



# Mobile Web UI Frameworks

IT 4403 Advanced Web and Mobile App

Jack G. Zheng  
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# Overview

- What is a mobile web framework
- Types of mobile web frameworks
- Popular products survey
- Bootstrap basics

# Framework



- A "framework" is
  - A fundamental structure for supporting or enclosing something else, especially a skeletal support used as the basis for something being constructed on.
- Types of software application framework
  - Full stack: ASP.Net
  - Frontend UI: Bootstrap
  - Frontend: Angular
  - Packaging: PhoneGap
  - JavaScript: AngularJS, Express.js
  - Architecture: AngularJS
  - Mobile app: Ionic, React
  - Data access: ORM
  - Communication: AJAX
  - Code organization: jQuery
  - Content management: WordPress

# Frontend Frameworks



- Frontend frameworks focus on development support for the browser environment
- Types
  - CSS framework: defining page's styles/themes
  - JavaScript framework/library: a layer built upon JavaScript to make programming more effective
  - Full stack frontend: both CSS and JS.

# User Interface Framework



- UI frameworks are emerging to become an accepted standard for building complex, consistent and maintainable presentation layer for a web application
- Often called CSS Frameworks for websites/applications
  - Because the heavy use of CSS
- More functional frameworks also come with more features and additional JavaScript based functions, but are mostly design oriented and unobtrusive. This differentiates these from functional and full JavaScript frameworks.

# UI Framework Capabilities



- Basic elements and features in a UI framework
  - A system of how things work together
  - CSS classes
  - Layout (grid) system
  - Typography
  - CSS resets
  - Frequently used components/Controls/widgets
  - Interactions/Effects/animations
  - Baseline styles and themes, icons,
  - Browser/environment compatibilities
  - Integration with other components/frameworks
- Flexibility, extensibility, generalizability

# Why Using UI Frameworks



- Define an architecture of how things work together, a system.
- Support common and best practices, such as responsive design, grid based layouts.
- Promote consistency, predictability, and standardization across projects
- Simplify application development and support rapid application development
- Enable a loose coupling between presentation and business implementation.
- Avoid repeat lower level development work like handling browser/device compatibility and CSS resets.
- Provide preconfigured ready-to-use styles, themes, UI elements, components, and plug-ins.
- Allow extensibility and customizability



# Not To Use?

- It's like Home Depot vs. Ikea's way of building furniture.
- Frameworks generally limit flexibility in some extent
- They define a certain way of doing things and require compliance
- Need further knowledge and training of using frameworks
- People may not really understand how a framework works

# Mobile Web Frameworks



- Responsive UI Frameworks: these frameworks supports UI design on screens of various sizes
  - Bootstrap <http://getbootstrap.com>
  - Foundation <http://foundation.zurb.com>
  - Framework 7
  - <http://materializecss.com/>
  - <http://www.material-ui.com>
  - <http://cssframeworks.org>
- HTML 5 mobile app: these frameworks mainly supports mobile devices, giving an app-like look and feel, and optimized for touch
  - jQuery Mobile <https://jquerymobile.com>
  - iUI <http://www.iui-js.org>
- Other mobile frameworks that are not just UI
  - Angular
  - React
- Other mobile (cross device) app frameworks that utilizes web technologies
  - Ionic <http://ionicframework.com>
  - Ext JS <https://www.sencha.com/products/extjs/>
  - Appcelerator <https://www.appcelerator.com/mobile-app-development-products/>
- More: <http://mobile-frameworks-comparison-chart.com/>

# Alternatives



- Boilerplate
  - A bare minimum frameworks providing you with only enough to get started.
  - <https://html5boilerplate.com/>
- Grid system
  - Grid Systems are a little more advanced than boilerplates. They focus more around building up a series of CSS classes that will form the grid system for page layouts.
- <https://responsivedesign.is/strategy/page-layout/should-i-use-a-responsive-framework-for-my-site>

# Bootstrap



- Bootstrap is a free and open-source UI framework for creating websites and web applications.
- Bootstrap is a front end web framework, that is, an interface for the user, unlike the server-side code which resides on the "back end" or server.
- Bootstrap, originally named Twitter Blueprint, was developed by Mark Otto and Jacob Thornton at Twitter as a framework to encourage consistency across internal tools.
- It was not responsive originally



# Bootstrap Adoption

- Bootstrap has become very popular and is the number 1 UI framework used in websites

- Bootstrap is the most popular CSS framework, constantly in the top rankings and ratings.

