



# ADVANCED JAVASCRIPT

KEYHOLE SOFTWARE LLC

# WHY JS?

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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)



# FRAMEWORKS

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- REQUIREJS
- UNDERSCOREJS
- BACKBONEJS
- BOOTSTRAP
- MOCKJAX



# REQUIRE.JS



# WHAT IS REQUIREJS ?

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- JAVASCRIPT MODULE LOADER
- ENCOURAGES MODULAR CODE
- IMPLEMENTS THE AMD SPECIFICATION
  - ALLOWS FOR MODULE AND DEPENDENCIES TO BE ASYNCHRONOUSLY LOADED
- LOAD SCRIPTS VIA "MODULES" USING "DEFINE" SYNTAX



# WHY REQUIRE.JS ?

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- ENCOURAGES MODULAR DEVELOPMENT
  - AS SUCH, USES MODULE IDS RATHER THAN URLS
- IMPROVES SPEED
- IMPROVES ORGANIZATION
- PROVIDES RUNTIME OPTIMIZATION

# 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
  - EXTENSION OF "MODULE PATTERN"



# 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

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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



# UNDERSCORE.JS



# WHAT IS UNDERSSCORE.JS ?

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- UTILITY BELT LIBRARY OF JAVASCRIPT
- DEFINES ~80 FUNCTIONS THAT PROVIDE
  - FUNCTIONAL PROGRAMMING
  - COLLECTION, ARRAY, UTILITY APIS
  - JAVASCRIPT TEMPLATING, CHAINING, ETC.
  - DELEGATES TO NATIVE BROWSER IMPLEMENTATIONS WHERE POSSIBLE (TO INSURE BEST POSSIBLE PERFORMANCE)

# WHY UNDERSCORE.JS ?

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- PROVIDES A PLETHORA OF USEFUL UTILITY FUNCTIONS
- FUNCTIONS ARE CROSS-BROWSER COMPATIBLE
- OPTIMIZED FOR PERFORMANCE



# WALKTHROUGH

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- QUICK DEMO OF BASIC UNDERScore.JS FUNCTIONALITY

The Backbone.js logo is a stylized, light blue wave shape. In the center of 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 IS BACKBONE.JS ?

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- JAVASCRIPT LIBRARY FOR BUILDING STRUCTURED WEB APPLICATIONS
- ADDS "STRUCTURE" TO THE CLIENT SIDE JS
- ESSENTIALLY MVC FOR THE CLIENT
- UTILIZES RESTFUL API FOR BACKEND COMMUNICATION
- LARGE AND REPUTABLE USER BASE
- WALMART, USA TODAY, HULU, WORDPRESS, MANY MORE...



# WHY BACKBONE.JS ?

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- FLEXIBILITY
  - SUPPLIES LIBRARY OF USEFUL OBJECTS, BUT NO "WIDGETS"
  - DOESN'T REINVENT JAVASCRIPT OBJECT MODEL
  - DOES NOT FORCE YOU TO A PARTICULAR TEMPLATE ENGINE
- SMALL/LIGHTWEIGHT
  - NO BUILT-IN PERFORMANCE PENALTY FOR USING IT
- SCALES WELL
  - CAN BE USED FOR LARGE-SCALE APPLICATIONS OR SIMPLE



# BACKBONE.JS FUNDAMENTALS

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MODEL\* :: A "BUSINESS" OBJECT W/ INCLUDED LOGIC

PROVIDES KEY-BINDING AND CUSTOM EVENTS

COLLECTION\* :: A "GROUP" OF MODEL OBJECTS

WITH FUNCTIONAL APIS FOR SORTING/FILTERING/AGGREGATION, ETC.

VIEW :: A LOGICAL "PIECE" OF THE UI

DECLARATIVE EVENT HANDLING

AGNOSTIC TO VIEW CREATION APPROACH

ROUTER :: MAPS URLS TO FUNCTIONAL CLOSURE

KEY TO "DEEP" LINKING INTO APPLICATION

\* 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 METHODS TO MANIPULATE IT
- EXTENSION OF BACKBONE.MODEL
  - WITH MODEL 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"
- CAN BIND "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
- EXTENSION OF BACKBONE.COLLECTION
  - WITH COLLECTION 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
  - ALLOWS FOR ANY TEMPLATING LIBRARY
- MAINLY ORGANIZATIONAL
- BACKED BY MODEL (OR COLLECTION OF MODEL)
- UPDATED VIA MODEL/COLLECTION EVENTS TIED TO "RENDER" METHOD



# BACKBONE.VIEW

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## BOOK.VIEW.JS

```
define(['jquery', 'underscore', 'backbone', './book.collection', 'text!./book-list.html'],
function($, _, Backbone, books, template) {
  return Backbone.View.extend( {
    el: 'div.books',
    collection: books,
    initialize: function() {
      this.render();
    },
    render: function() {
      this.$el.empty();
      var _html = _.template(template, this.collection, { variable: 'books' } );
      this.$el.append(_html);
    }
  });
});
```

# WHAT IS A BACKBONE ROUTER ?

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- PROVIDES METHODS FOR ROUTING CLIENT-SIDE REQUESTS
  - CONNECTING THEM TO ACTIONS AND EVENTS
- ALLOWS FOR "DEEP-LINKING" INTO OUR APPLICATIONS



# BACKBONE.ROUTER

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## ROUTER.JS

```
define(['backbone'], function(Backbone) {  
  return Backbone.Router.extend({  
    routes: {  
      'search/:query' : 'search',  
      'book/:id' : 'book'  
    },  
    search : function(query) {  
      ...  
    },  
    book : function(id) {  
      ...  
    }  
  });  
});
```

# WALKTHROUGH

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- QUICK DEMO OF BASIC BACKBONEJS USAGE





BOOTSTRAP

# WHAT IS BOOTSTRAP ?

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- FRONT-END WEB DEVELOPMENT FRAMEWORK
- BUILT 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
- 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 (LESS JS NEEDED FOR UI)



# WALKTHROUGH

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- QUICK DEMO OF BASIC BOOTSTRAP USAGE



MOCKJAX



# WHAT IS MOCKJAX ?

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- AJQUERY PLUGIN THAT PROVIDES AN INTERFACE FOR SIMULATING AJAX REQUESTS & RESPONSES

# WHY MOCKJAX?

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- PROVIDES A SOLUTION FOR CLEANLY SEPARATING FRONT-END & BACK-END DEVELOPMENT
- EASY TO USE :: JQUERY BASED
- FLEXIBLE & POWERFUL FEATURE SET



# WALKTHROUGH

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- QUICK DEMO OF BASIC MOCKJAX USAGE

# API DOCUMENTATION & REFERENCES

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- [HTTP://REQUIREJS.ORG](http://requirejs.org)
- [HTTP://UNDERSCOREJS.ORG](http://underscorejs.org)
- [HTTP://UNDERSCOREJS.ORG](http://underscorejs.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.TUTSPPLUS.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/)