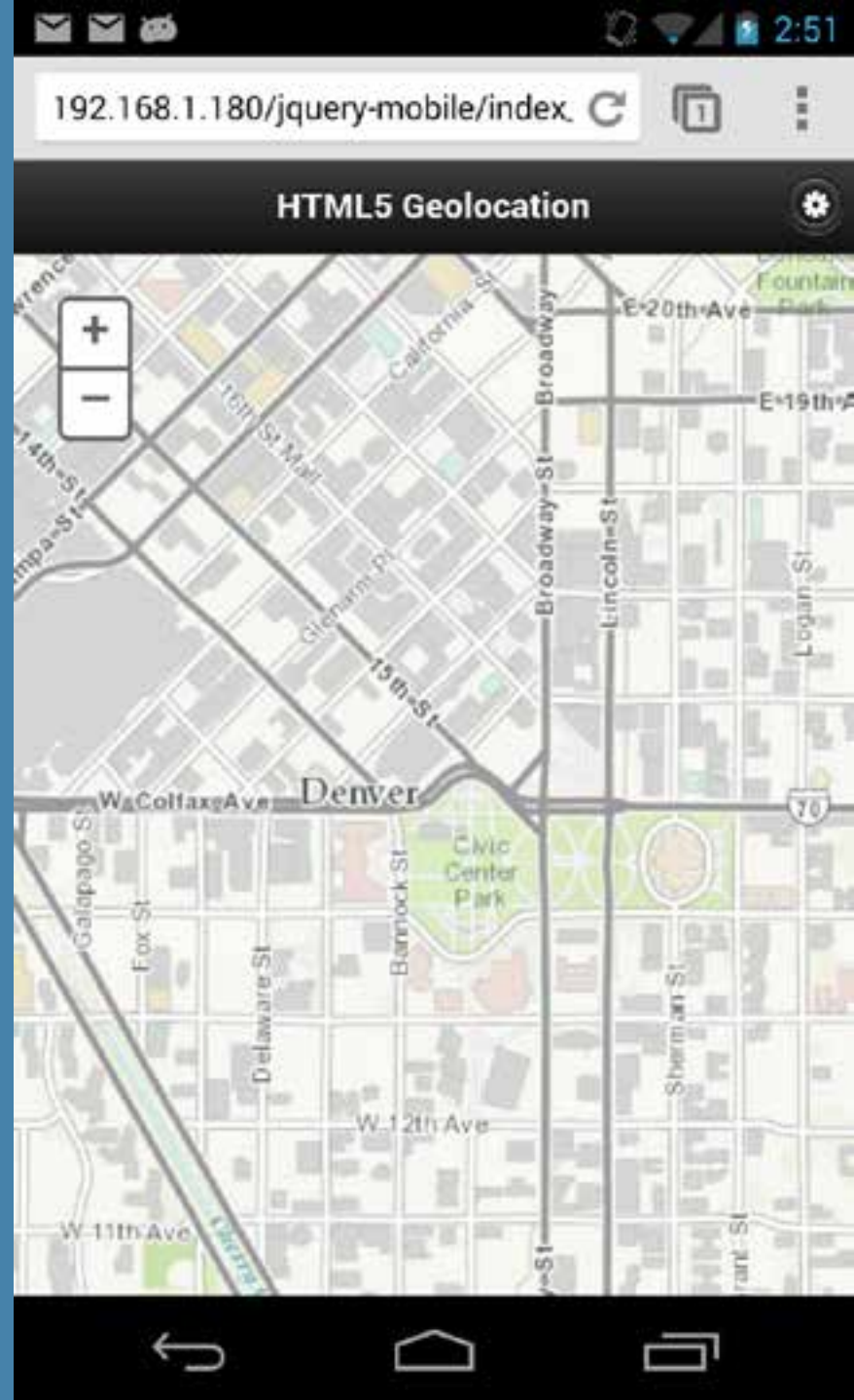
Auto-recenter after orientation change

```
//Listen for map load event
map.on("load",init);

function init(){
  try{
    helper = new jQueryHelper(map);
    helper.setCenterPt(x,y,4326);
  }
  catch(err) {
    console.log("jQueryHelper " + err.message);
  }

  //Some browsers don't show full height after onLoad
  map.reposition();
  map.resize();
}
```

