Client Side and Presentation

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HTML

- HyperText Markup Language
    - markup language to define web pages
- defines structure and content (.html, .htm)
- HTML (SGML)
- XHTML (XML)
- 4.01 .. 5
- Document Object Model (DOM)

```
<!DOCTYPE html>
<html>
  <head>
    <title>This is a title</title>
  </head>
  <body>
    <h1>Hello world!</h1>
  </body>
</html>
```

CSS

- Cascading Style Sheets
  - style sheet language to describe **how to display** HTML elements
- in `<style>..</style>` tags or external style sheets (.css)

```html
<!DOCTYPE html>
<html>
  <head>
    <title>This is a title</title>
    <style>
      h1 {
        text-align:center;
      }
    </style>
  </head>
  <body>
    <h1>Hello world!</h1>
  </body>
</html>
```

CSS, cont.

```html
<!DOCTYPE html>
<html>
  <head>
    <title>This is a title</title>
    <link rel="stylesheet" type="text/css" href="basic.css">
  </head>
  <body>
    <h1>Hello world!</h1>
  </body>
</html>
```

```css
/* basic.css */
h1 {
  text-align: center;
}
```

Javascript

- Javascript (JS)
  - interpreted programming language
  - implemented as part of browsers to enable client-side processing
  - multi-paradigm: OO, imperative, functional
- Allows web page to interact with user directly
  - without another client-server round-trip
- Can manipulate the DOM
- Server-side processing (Node.js)

Javascript, cont.

```
<!DOCTYPE html>
<html>
  <head>
    <title>This is a title</title>
    <link rel="stylesheet" type="text/css" href="basic.css">
  </head>
  <body>
    <h1 id="main-header">Hello world!</h1>

    <script>
      document.getElementById("main-header").innerHTML = "Hello Javascript!";
    </script>

  </body>
</html>
```

Javascript, cont.

```html
<!DOCTYPE html>
<html>
  <head>
    <title>This is a title</title>
    <link rel="stylesheet" type="text/css" href="basic.css">
  </head>
  <body>
    <h1 id="main-header">Hello world!</h1>

    <script src="basic.js"></script>

  </body>
</html>
```

```javascript
// basic.js
document.getElementById("main-header").innerHTML = "Hello ↩
    Javascript!";
```

AJAX

- Asynchronous JavaScript and XML
  - enables communication with the server in the background
  - group of technologies: HTML, CSS, DOM, XML, JSON
- Typically *JSON* is used
- Requests need not be *asynchronous*
- Javascript `XMLHttpRequest` object

```
// This is the client side
// Initialize the Ajax request
var xhr = XMLHttpRequest();
xhr.open('get', 'send-ajax-data.txt', false);

// Send the request to send-ajax-data.php
xhr.send(null);

var response = xhr.responseText;

alert(response); // 'This is the returned text.'
```

More CSS: SASS

- Syntactically Awesome Stylesheets
  - CSS metalanguage; scripting language that is interpreted into CSS
- CSS deficiencies:
  - no variables: colour `#ffcc33` needs to be repeated
  - code blocks cannot be nested (although logical nesting is allowed)
  - no mixin support: repeated code blocks needs to be repeated in every location
  - ...
- Two syntaxes
  - the indented syntax; haml-like (.sass)
  - SCSS: the newer syntax; CSS block formatting (.scss)

More CSS: SASS, cont.

```
$ gem install sass
$ sass style.scss style.css
```

```
// style.scss
/* style.css */
$blue: #3bbfce;
$margin: 16px;

.content-navigation {
  border-color: $blue;
  color:
    darken($blue, 9%);
}

.border {
  padding: $margin / 2;
  margin: $margin / 2;
  border-color: $blue;
}
```

```
/* style.css */
.content-navigation {
  border-color: #3bbfce;
  color: #2ca2af; }

.border {
  padding: 8px;
  margin: 8px;
  border-color: #3bbfce; }
```

More CSS: LESS

- LESS: metalanguage that is interpreted into CSS
- Similar to SASS
  - main difference is that real-time compilation can be accomplished via `LESS.js`
- Current implementation is in Javascript
  - Can run on both the server (Node.js) and the client (browsers)
  - Prerequisites: Node.js and NPM (Node Package Manager)

More Javascript

- jQuery
  - cross-browser Javascript library
  - easier client-side scripting
    - document navigation
    - DOM element selection
    - event handling
    - animations
    - AJAX
- Jquery Mobile
- Prototype
- ...

