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# HTML5 / JAVASCRIPT DEVELOPMENT

*EATING THE ELEPHANT WHILE AVOIDING INDIGESTION*

KEYHOLE SOFTWARE LLC



# PRESENTATION FOCUS

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- ☐ ENTERPRISE APPLICATION DEVELOPMENT
  - ☐ HEAVILY USED APPLICATIONS
  - ☐ RICH USER INTERFACE
  - ☐ COMPLEX FUNCTIONALITY
  - ☐ RESPONSIVE TO DEVICE (TABLET/PHONE)
  - ☐ TEAM DEVELOPMENT

# COMMON ENTERPRISE DEVELOPMENT ARCHITECTURE

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- ☐ SERVER FOCUSED
  - ☐ HTML GENERATED DYNAMICALLY ON SERVER
  - ☐ APPLICATION LOGIC & DATA-ACCESS ON SERVER
  - ☐ JAVASCRIPT USED PRIMARILY FOR UI ENHANCEMENT & FUNCTIONALITY
  - ☐ AJAX USED TO REDUCE "SCREEN REFRESH" & LATENCY



# HOW ABOUT AN HTML5/ JAVASCRIPT APPROACH?

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- ☐ WITH THIS APPROACH, WE CAN EXPLOIT:
  - ☐ CLEAR SEPARATION OF APPLICATION RESPONSIBILITIES
  - ☐ SERVER BECOMING ONLY LOGIC & DATA ACCESS API
  - ☐ CLIENT (BROWSER) RESPONSIBLE FOR HTML CONTENT (WHAT IT DOES BEST!)
  - ☐ OPTIMIZED JAVASCRIPT
  - ☐ HTML5 / CSS3
  - ☐ LOCAL STORAGE
  - ☐ PROVEN CROSS BROWSER COMPATIBLE MV\* FRAMEWORKS



# WHAT IS HTML5?

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- ☐ SIMPLY THE 5TH REVISION OF THE HTML STANDARD
- ☐ ADDS SYNTACTIC SUPPORT FOR:
  - ☐ MEDIA - AUDIO/VIDEO/CANVAS
  - ☐ "OFFLINE" APPLICATIONS
  - ☐ NEW CONTENT/LAYOUT ELEMENTS
  - ☐ WEB SOCKET API
  - ☐ MANY OTHERS...



# WHY HTML5/JAVASCRIPT?

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- ☐ ABILITY TO CREATE RICH-CLIENT USER INTERFACE
- ☐ CLEAR SEPARATION OF APPLICATION RESPONSIBILITIES
- ☐ PROLIFERATION OF "LIBRARIES" MAKING IT A VIABLE PLATFORM FOR ENTERPRISE DEVELOPMENT
- ☐ SUPPORT "MOBILE" APPLICATIONS WITH A CONSISTENT DEVELOPMENT APPROACH
- ☐ HTML5 ADDS FEATURES TO SUPPORT RICH-CLIENT INTERFACES AND MOBILE SUPPORT
- ☐ ELIMINATES NEED FOR BROWSER PLUGINS (FLASH/FLEX, SILVERLIGHT, APPLETS, ETC)



# WHERE TO START!?

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- ☐ THERE ARE MANY OPTIONS IN THIS SPACE...WHERE SHOULD I START?
- ☐ ONE OPTION...AND THE ONE WE WILL LOOK AT TODAY!
  - ☐ REQUIREJS - FOR ORGANIZATION, PERFORMANCE, & OPTIMIZATION
  - ☐ BACKBONEJS - FOR STRUCTURE & ARCHITECTURE
  - ☐ BOOTSTRAP - FOR USER EXPERIENCE & DEVICE RESPONSIVENESS





# REQUIREJS

# WHAT PROBLEM ARE WE TRYING TO SOLVE?

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- ☐ WEBSITES ARE TURNING INTO "APPLICATIONS"
- ☐ COMPLEXITY IN THIS SPACE CONTINUES TO INCREASE
- ☐ DEVELOPERS WANT DISCRETE JS FILES/MODULES
  - ☐ AS OPPOSED TO LARGE UNSTRUCTURED SCRIPTS
- ☐ PROPER DEPLOYMENT NEEDS OPTIMIZED CODE IN FEWER HTTP CALLS



