

AIChE/CACHE Mobile Device APP Competition

Robert P. Hesketh

29 October 2012

Rowan University

Computing and Technology In Chemical Engineering
Education

Monday, October 29, 2012: 3:15 PM-5:45 PM

328 (Convention Center)

hesketh@rowan.edu

Mobile Device App Competition

Presentation:

The competition at the AIChE annual meeting will consist of a poster competition where finalists will be selected to give a short presentation to a general audience at the conference in San Francisco, CA on November 3, 2013.

Instructions:

Before submitting an application or making inquiries, make sure you read the complete document on this competition, covering its objectives, rules, judging criteria, and how the app and poster will be demonstrated at the conference.

[AIChE/CACHE APP Complete Documentation](#)

The AIChE/CACHE APP competition Committee consists of Chau-Chyun Chen, Scott Fogler, Robert Hesketh, Jason Keith, Concetta LaMarca.

Questions about this competition can be directed to:

Email: hesketh@rowan.edu
Robert P. Hesketh
Professor and Chair
Chemical Engineering
Rowan University
201 Mullica Hill Rd.
Glassboro, NJ 08028-1701
Phone: (856) 256-5313

October 28 – November 2 • Pittsburgh, PA

Giving Back.

Donations small and large and make a difference, and remember all gifts to the AIChE Foundation are tax-deductible.

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Student AIChE/CACHE Mobile Device APP Competition

- Prizes

- \$500 from CACHE for the first place winner of the best mobile device APP
- \$500 from a corporate sponsor for the best mobile device APP that addresses safety.

- Timeline:

- Intent to submit December 1, 2012
- Preliminary APP and Technical Documentation Submission February 2013 through website upload (details to be announced)
- Final APP and Technical Documentation Submission 10/1/2013
- Poster Competition – 11/03/2013 San Francisco, CA

APP Competition - Rules

- Student teams must consist of fulltime students
- Student teams can consist of any discipline, but at least half of the team must be members of the AIChE
- Student developed APPs can be constructed using existing software templates and components.
- The final APP must be an original creation of the team.
- Submissions must comply with intellectual property rules (e.g. copyright etc.)
- The student team must have at least one team member presenting at Annual Meeting.
- The App must be able to run on a mobile device that uses one of these operating Systems: Android, BlackBerry, iPhone, Palm, Symbian, or Windows Mobile.

APP Competition - Judging

- Creativity and uniqueness of the APP (15%)
- Usefulness of the APP (20%)
- Ease of use of the APP (15%)
- Professional and/or Societal Impact of APP (20%)
- Poster Presentation which includes demonstration of APP on a mobile device at AIChE Annual Meeting (30%)

Submission -1 October 2013

1 month before San Francisco Meeting

- Description of the APP and equations
- Flow chart illustrating how the APP works
- Sufficient worked-out examples to verifying the utility of the APP
- Description of broad impacts of chemical engineering on society
- Sources of technical information
- Sources of software code that were used in APP
- APP Code

What should students do?

- Form multidisciplinary teams (CS, EE, etc.) NOW
- Recruit a member that likes to program – even better has programmed apps in a previous course
- Decide on mobile device (e.g. iphone is OS 6 using Objective C; Android's use Java.
- Download software

Activities to Promote Competition

- AIChE Website
- CACHE Website and Newsletter
- Email Sent to Student Chapters
- AIChE Meeting
 - 2 Workshops at Student meeting -120 students (42 emails from students so far)
 - Brochures at Student Networking Brunch – 500 students
 - This session



Need Help with Promoting Competition

- Need help from faculty to promote competition (best method)
 - Can you talk to your students?
 - Tuesday Meeting with Student Chapters Committee
- AIChE - Michelle S. Marsnick
 - Blog for students
 - share point site
- Facebook Page on Competition

Characteristics of a Great App

- Why would you want your App on a mobile device?
- Exploit the mobile device features
 - Address book, contacts, and calendar
 - Camera and photos
 - Audio and video
 - Access the internet – get information from online databases
 - Maps and location
 - Accelerometer functions for orientation and motion

Search for similar apps

- Don't reinvent the wheel. Find an Apple sample app that closely mimics your app. Then strip out the Apple stuff and integrate your own code into this working sample shell. (Credit the original App)
- Learn from others' mistakes. Go grab a couple of apps from the iTunes App Store that are representative of your competition. Use what they did right, and seriously avoid what they did wrong.
- Mine the superhighway for clever programming tricks. When you're stumped (and you will be... several times or more!), search the Web for a code snippet or fragment that deftly handles a problem similar to yours.