Multiple Page App



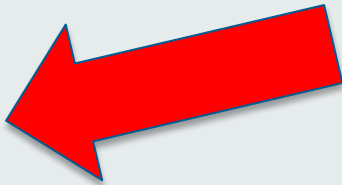
Multi Page View

Set up additional pages

Set up page navigation

Additional CSS

HTML5 Geolocation





Geolocation:
On

Multiple Page app – Page 2 HTML

```
<div data-role="page" id="settings" data-add-back-btn="true">
  //Our Header
  <div data-theme="a" data-role="header"
    data-position="fixed">
    <h1>Settings</h1>
  </div>

  //Page Content
  <div data-role="content">
    <div class="settings" style="margin-top: 15px;">
      <div>Geolocation:</div>
      <select name="slider" id="slider-geo-on-off"
        data-role="slider" data-theme="a">
        <option value="off">Off</option>
        <option value="on" selected>On</option>
      </select>
    </div>
  </div>
</div>
```

Multiple Page app – Page 2 HTML

```
<div data-role="page" id="settings" data-add-back-btn="true">
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  <div data-theme="a" data-role="header"
    data-position="fixed">
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  </div>

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      <select name="slider" id="slider-geo-on-off"
        data-role="slider" data-theme="a">
        <option value="off">Off</option>
        <option value="on" selected>On</option>
      </select>
    </div>
  </div>
</div>
```

Multiple Page app – Page 2 HTML

```
<div data-role="page" id="settings" data-add-back-btn="true">  
  //Our Header  
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  </div>  
  
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  <div data-role="content">  
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        <option value="on" selected>On</option>  
      </select>  
    </div>  
  </div>  
</div>
```

Multiple Page app – Page 2 HTML

```
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      <select name="slider" id="slider-geo-on-off"
        data-role="slider" data-theme="a">
        <option value="off">Off</option>
        <option value="on" selected>On</option>
      </select>
    </div>
  </div>
</div>
```

Multiple Page app – Page 2 CSS

```
<style type="text/css">  
  /* Class for aligning buttons */  
  .settings{  
    margin-left: auto;  
    margin-right: auto;  
    text-align: center;  
    width: 100%;  
  }  
</style>
```

Multiple page app – **Map** Life Cycle

Listen for “helper-map-loaded” event

```
//Custom event from jQueryHelper
$(document).on("helper-map-
loaded",function(evt){
    map = helper.map;

    if(geoEnabled == true) {
        startGeolocation();
    }
});
```