# WHAT IS REQUIREJS ?

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- ☐ JAVASCRIPT MODULE LOADER THAT IMPLEMENTS THE AMD SPECIFICATION
- ☐ ENCOURAGES MODULAR CODE
- ☐ ALLOWS FOR A MODULE AND ITS DEPENDENCIES TO BE ASYNCHRONOUSLY LOADED



# WHY REQUIRE.JS ?

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- ☐ PROVIDES FUNCTIONAL SYNTAX FOR LOADING 'MODULES' ASYNCHRONOUSLY
- ☐ PROVIDES ABILITY TO DEFINE & LOAD NESTED DEPENDENCIES W/IN MODULES
- ☐ IMPLEMENTS THE AMD SPECIFICATION
- ☐ EASY FOR DEVELOPER TO LEARN & BACKED BY AN OPTIMIZATION TOOL FOR EASING DEPLOYMENT AND RUNTIME OVERHEAD



# WHAT IS A MODULE?

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- ☐ A JAVASCRIPT FILE, BUT...
  - ☐ DEFINES A WELL-SCOPED OBJECT
  - ☐ AVOIDS POLLUTING THE GLOBAL NAMESPACE
  - ☐ EXPLICITLY LISTS ITS DEPENDENCIES
  - ☐ DOES NOT NEED "GLOBALS" DEFINED TO REFER TO OTHER MODULES

# MODULE DEFINITION

## SIMPLE NAME/VALUE PAIRS

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BOOK.JS

```
define({  
  isbn: "9780261102217",  
  title: "The Hobbit",  
  author: "J.R.R. Tolkien"  
});
```



# MODULE DEFINITION FUNCTION

---

BOOK.JS

```
define(function() {  
  console.log('defining book');  
  return {  
    isbn: "9780261102217",  
    title: "The Hobbit",  
    author: "J.R.R. Tolkien"  
  }  
});
```

# MODULE DEFINITION FUNCTION W/ DEPENDENCIES

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LIBRARY.JS

```
define('backbone', './book', function(Backbone, Book) {  
    return Backbone.Collection.extend({  
        model: Book  
    });  
});
```



# WALKTHROUGH

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- ☐ QUICK DEMO OF BASIC REQUIREJS FUNCTIONALITY

The Backbone.js logo is a stylized blue wave shape. Inside the wave is a white circle containing a grey letter 'K'. The text 'BACKBONE.JS' is written in a dark blue, sans-serif font across the middle of the wave.

BACKBONE.JS



# WHAT PROBLEM ARE WE TRYING TO SOLVE?

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- ☐ WHEN WRITING JAVASCRIPT BASED APPLICATIONS, SOMETIMES BAD THINGS HAPPEN!
- ☐ IT CAN BECOME A TANGLED WEB OF JQUERY SELECTORS & CALLBACKS
- ☐ KEEPING DATA IN SYNC BETWEEN THE UI, YOUR JAVASCRIPT LOGIC, & THE 'DATASOURCE' CAN BECOME QUITE CUMBERSOME
- ☐ DATA IS OFTEN BE TIED DIRECTLY TO THE DOM
- ☐ WE WANT TO BRING SOME "STRUCTURE" TO OUR JAVASCRIPT DEVELOPMENT, JUST LIKE WE WOULD ON THE SERVER SIDE!



# WHAT IS BACKBONE.JS ?

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- ☐ JAVASCRIPT LIBRARY FOR BUILDING STRUCTURED WEB APPLICATIONS
- ☐ DATA IS REPRESENTED IN A 'MODEL' THAT TRIGGERS EVENTS AS PROPERTIES CHANGE
- ☐ 'VIEWS' DISPLAY A 'MODEL' STATE, AND AUTOMATICALLY UPDATE UPON MODEL CHANGES (CAN BE MULTIPLE VIEWS FOR A GIVEN MODEL)



# WHY BACKBONE.JS ?

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- ☐ FLEXIBILITY
  - ☐ DOESN'T REINVENT JAVASCRIPT OBJECT MODEL
  - ☐ UN-OPINIONATED - DOES NOT MAKE A LOT OF DECISIONS FOR YOU
- ☐ SMALL/LIGHTWEIGHT
  - ☐ NO BUILT-IN PERFORMANCE PENALTY FOR USING IT
- ☐ SCALES WELL
  - ☐ CAN BE USED FOR LARGE-SCALE APPLICATIONS OR SIMPLE EMBEDDED WIDGETS
- ☐ LARGE AND REPUTABLE USER BASE
  - ☐ WALMART (MOBILE), USA TODAY, HULU, WORDPRESS, LINKED IN (MOBILE), MANY MORE...