- <https://gitstar-ranking.com/>
- <https://www.sitepoint.com/most-popular-frontend-frameworks-c>
- <https://www.themexpert.com/blog/top-5-responsive-css-framework>
- <https://scotch.io/bar-talk/6-popular-css-frameworks-to-use-in-20>
- <https://www.altexsoft.com/blog/engineering/most-popular-responsive-bootstrap-foundation-materialize-pure-and-more/>
- <https://www.keycdn.com/blog/front-end-frameworks>
- <https://cssauthor.com/html5-mobile-ui-framework/>

- Notable sites using Bootstrap

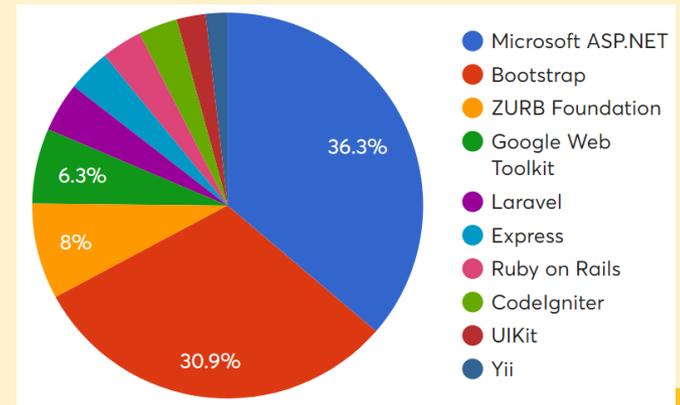
- <http://www.dell.com>
- <http://www.uh.edu> and <http://www.auburn.edu>
- <https://www.gliffy.com>

- More example sites

- <http://expo.getbootstrap.com>

Coverage Totals	
<b>Quantcast Top 10k</b> 1,433 of 10,000	<b>14.3%</b>
<b>Quantcast Top 100k</b> 17,266 of 100,000	<b>17.3%</b>
<b>BuiltWith Top Million</b> 178,983 of 969,294	<b>18.5%</b>
<b>Entire Internet</b> 13,474,785 of 374,866,433	<b>3.6%</b>

<http://trends.builtwith.com/docinfo/Twitter-Bootstrap>



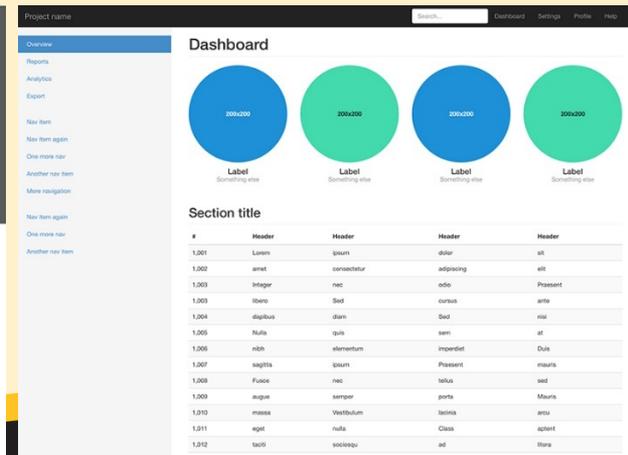
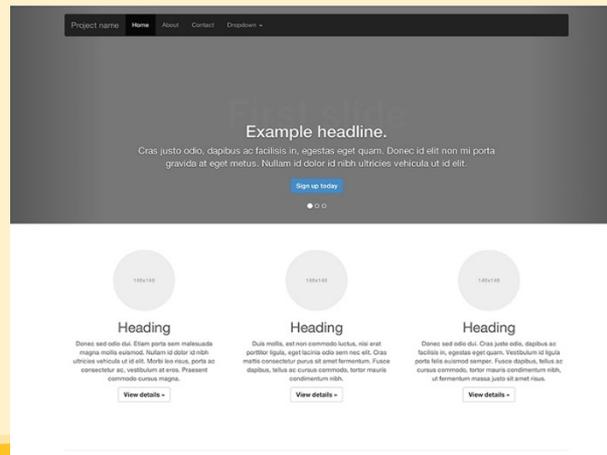
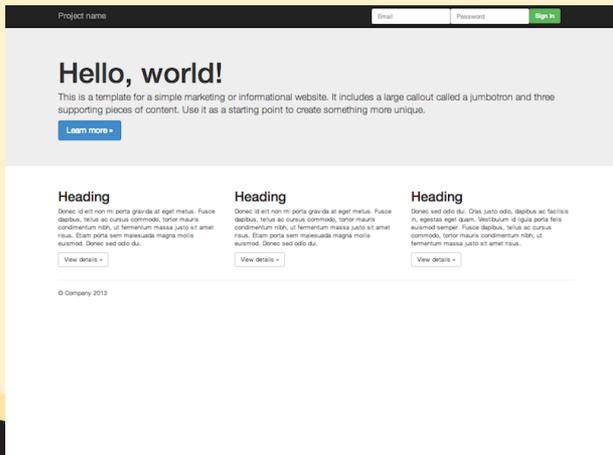
<https://wappalyzer.com/categories/web-frameworks>





