

# Single Page Applications

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# Web Apps and Browsers

- Web apps run in browsers (by definition)
- Users are use to browsing in browsers
  - Browser maintains a history of URLs visited
    - Back button - Go back in history to previous URL
    - Forward button - Go forward in history to next URL
  - Can move to a different page
    - Typing into location bar or forward/back buttons
    - Selecting a bookmarked URL
    - Page refresh operation
- Browser tosses the current JavaScript environment when navigating to a different page
  - Problematic for JavaScript frameworks: URL (and cookies) are the only information preserved

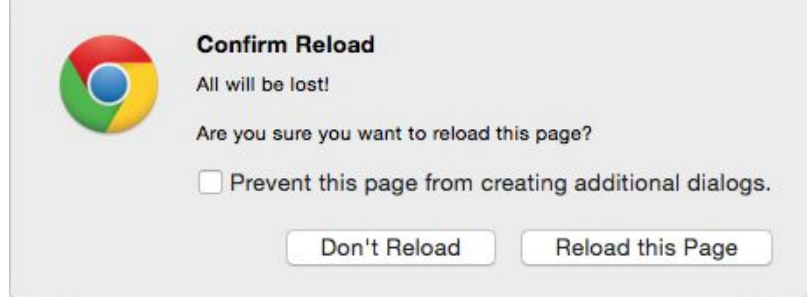
# Problem with some web apps

- Initial: pages served from web server
  - Each page had a URL and app switched between pages served by web server
- Early JavaScript apps: Website a single page/URL with the JavaScript

Problem: Restart web app on navigation (Can lose a lot of work!)

```
window.onbeforeunload = function(e) { return 'All will be lost!'; }
```

- Users expect app in browser to do the right thing:
  - Navigate with forward and back buttons, browser page history
  - Navigate away and come back to the app
  - Bookmark a place in the app
  - Copy the URL from the location bar and share it with someone
  - Push the page refresh button on the browser



# Changing URL without page refresh

- Can change hash fragment and query parameters in URL without reload

`http://example.com`

`http://example.com#fragment`

`http://example.com?id=3535`

`http://example.com?id=3535#fragment`

- HTML5 give JavaScript control of page reload

# Deep linking

- Concept: the URL should capture the web app's context so that directing the browser to the URL will result the app's execution to that context
  - Bookmarks
  - Sharing

- Context is defined by the user interface designer!

Consider: Viewing information of entity and have an edit dialog open

Should the link point to the entity view or to the entity & dialog?

Does it matter if I'm bookmarking for self or sharing with others?

How about navigating away and back or browser refresh?

# Deep linking in Single Page Apps

Two approaches:

1. Maintain the app's context state in the URL
  - + Works for browser navigation and refresh
  - + User can copy URL from location bar
2. Provide a share button to generate deep linking URL
  - + Allows user to explicitly fetch a URL based on need
  - + Can keep URL in location bar pretty

Either way web app needs to be able to initialize self from deep linked URL

# Ugly URLs

`http://www.example.org/dirmod?sid=789AB8&type=gen&mod=Core+Pages&gid=A6CD4967199`

versus

`http://www.example.org/show/A6CD4967199`

What is that ugly thing in the location bar above my beautiful web application?

`https://www.flickr.com/photos/jarnasen/24593000826/in/explore-2016-01-26/`

# Angular Support for SPA

- Idea: Do client-side routing of URLs to view components
  - Several different Angular URL routing frameworks written, no clear winner at this point
- `ngRoute` - provides routing and deep linking
  - We'll use this one in class
- `ngRoute` is an Angular API that provides:
  - A directive (`ngView`) to indicate where view components should be inserted in template
  - A service (`$route`) that watches `window.location` for changes and updates the displayed view.
  - A configuration (`$routeProvider`) that allows the user to specify the mappings of URLs to view components.