# BACKBONE.JS FUNDAMENTALS

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- ☐ MODEL\* :: A "BUSINESS" OBJECT W/ INCLUDED LOGIC
- ☐ COLLECTION\* :: A "GROUP" OF MODEL OBJECTS
- ☐ VIEW :: A LOGICAL "PIECE" OF THE UI

\* RESTFUL JSON API CONNECTS TO 'BACKEND'



# WHAT IS A BACKBONE MODEL?

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- ☐ JUST LIKE TRADITIONAL OO, THE "MODEL" IS THE CORE OF THE APPLICATION BUSINESS DOMAIN
  - ☐ CONTAINS STRUCTURED DATA, AND LOGIC TO MANIPULATE IT
- ☐ DEFINED BY EXTENDING BACKBONE.MODEL
  - ☐ WITH USAGE SPECIFIC PROPERTIES AND FUNCTIONS
  - ☐ PROTOTYPE PROVIDES BASIC FUNCTIONALITY FOR MANAGING CHANGES
  - ☐ PROVIDES RESTFUL JSON INTERFACE TO SERVER (VIA `BACKBONE.SYNC`)



# BACKBONE.MODEL

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## BOOK.MODEL.JS

```
define('backbone', function(Backbone) {  
    return Backbone.Model.extend({  
        defaults: {  
            isbn: undefined,  
            title: undefined,  
            author: undefined  
        },  
        validate: function(attrs) {  
            if (!attrs.isbn  
                || !attrs.title  
                || !attrs.author) {  
                return 'Not valid sucker!';  
            }  
        }  
    });  
});
```



# WHAT IS A BACKBONE COLLECTION?

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- ☐ ORDERED SETS OF "MODELS"
- ☐ TRIGGERS EVENTS ON "CHANGE", "ADD", "REMOVE", ETC.
- ☐ EVENTS TRIGGERED ON MODEL ALSO TRIGGERED ON THE COLLECTION DIRECTLY
  - ☐ ALLOWS FOR LISTENING FOR CHANGES TO SPECIFIC ATTRIBUTES ON ANY MODEL IN THE COLLECTION
- ☐ DEFINED BY EXTENDING BACKBONE.COLLECTION
  - ☐ WITH USAGE SPECIFIC PROPERTIES AND FUNCTIONS
  - ☐ PROTOTYPE PROVIDES BASIC FUNCTIONALITY FOR MANAGING CHANGES
  - ☐ PROVIDES RESTFUL JSON INTERFACE TO SERVER (VIA BACKBONE.SYNC)



# BACKBONE.COLLECTION

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## BOOK.COLLECTION.JS

```
define('backbone', './book.model', function(Backbone, BookModel) {  
    return Backbone.Collection.extend({  
        model: BookModel,  
        url: '/sherpa/book'  
    });  
});
```



# WHAT IS A BACKBONE VIEW ?

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- ☐ LOGICAL REPRESENTATION OF A "PIECE" OF YOUR HTML
- ☐ ALWAYS BACKED BY MODEL (OR COLLECTION)
- ☐ MERGES THE BACKING MODEL INTO AN HTML TEMPLATE TO PRODUCE ITS "PIECE" OF THE DOM
- ☐ CAN UPDATE THE UI AUTOMATICALLY VIA MODEL/ COLLECTION EVENTS TIED TO "RENDER" METHOD



# BACKBONE.VIEW

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## BOOK.VIEW.JS

```
define(['backbone', 'text!./book.html'], function(Backbone, template) {  
  return Backbone.View.extend( {  
    initialize: function(options) {  
      this.el = options.el;  
      this.model = options.book;  
      this.listenTo(this.model, "change", this.render);  
    },  
    render: function() {  
      this.$el.empty();  
      var _html = _.template(template, this.model, { variable: 'book' } );  
      this.$el.append(_html);  
    }  
  });  
});
```