Page Transitions & Orientation Change

Page and orientation life cycle

Map destruction & resizing

Page Transitions

Page 1



Page 2



~250 ms

HTML/CSS

jQuery

**ArcGIS API
for JavaScript**

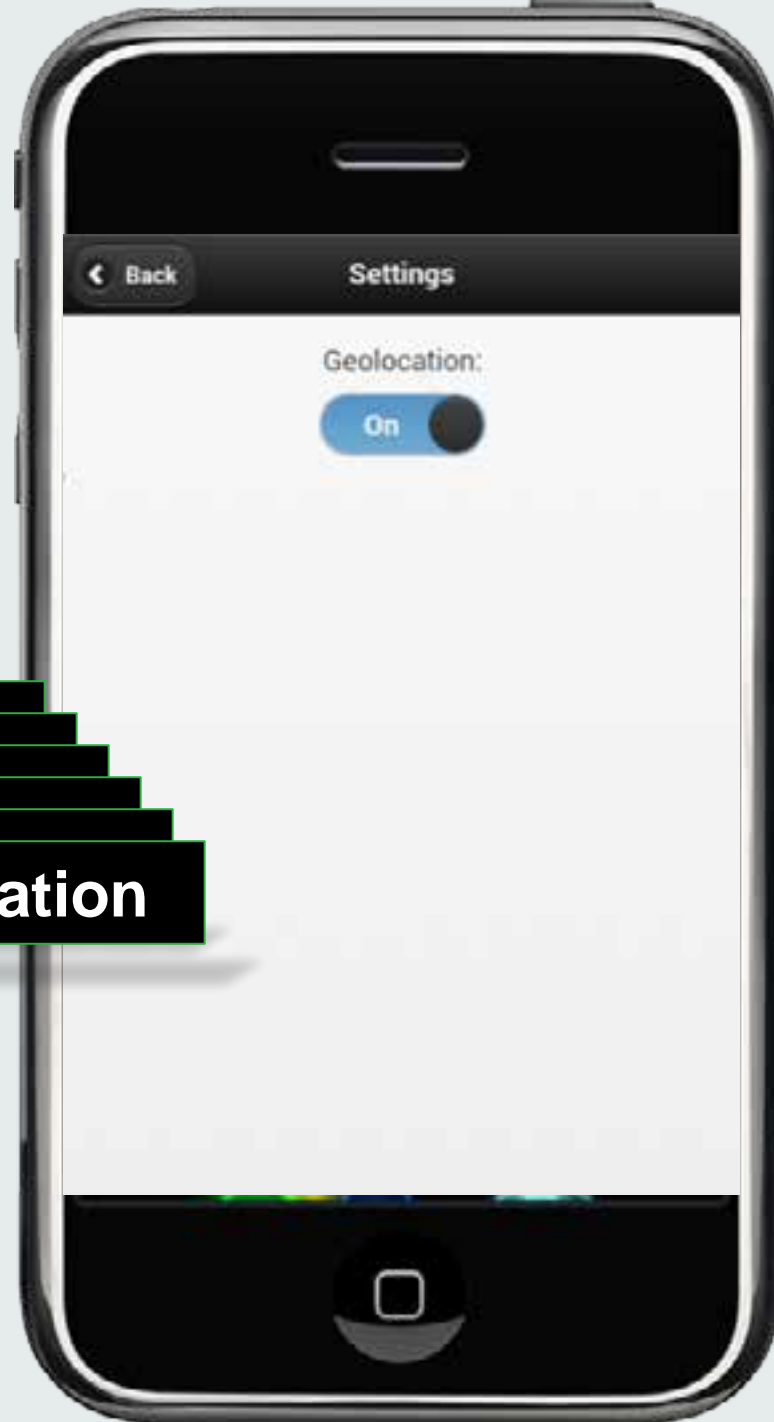
animation

< Back

Settings

Geolocation:

On



User-driven Page **Transition** Events

pagebeforeshow

pageshow

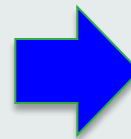
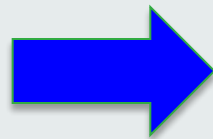
pagechangefailed