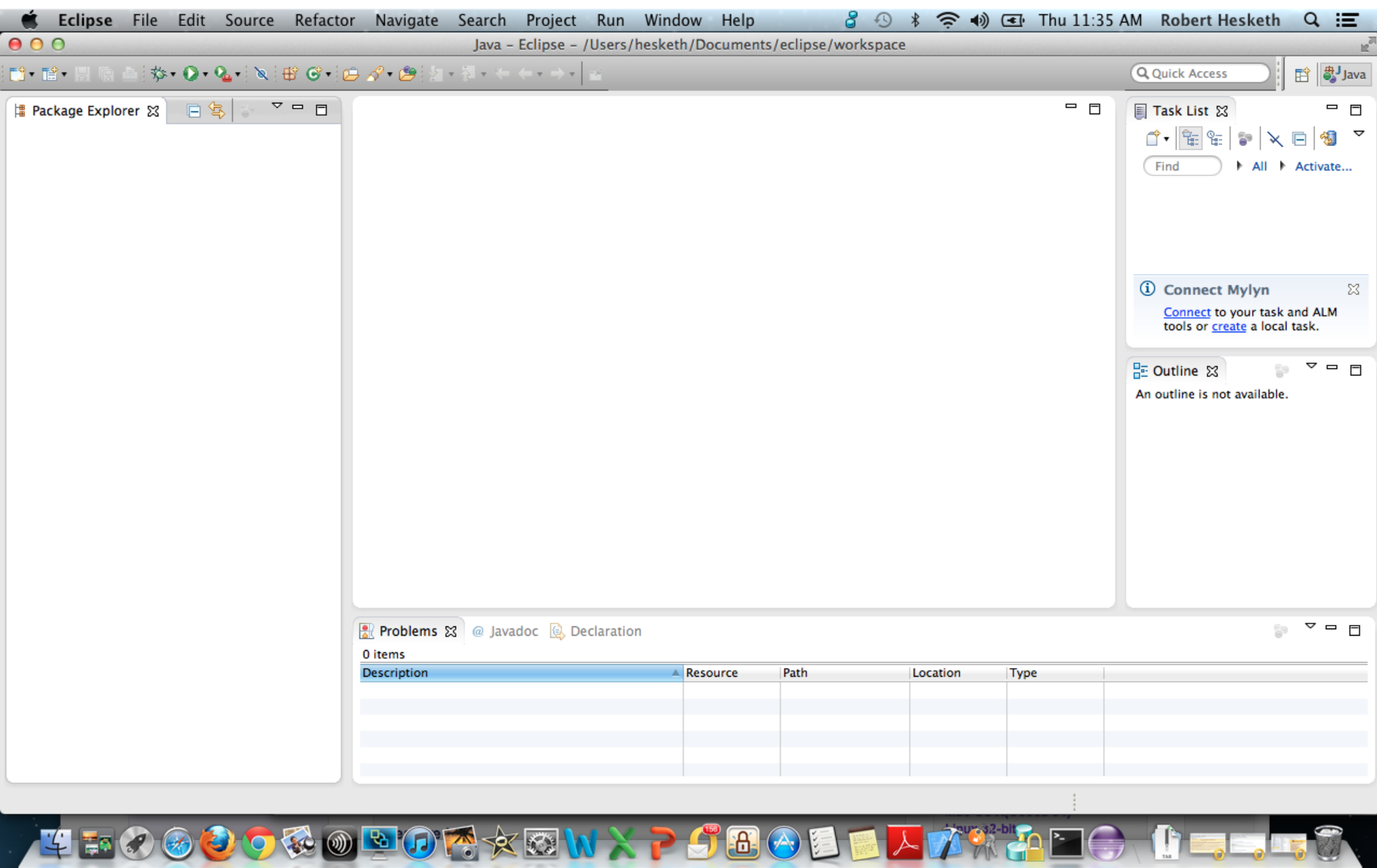
Android

- Check to see if you have Java Development Kit (JDK)
- Download Android Software Development Package (SDK) Package (follow instructions on website)
- Install Eclipse (Integrated Development Environment – IDE) (Eclipse IDE for Java Developers)
- Install Eclipse Plugin
- Create simulator
- Use Tutorials
 - web
 - Dummies Guides



Developers

Eclipse - IDE



Eclipse Plugin

Install the Eclipse Plugin through the Eclipse

- Start Eclipse, then select **Help > Install New Software**.
- Click **Add**, in the top-right corner.
- In the Add Repository dialog that appears, enter "ADT Plugin" for the *Name* and the following URL for the *Location*: <https://dl-ssl.google.com/android/eclipse/>
- Click **OK**.

Install Android Virtual Device

- Create a device using the Window=>AVD manager
- Select
 - Platform
 - SD card size
 - Etc.