More Javascript: jQuery Example

```
<!doctype html>
<html lang="en">

  <head>
    <meta charset="utf-8">
    <title>ready demo</title>
    <script src="http://code.jquery.com/jquery-1.9.1.js"></script>
    <script>
      $(document).ready(function () {
        $("p").text("The DOM is loaded and can be manipulated.");
      });
    </script>
  </head>

  <body>
    <p>Not loaded yet.</p>
  </body>

</html>
```

More Javascript: CoffeeScript

- Is an alternative syntax for Javascript
- Compiles to Javascript
- Offers syntactic sugar
- Is indentation-based – no curly braces
- 2/3 lines of equivalent JS file

```
$ ->
  $("body").html "Hello!"
```

```
$(function() {
  $("body").html("Hello!");
})
```

- Dart (by Google)

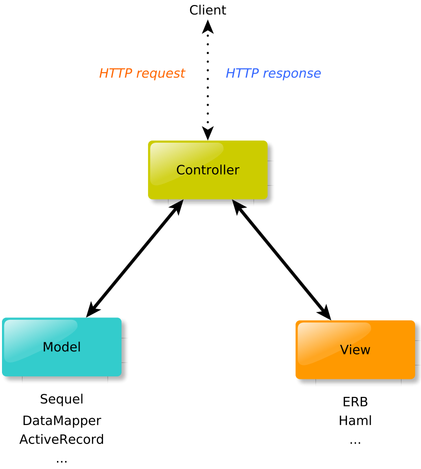
More Javascript: Web Application Frameworks

- Web Application Frameworks
  - Angular
  - Ember
  - YUI
  - Dojo
  - ExtJS
  - Meteor
  - ...

Single-Page Applications

- Up and coming
- Server
  - API (REST)
  - models, DB, migrations, etc.
  - but **no** views
- Client
  - templates for views
  - models for updating the views
  - *controllers*
  - MV*

MVC – MV*



Client

HTTP request

HTTP response

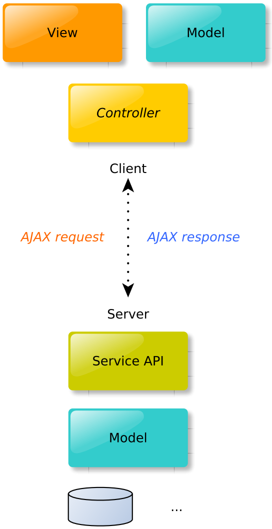
Controller

Model

Sequel
DataMapper
ActiveRecord
...

View

ERB
Haml
...



View

Model

Controller

Client

AJAX request

AJAX response

Server

Service API

Model

...

AngularJS: why?

- Backed by Google
- Actively maintained
- Comprehensive feature set
- It doesn't get in the way
- Large and quickly growing community
- Built for testability
- Get started in minutes
- Built with REST in mind
- Fast

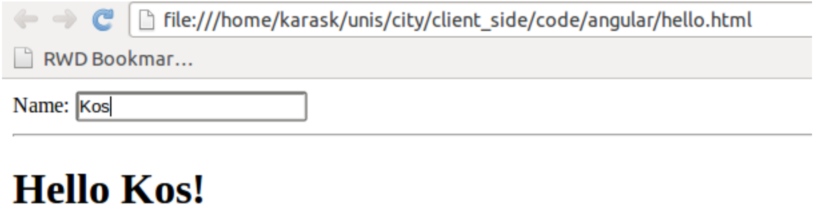
AngularJS: Introduction

- Features:
    - Client-side MV*C*
    - Templating
    - Two way data-binding
    - Routing
    - Event dispatching
    - Extensibility
    - Dependency Injection

AngularJS: Example 1

```
<!doctype html>
<html ng-app>
  <head>
    <script src="https://ajax.googleapis.com/ajax/libs/angularjs/1.0.7/angular.min.js"></script>
  </head>
  <body>
    <div>
      <label>Name:</label>
      <input type="text" ng-model="yourName" placeholder="Enter a name here">
      <hr>
      <h1>Hello {{yourName}}!</h1>
    </div>
  </body>
</html>
```

AngularJS: Example 1, cont.



file:///home/karask/unis/city/client_side/code/angular/hello.html

Name: Kos

Hello Kos!