Page Transitions & Orientation Change

Page 1

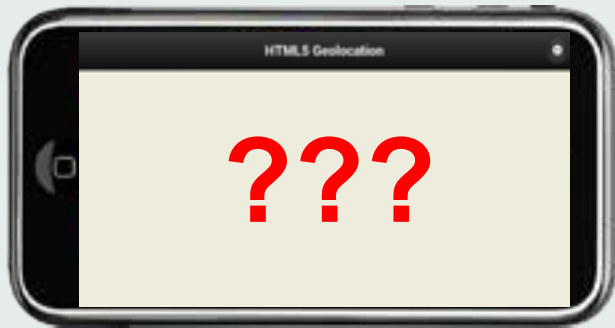
Page 2

Page 2

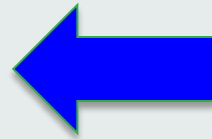


Page Transitions & Orientation Change

Page 1



Page 2



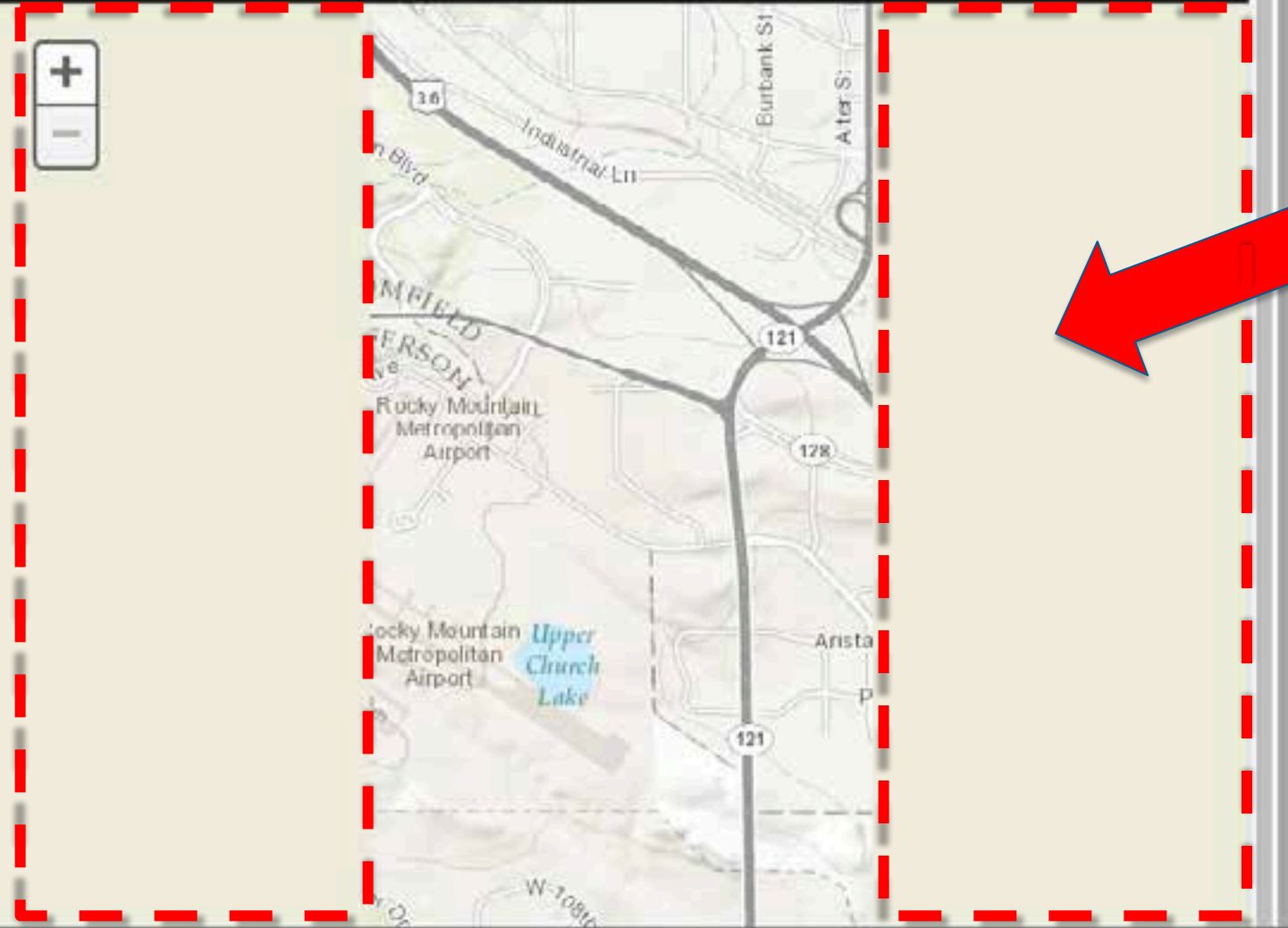
HTML5 Geolocation



⌘ Elements Resources Network Sources Timeline Profiles Audits Console

- ❌ XMLHttpRequest cannot load <http://services.arcgisonline.com/ArcGIS/rest/info?f=json>. Origin http://servicef=json&callback=dojo.io.script.io&dojoToScript1_isonmCallback. Resource interpreted as Script but transferred with MIME type text/plain: "http://servicef=json&callback=dojo.io.script.io&dojoToScript1_isonmCallback".
- 📍 home showing
- ❌ ▶ Error: Invalid value for <image> attribute x="NaN"
- ❌ ▶ Error: Invalid value for <image> attribute y="NaN"
- >

HTML5 Geolocation



⌘ Elements Resources Network Sources Timeline Profiles Audits Console

```
⊗ XMLHttpRequest cannot load http://services.arcgisonline.com/ArcGIS/rest/info?f=json. Origin
  ▶ Resource interpreted as Script but transferred with MIME type text/plain: "http://service
    f=json&callback=doio.io.script.isonp doioToScript1. isonpCallback".
Ⓛ home showing
⊗ ▶ Error: Invalid value for <image> attribute x="NaN"
⊗ ▶ Error: Invalid value for <image> attribute y="NaN"
>
```