# WALKTHROUGH

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- ☐ QUICK DEMO OF BASIC BACKBONE.JS USAGE



BOOTSTRAP



# WHAT PROBLEM ARE WE TRYING TO SOLVE?

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- ☐ BUILDING VERY RICH INTERFACES
  - ☐ ON THE CLIENT SIDE
  - ☐ IN LESS DEVELOPMENT TIME
  - ☐ WITH LESS JAVASCRIPT
  - ☐ AND SUPPORT MULTIPLE DEVICES, WITH MINIMAL EFFORT

# WHAT IS BOOTSTRAP ?

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- ☐ FRONT-END WEB DEVELOPMENT FRAMEWORK DEVELOPED AT TWITTER
- ☐ DESIGNED TO EASE CROSS DEVICE DEVELOPMENT ...BOTH AESTHETICS AND BEHAVIOR
  - ☐ BROWSER, TABLET, PHONE, ETC.
- ☐ BASED ON "LESS" (A DYNAMIC CSS EXTENSION)
- ☐ GOBS OF BUILT IN FEATURES, BUT FULLY EXTENDABLE



# WHY BOOTSTRAP ?

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- ☐ DYNAMIC CSS BASED, MINIMIZING JAVASCRIPT NEEDED FOR RICH USER INTERFACE DEVELOPMENT
- ☐ FOCUSES ON MINIMALISTIC APPROACH TO WEB DESIGN
- ☐ VERY EFFICIENT USAGE PATTERNS, YET INTUITIVE
- ☐ RESPONSIVE LAYOUT
  - ☐ CHANGING CSS BASED ON DEVICE LAYOUT



# BOOTSTRAP FEATURES

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- ☐ RESPONSIVE 12 COLUMN GRID SYSTEM
- ☐ LAYOUT METAPHOR
- ☐ CUSTOMIZABLE BASE CSS
- ☐ LARGE COLLECTION OF GUI COMPONENTS
- ☐ GROWING COLLECTION OF JQUERY PLUGINS
- ☐ HTML5 BASED DYNAMIC CONTROLS



# WALKTHROUGH

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- ☐ QUICK DEMO OF BASIC BOOTSTRAP USAGE

# API DOCUMENTATION & REFERENCES

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- ☐ [HTTP://REQUIREJS.ORG](http://requirejs.org)
- ☐ [HTTP://UNDERSCOREJS.ORG](http://underscorejs.org)
- ☐ [HTTP://BACKBONEJS.ORG](http://backbonejs.org)
- ☐ [HTTP://TWITTER.GITHUB.COM/BOOTSTRAP/](http://twitter.github.com/bootstrap/)
- ☐ [HTTPS://GITHUB.COM/APPENDTO/JQUERY-MOCKJAX](https://github.com/appendto/jquery-mockjax)



# RECOMMENDED READING

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- ☐ [HTTP://WWW.INFOQ.COM/ARTICLES/MOBILE-ARCHITECTURE-HTML5-JAVASCRIPT](http://www.infoq.com/articles/mobile-architecture-html5-javascript)
- ☐ [HTTP://JAVASCRIPTPLAYGROUND.COM/BLOG/2012/07/REQUIREJS-AMD-TUTORIAL-INTRODUCTION](http://javascriptplayground.com/blog/2012/07/requirejs-amd-tutorial-introduction)
- ☐ [HTTP://NET.TUTSPLUS.COM/TUTORIALS/JAVASCRIPT-AJAX/GETTING-COZY-WITH-UNDERSCORE-JS/](http://net.tutsplus.com/tutorials/javascript-ajax/getting-cozy-with-underscore-js/)
- ☐ [HTTP://ARTURADIB.COM/HELLO-BACKBONEJS/](http://arturadib.com/hello-backbonejs/)
- ☐ [HTTP://JA.MESBROWN.COM/2012/04/ADVENTURES-IN-MOCKJAX/](http://ja.mesbrown.com/2012/04/adventures-in-mockjax/)
- ☐ [HTTP://WWW.WEBMONKEY.COM/2012/10/BOOTSTRAP-FRAMEWORK-PLANS-TO-GIVE-TWITTER-THE-BOOT/](http://www.webmonkey.com/2012/10/bootstrap-framework-plans-to-give-twitter-the-boot/)