The screenshot shows the 'Create new Android Virtual Device (AVD)' dialog box. The fields are as follows:

- Name: GenericAndroidPhone
- Target: Android 4.1.2 - API Level 16
- CPU/ABI: ARM (armeabi-v7a)
- SD Card:
 - ☒ Size: 1000 MiB
 - ☐ File: Browse...
- Snapshot: ☐ Enabled
- Skin:
 - ☒ Built-in: Default (WVGA800)
 - ☐ Resolution: x
- Hardware:

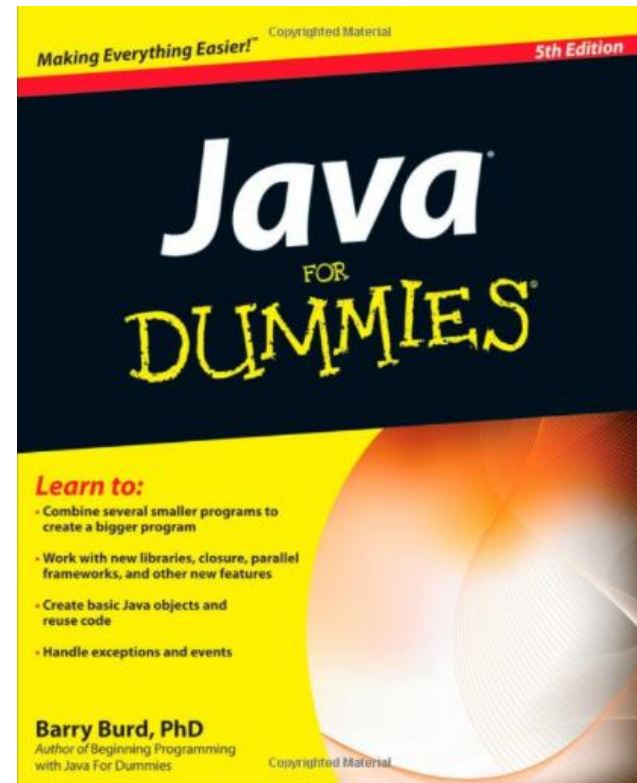
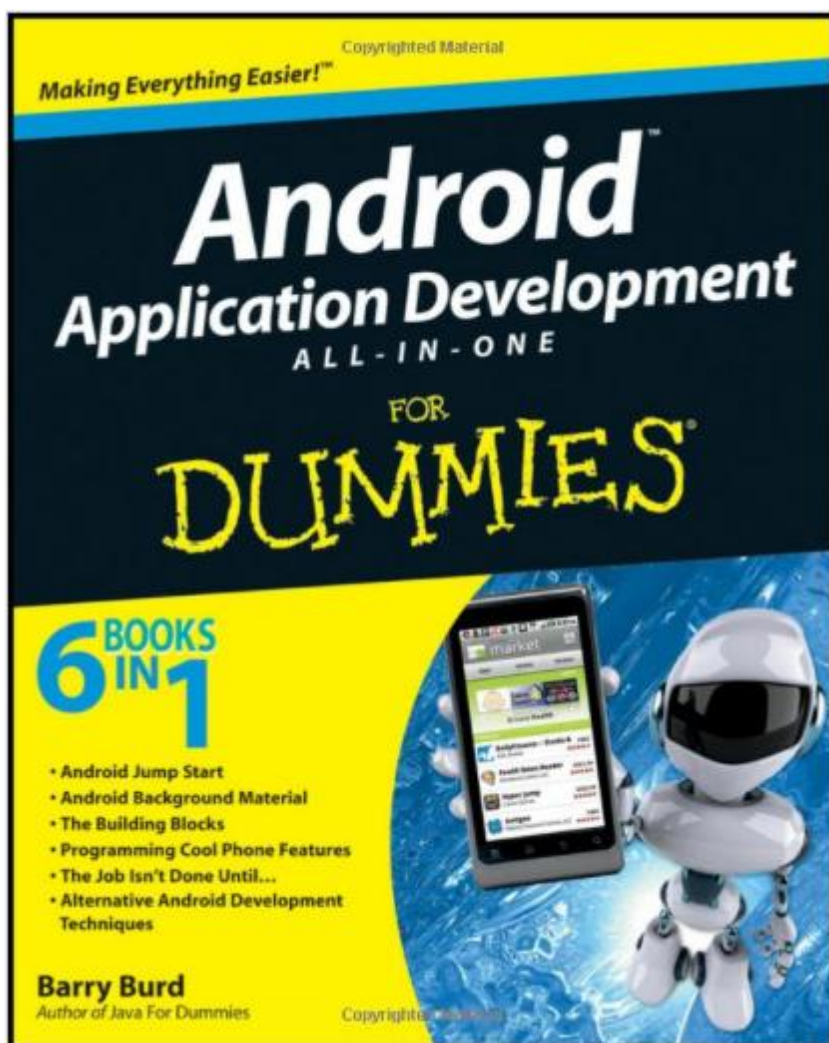
Property	Value	
Abstracted LCD density	240	
Max VM application hea...	48	
Device ram size	512	