Use jquery-mobile-map-js library!

```
var helper =  
    new jQueryHelper( map );
```

Auto-recenter after orientation change

```
//Listen for map load event
```

```
map.on("load",init);
```

```
function init(){
```

```
  try{
```

```
    helper = new jQueryHelper(map);
```

```
    helper.setCenterPt(x,y,4326);
```

```
  }
```

```
  catch(err) {
```

```
    console.log("jQueryHelper " + err.message);
```

```
  }
```

```
//Some browsers don't show full height after onLoad
```

```
map.reposition();
```

```
map.resize();
```

```
}
```

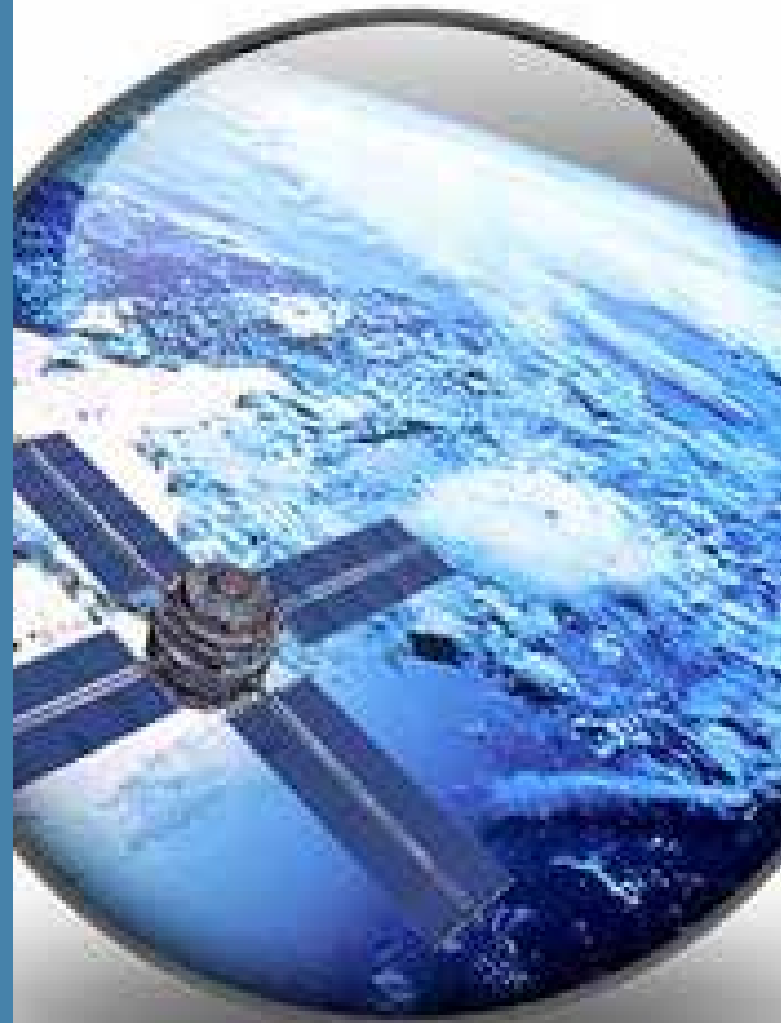

Use jquery-mobile-map-js library!

The following won't work for all use cases:

```
map.reposition();
```

```
map.resize();
```

Working with GPS



Working with GPS

```
// Wait until map has loaded before
// starting geolocation
map.on("load", startGeolocation);

function startGeolocation(){
    navigator.geolocation.getCurrentPosition(
        locationSuccess,
        locationError,
        {setHighAccuracy:true}
    );
}
```

GPS Best Practices

When viewing non-map pages

- Turn off GPS
- Or, do not write points to map
- Or, cache points in localStorage

GPS Best Practices

When returning to map page

- “helper-map-loaded” event
- Turn GPS back on
- Recenter map
- Write cache points to map

Themes

Theming pages

Theme Overview

A

B

C

D

E

Theme A Sample Page

This is an example of `data-theme="a"` applied to the same e...
is inherited by widgets throughout the page.