# Using ngRoute

- In a view template (frequently the "shell" of the web application)

```
<div ng-view></div>
```

- In your Angular module add ngRoute as a dependency

```
angular.module('cs142App', ['ngRoute'])
```

- Configure the routing table in a module config block

```
cs142App.config(['$routeProvider', function($routeProvider) {
```

# ngRoute - Specify URL $\Rightarrow$ View mapping

```
cs142App.config(['$routeProvider', function($routeProvider) {  
    $routeProvider  
        .when('/Book/:bookId', {  
            templateUrl: 'book.html',  
            controller: 'BookController',  
        })  
        .when('/Book/:bookId/ch/:chapterId', {  
            templateUrl: 'chapter.html',  
            controller: 'ChapterController'  
        });  
}]);
```

# ngRoute - Passing parameters to controllers

```
<a href="#!/Book/Moby">...</a>
```

```
cs142App.controller('BookController', ['$routeParams',  
  function($routeParams) {  
    $routeParams.bookId // Will be "Moby"  
  }]);
```

```
<a href="#!/Book/Gatsby/ch/3">...</a>
```

```
cs142App.controller('ChapterController', ['$routeParams',  
  function($routeParams) {  
    $routeParams.bookId // Will be "Gatsby"  
    $routeParams.chapterId // Will be "3"  
  }]);
```

# ngRoute handles query params as well

```
<a href="#!/Book/Moby?noShow=true&upsideDown=Yes">...</a>
```

```
cs142App.controller('BookController', ['$routeParams',  
  function($routeParams) {  
    $routeParams.bookId // Will be "Moby"  
    $routeParams.noShow // Will be "true"  
    $routeParams.upsideDown // Will be "Yes"  
  }]);
```

# Example

SortTab - no ResponsiveSortTab - ResponsiveSortTab - Responsive with Scroll

All Columns

Records 110 of 49

reset

ID	Name	Phone	Email	Birthdate	Last Access	Rating	Time	Salary	Score
24	Alexandra Nixon	(422) 644-3488	nixon.alex@coria.com	12/01/1981	February 25, 2001	-1	41%	\$46,672	7.5
17	Aisa Monroe	(859) 974-4442	aisa.lla@aram.edu	02/14/1990	April 30, 2003	6	95%	\$103,999	5.9
10	Baker Osborn	(378) 371-6559	turns.baker@ec.edu	03/29/1970	July 23, 2005	-7	61%	\$2,868	0.1
9	Caldwell Larson	(850) 562-3177	slr@dolor.com	07/20/1983	June 22, 2004	-3	81%	\$63,736	7.5
25	Charissa Manning	(438) 395-9392	rb.vuata@necon.org	07/01/1980	April 02, 2005	-8	11%	\$32,199	3.5
48	Charly Hahn	(395) 200-9188	ac@Quous.edu	06/04/1976	January 17, 2009	-2	88%	\$3,246	5.5
30	Donan Hodge	(304) 536-8850	selous@lacrest.org	06/16/1978	February 21, 2007	6	6%	\$28,057	0.1
1	Ezekiel Hart	(627) 536-4760	torlor@est.ca	12/02/1962	March 26, 2009	-7	7%	\$73,229	6.9
12	Fletcher Briggs	(992) 962-9419	amel.arta@lenore.edu	06/12/1971	December 12, 2006	7	23%	\$142,448	8.9
40	Fritz Benton	(525) 353-2984	a@diamunt.com	10/02/1957	June 16, 2002	-3	2%	\$75,654	8.9
								\$3,442,036	
						0.8	44.1%	\$70,246	5.19

1

view all

10

Entries Per Page

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What to keep in URL: table length, viewport in table, search box, sort column, etc.  
Is it different for bookmark or share? Nav away and back?

# Example: Not everything goes in URL

Angular JS Crud Grid

This is a running demo of the Angular JS CRUD Grid I describe in my blog:

Angular JS CRUD Grid  
softwarejuancarlos.com

### Delete 'Eggs'

Are you sure you want to remove this item?

		Name	Expire Date
		Milk	Sunday, October 5, 2014
		Eggs	Sunday, October 5, 2014
		Steak	Saturday, September 20, 2014
		Oranges	