New... Delete

☐ Override the existing AVD with the same name

Cancel Create AVD

Use Tutorials such as the Dummies Guide

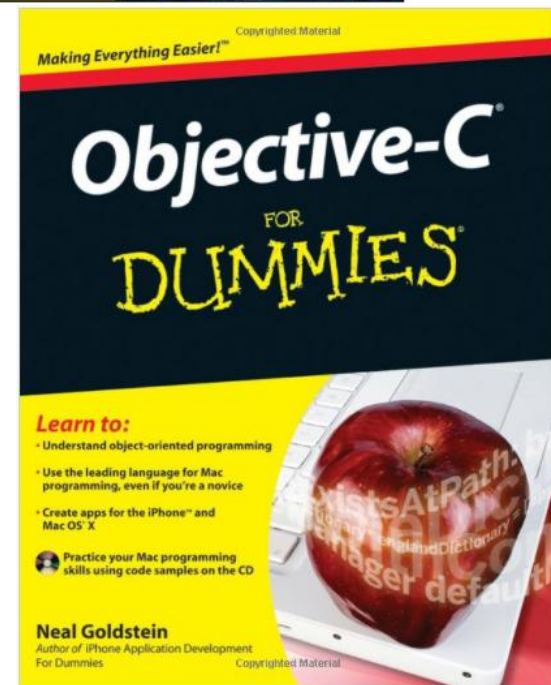
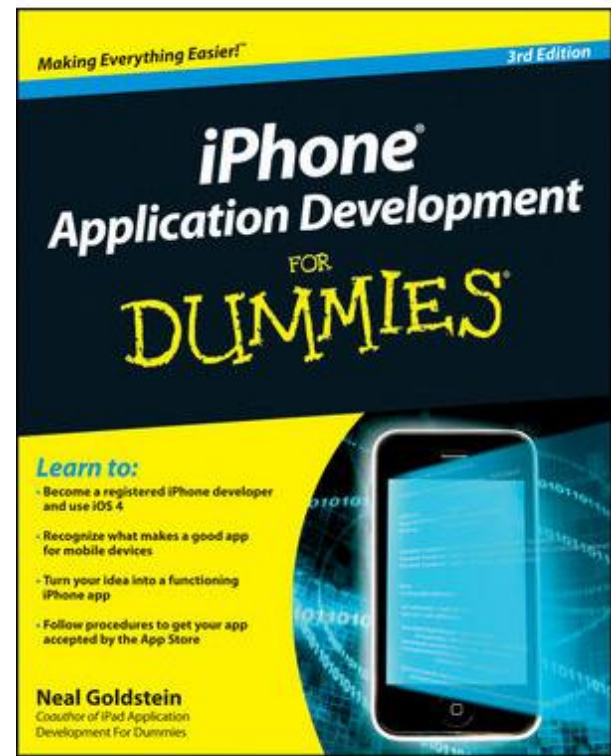