Text Input:

Flip switch:

 Off

Slider:

 0 8

Font styling:

 b i u

Choose a pet:

Cat

Dog

Hamster

Lizard

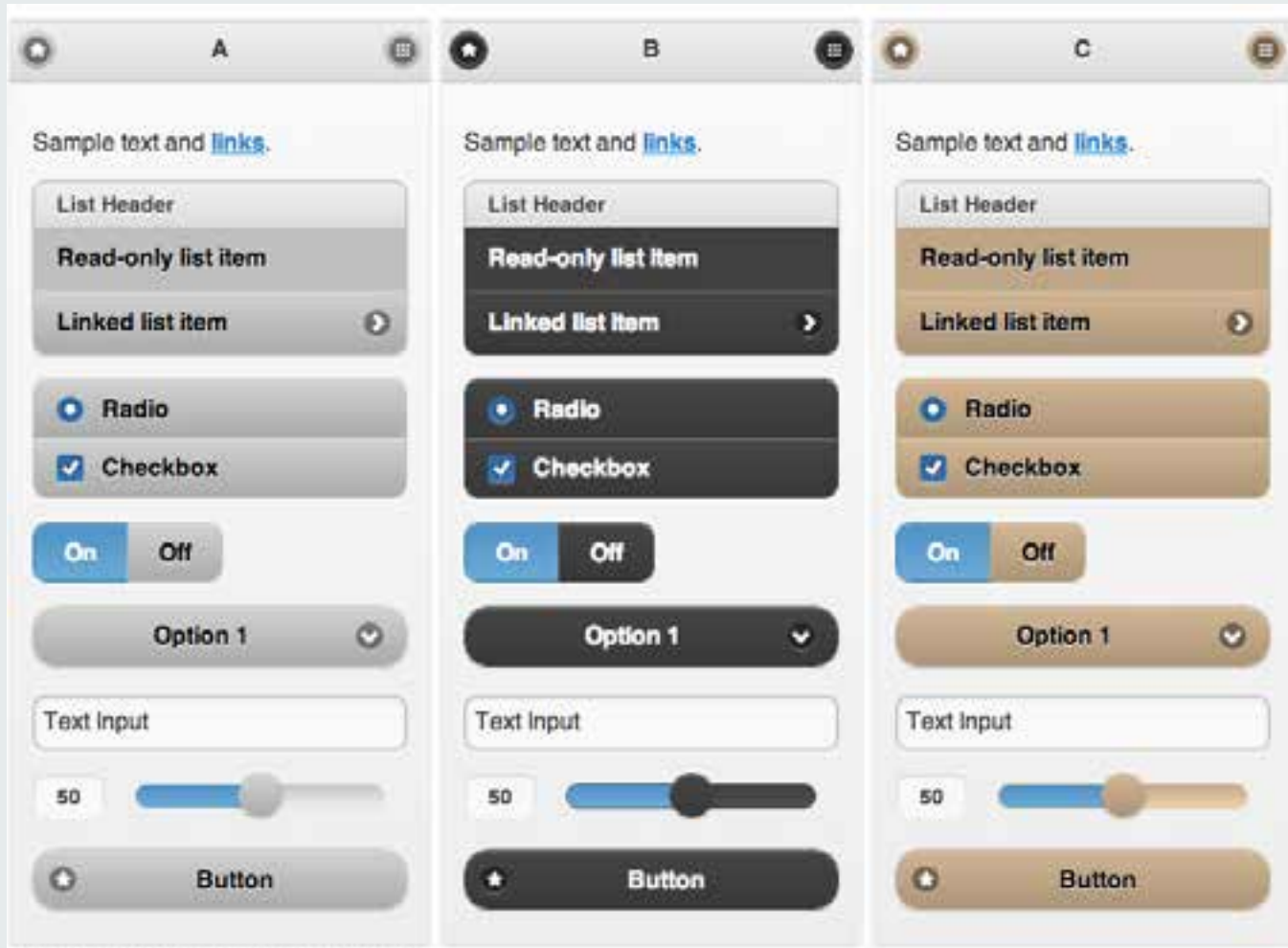
Choose shipping
method:

Collapsible Sets

- Section 1

I'm the collapsible content in a set so this feels like an accord...
`collapsed="false"` attribute; to collapse me, either click

Themes and Styling



JavaScript UX Frameworks wrap up

Mimic native behavior

Gives more control over life cycle

Can you used on Google Play and
App Store

Questions?

@AL_Laframboise

@agup



Understanding our world.