# Quick First Impressions

- Examples
  - Starter template with jumbotron: <https://getbootstrap.com/docs/4.3/examples/jumbotron/>
  - Dashboard with fixed left bar: <https://getbootstrap.com/docs/4.3/examples/dashboard/>
- More examples and themes
  - <https://getbootstrap.com/docs/4.0/examples/>
  - <https://getbootstrap.com/docs/4.3/examples/>
  - <http://startbootstrap.com>
  - <http://www.bootply.com/new> (see the templates on the left menu)



# Bootstrap Key Components



- CSS
  - Global CSS settings, fundamental HTML elements styled and enhanced with extensible classes, and an advanced grid system.
- Components
  - Reusable UI components like menus, tables, forms.
- JavaScript
  - Provide interactivity to some UI components

# Bootstrap Key Basics



- Intro <https://getbootstrap.com/docs/4.3/getting-started/>
- Layout <https://getbootstrap.com/docs/4.3/layout/overview/>
- Table <https://getbootstrap.com/docs/4.3/content/tables/>
- Menu <https://getbootstrap.com/docs/4.3/components/navs/>
- Menu bar <https://getbootstrap.com/docs/4.3/components/navbar/>
- Forms <https://getbootstrap.com/docs/4.3/components/forms/>

# Responsive Features



- Fluid grid system (v4 uses flexbox)
- Many elements are already responsive, or classes defined for responsiveness
  - Navigation, Menu
  - Form
  - Table

# Bootstrap Weakness



- They layout is strictly grid (rows and columns) based; not for some creative and artistic sites
- Layout size difficult for fine tuning
- More
  - <http://www.htmlcenter.com/blog/the-bootstrap-framework-controversy-should-you-use-it-or-not/>



# Bootstrap Resources



- Pocket guide: <http://bootstrap4.guide>
- Tutorials
  - <http://www.w3schools.com/bootstrap/>
  - [https://www.youtube.com/playlist?list=PLUoqTnNH-2Xz\\_BUrjcahKWDhPcUj-FTOt](https://www.youtube.com/playlist?list=PLUoqTnNH-2Xz_BUrjcahKWDhPcUj-FTOt)
  - [https://www.youtube.com/playlist?list=PLVDYxb1dYhnqUn0\\_liNeONyicF1Y3ajLp](https://www.youtube.com/playlist?list=PLVDYxb1dYhnqUn0_liNeONyicF1Y3ajLp)
  - <http://www.w3resource.com/twitter-bootstrap/tutorial.php>
  - <http://webdesign.tutsplus.com/series/bootstrap-3-succinctly>
- Example sites: <http://builtwithbootstrap.com>
- Generators, code testing, and playground
  - Playground <http://www.bootply.com> and <http://www.codeply.com>
  - Style generation tool: <http://stylebootstrap.info>
  - Menu generator: <http://bootstrap3-menu.codedorigin.com>
  - Boilerplate <http://www.initializr.com>
- Snippets, themes, and templates
  - Templates, themes, code snippets, components <http://www.bootbundle.com>
  - Element gallery code snippet: <http://bootsnipp.com>
  - Free themes <http://bootswatch.com> and <http://startbootstrap.com>
  - Theme marketplace <https://wrapbootstrap.com> and <http://bootstrapbay.com>
- Bootstrap for WordPress
  - Theme for WordPress: <https://wordpress.org/themes/search/bootstrap/>
  - <https://www.youtube.com/playlist?list=PLKIA1QwYBcmdWMz5fg7q5qIMbvCg5Ug0>

# Bootstrap and jQuery Mobile Comparison



- Bootstrap
  - Started as a desktop web CSS framework
  - Growing into responsiveness, but not necessarily touch screen optimized.
- jQuery Mobile
  - Started as a framework to build mobile apps
  - Optimized for small touch screens.
- Which one?
  - <http://www.gajotres.net/bootstrap-or-jquery-mobile-pros-and-cons/>

# Frontend Frameworks Resources



- Comparison and selection tools
  - <http://mobile-frameworks-comparison-chart.com>
  - <http://cssframeworks.org>
  - <http://usablica.github.io/front-end-frameworks/compare.html>
- Online tools
  - <http://www.codeply.com>