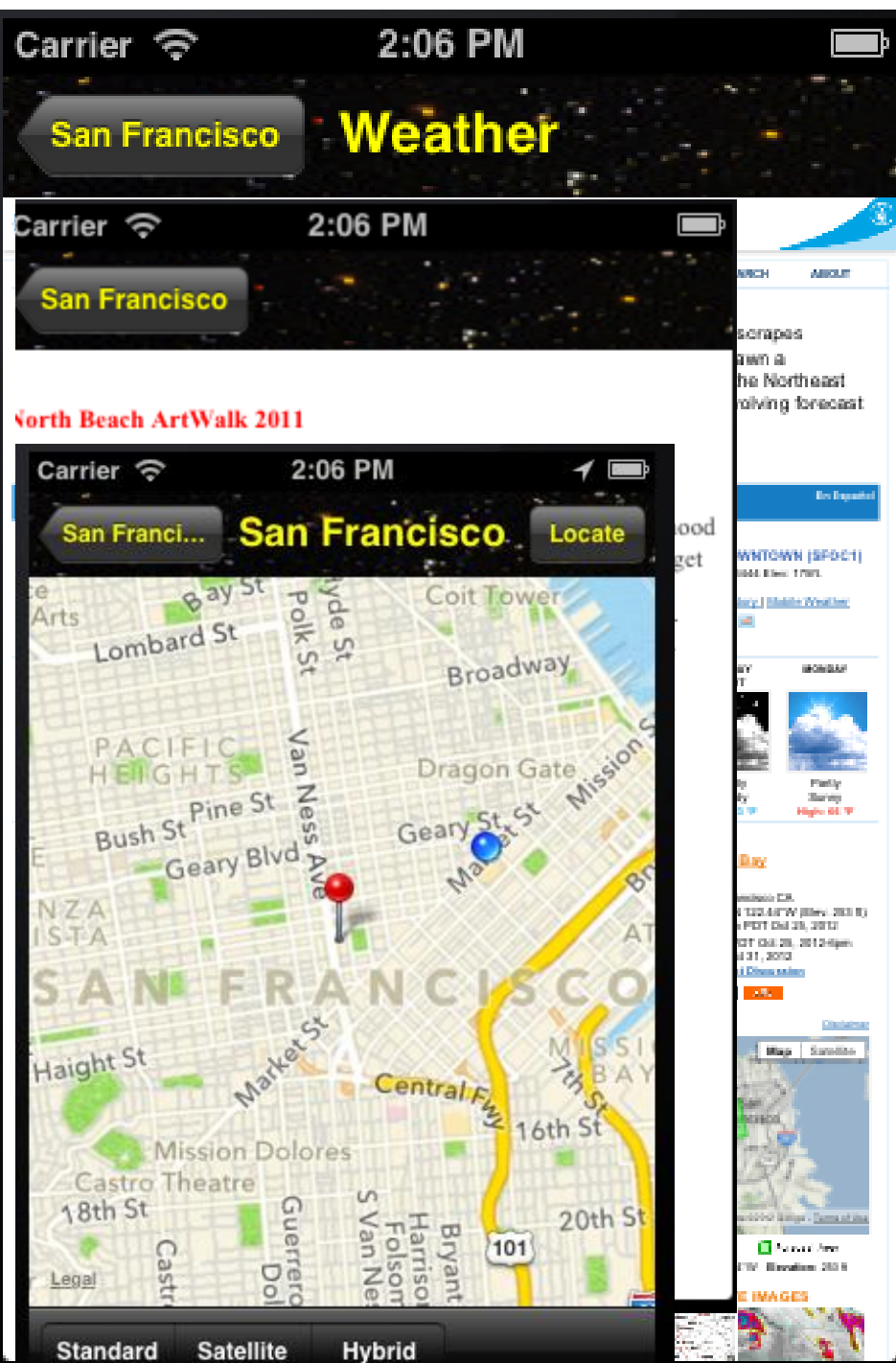
iPhone

- It is very useful to have a team member with an apple computer!
- Download latest version of Xcode from the Mac App Store
- Use Tutorials
 - Xcode has tutorials – “Hello World”
 - Dummies Guides
- To load your App to a real phone
Subscribe to the iPhone Developer Program (\$99 + sales tax!)