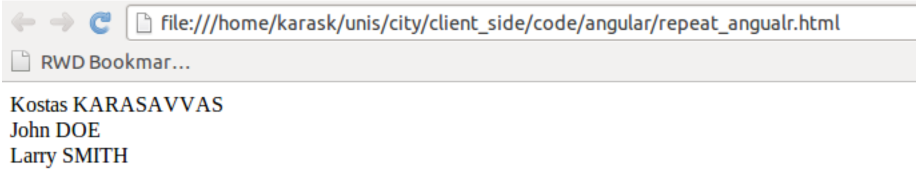
AngularJS: Example 2

```
<!doctype html>
<html ng-app>
  <head>
    <script src="https://ajax.googleapis.com/ajax/libs/angularjs/1.0.7/angular.min.js"></script>
    <script src="controllers/names.js"></script>
  </head>
  <body ng-controller="NamesController">
    <div ng-repeat="name in names">
      <span>{{name.first}}<span>
      <span>{{name.last | uppercase}}<span>
    </div>
  </body>
</html>
```

AngularJS: Example 2, cont.

```
// controllers/names.js
function NamesController($scope) {
  $scope.names = [
      { "first" : "Kostas", "last" : "Karasavvas" },
      { "first" : "John", "last" : "Doe" },
      { "first" : "Larry", "last" : "Smith" }
  ];
}
```

AngularJS: Example 2, cont.



file:///home/karask/unis/city/client_side/code/angular/repeat_angualr.html
RWD Bookmar...

Kostas KARASAVVAS
John DOE
Larry SMITH

Web Design

- ... is an art
- Requires a whole different expertise
  - not just HTML, CSS and Javascript
- Which colours look good combined?
- What button sizes?
- How to layout our application?
- How to make menus? Vertical? Horizontal?
- Device heterogeneity? Responsive design?
- Cross-browser?
- Consistency?
- Images?
- Fortunately, there are tools to help

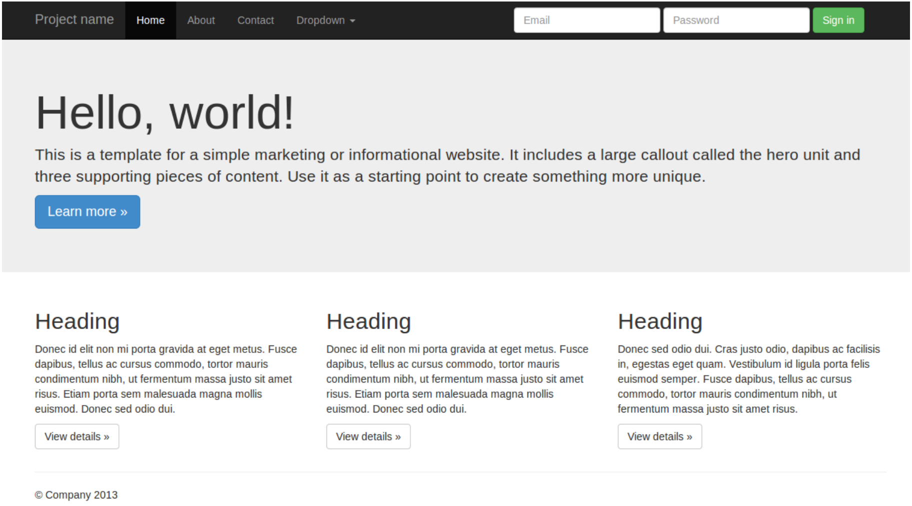
Front-end Frameworks: Easier web development!

- Twitter Bootstrap
- Foundation
- GroundworkCSS
- Gubmy
- HTML KickStart
- Kube
- Bootmetro
- Bootstrap-based
  - Fbootstrapp
  - Kickscrap
  - FlatUI

Twitter Bootstrap

- Developed by Twitter's developers
- Features:
  - **Grid system** with support for **Responsive Design**
  - **CSS classes** for buttons, forms, tables, icons, navigation bars, labels, progress bars, etc.
  - **Javascript UI widgets** for modals, menu dropdowns, images slider, accordions, notifications, etc.
- Highly customizable using LESS

Twitter Bootstrap: Example



Hello, world!

This is a template for a simple marketing or informational website. It includes a large callout called the hero unit and three supporting pieces of content. Use it as a starting point to create something more unique.

Heading

Donec id elit non mi porta gravida at eget metus. Fusce dapibus, tellus ac cursus commodo, tortor mauris condimentum nibh, ut fermentum massa justo sit amet risus. Etiam porta sem malesuada magna mollis euismod. Donec sed odio dui.

Heading

Donec id elit non mi porta gravida at eget metus. Fusce dapibus, tellus ac cursus commodo, tortor mauris condimentum nibh, ut fermentum massa justo sit amet risus. Etiam porta sem malesuada magna mollis euismod. Donec sed odio dui.

Heading

Donec sed odio dui. Cras justo odio, dapibus ac facilisis in, egestas eget quam. Vestibulum id ligula porta felis euismod semper. Fusce dapibus, tellus ac cursus commodo, tortor mauris condimentum nibh, ut fermentum massa justo sit amet risus.

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