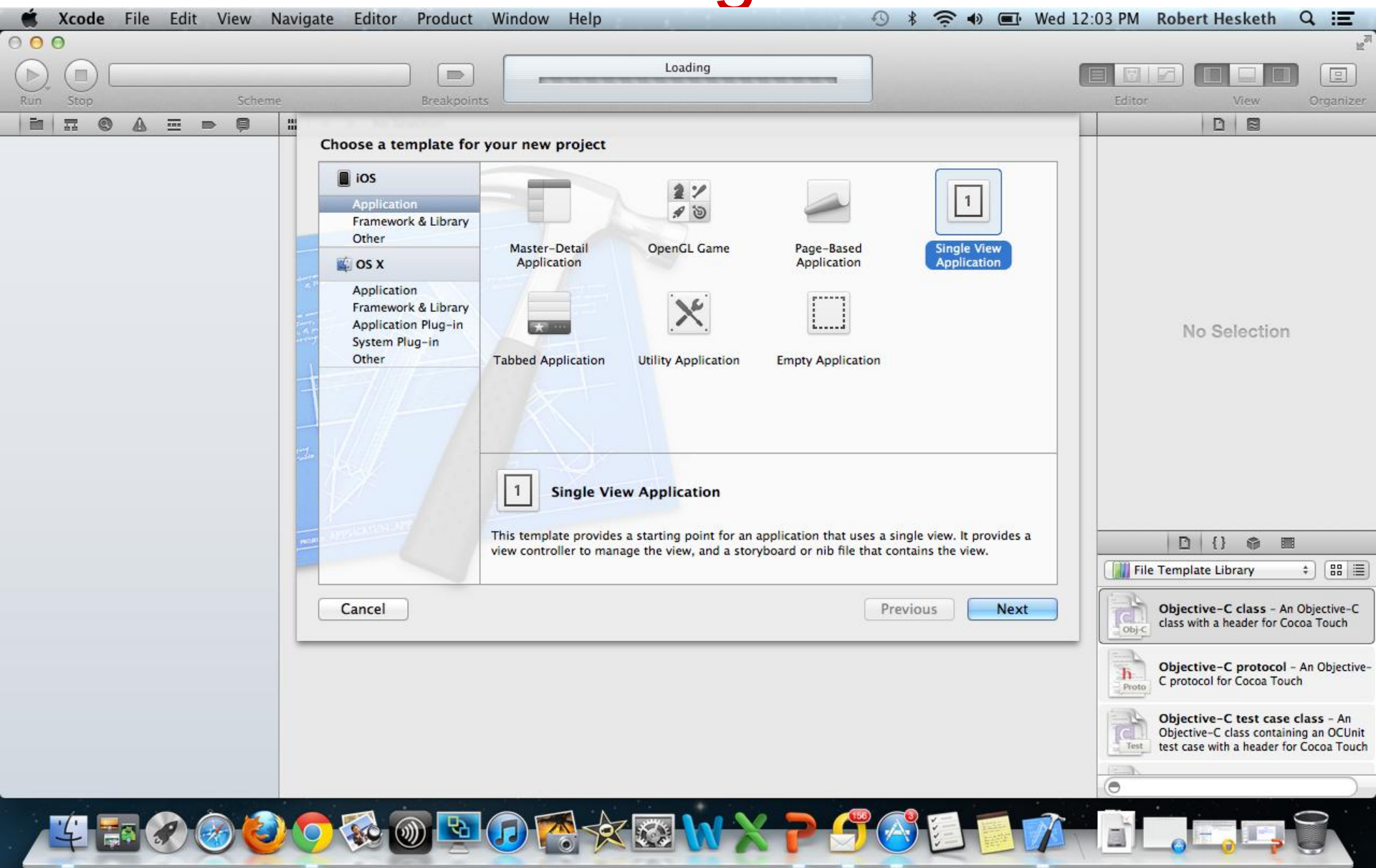
Using the Dummies Guide

- iPhone Application Development - Step by Step procedure to create an App titled Road Trip
- Objective-C
- By Neal Goldstein
- Can a professor who learned only Fortran do this?

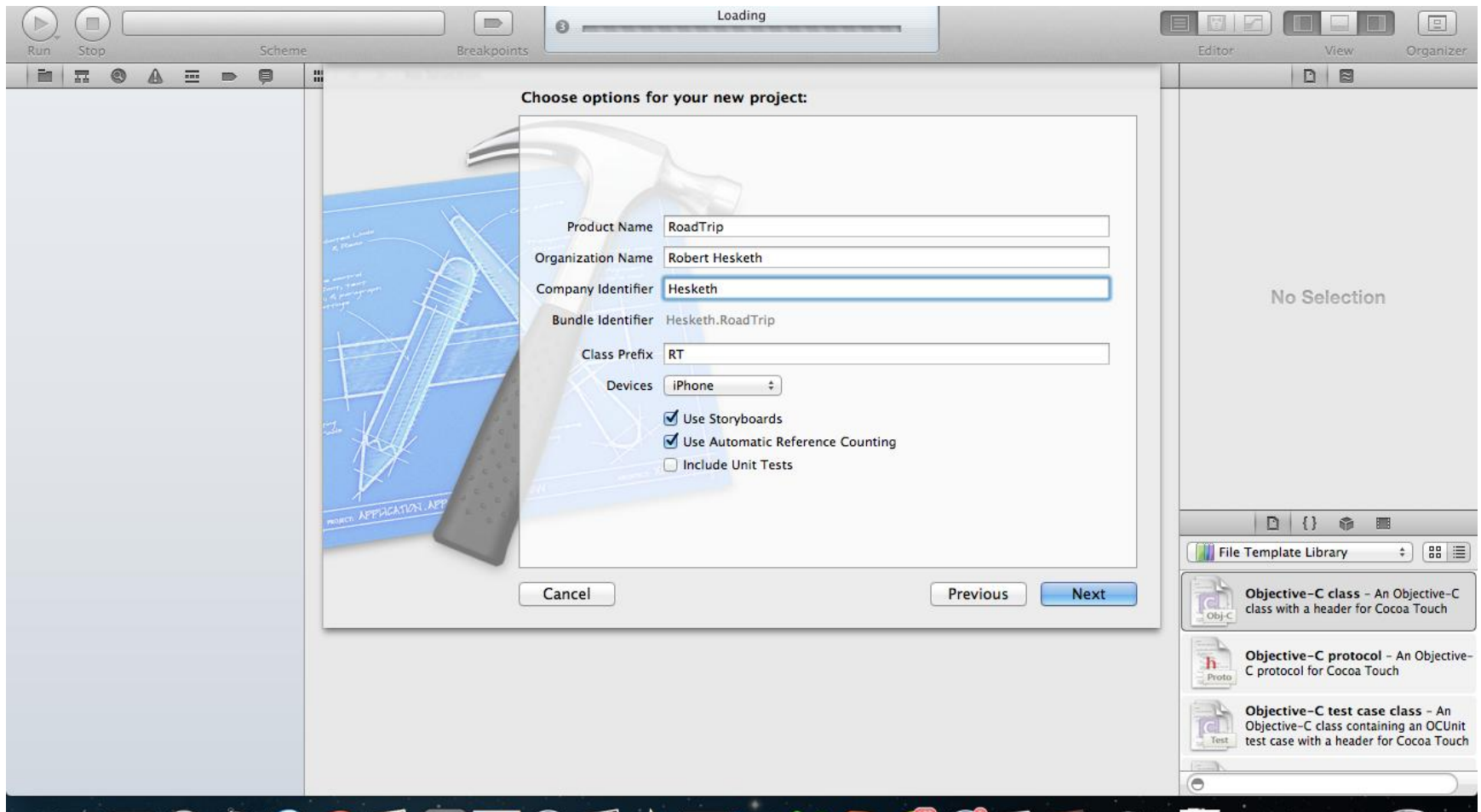




Start using Xcode



Project Options



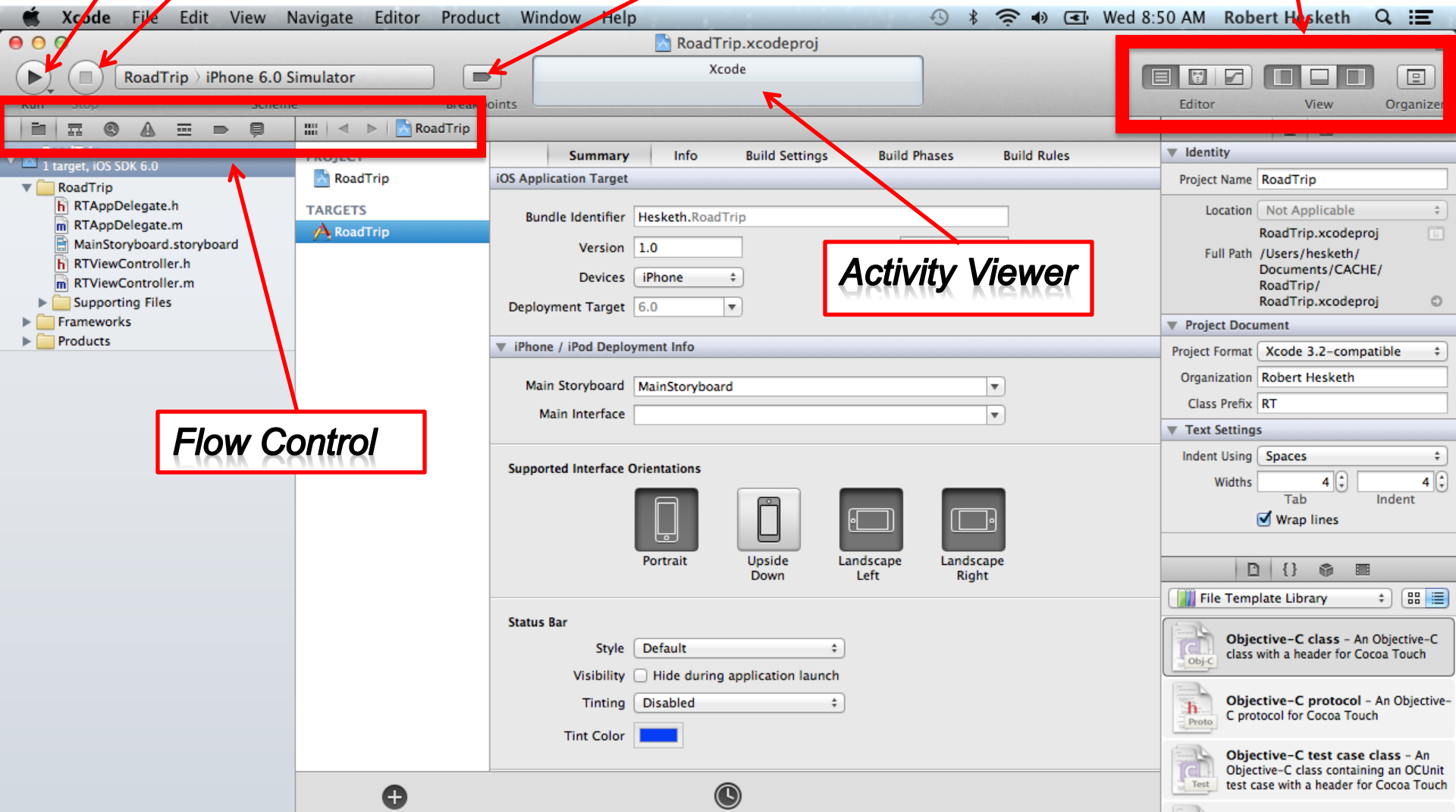
Run the Code

Stop Code

The Project

**Debugger -
Breakpoints**

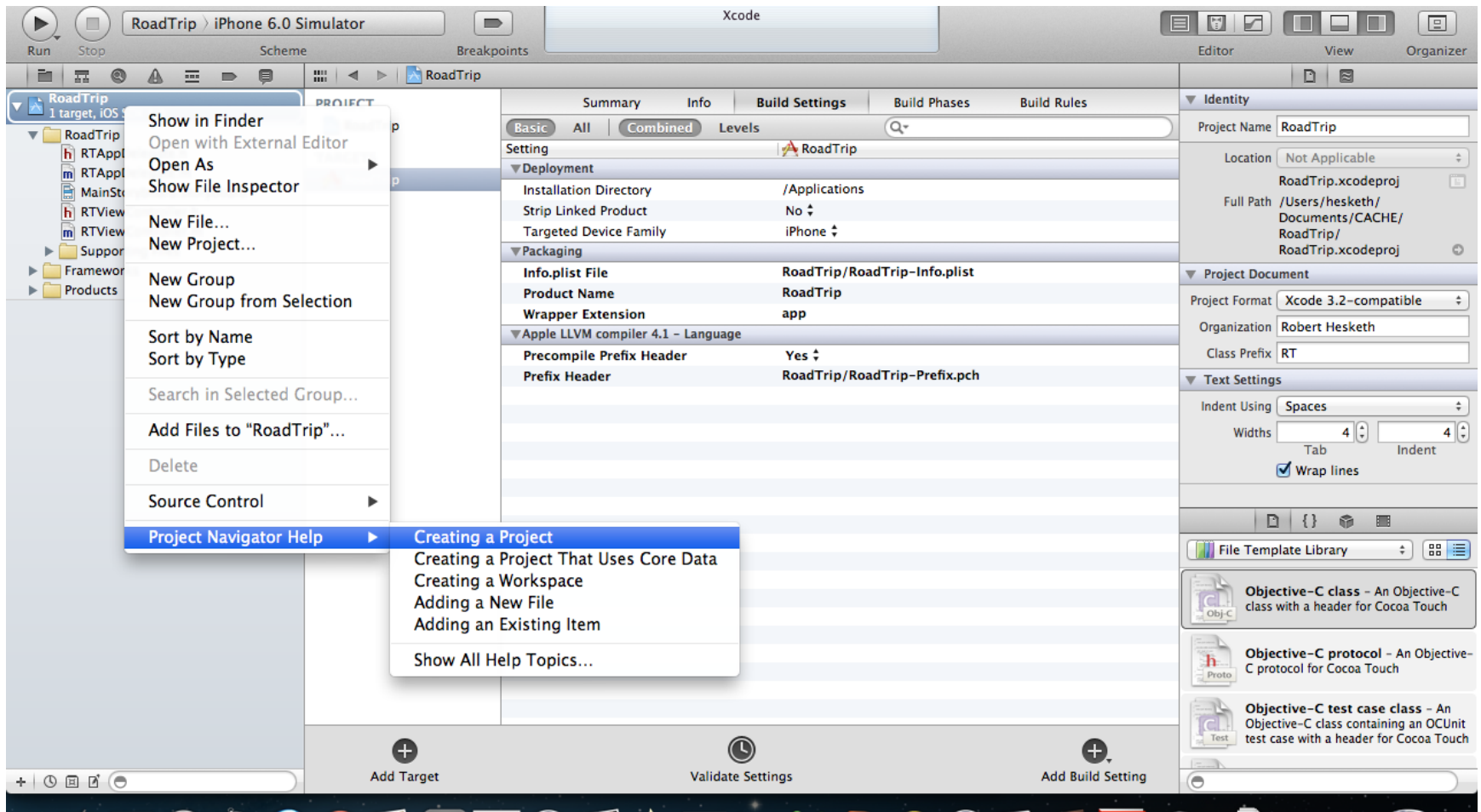
**Workspace
Configuration**



Activity Viewer

Flow Control

Getting Help: Right Click



Creating a Project: Right Click for Help

▶ iOS 6.0 Documentation Set

▶ OS X 10.8 Core Library

▶ Xcode 4.5 Developer Library

Xcode 4.5 Developer Library > Xcode > IDEs > Project Navigator Help > Creating a Project

Creating a Project

Steps

1. Choose **File > New > New Project**.
2. Select the project template for your iOS or OS X product, and click **Next**.
3. Enter the product name and other project details, and click **Next**.
4. Specify the project's location in your file system, and click **Save**.

Prerequisite

[Xcode Project](#)
[Xcode Workspace](#)

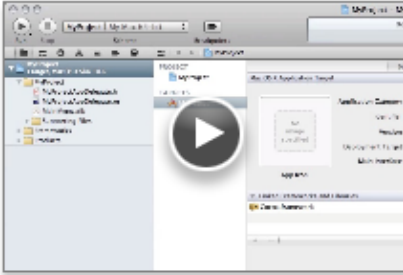
Related

Start developing a software product by creating a project. All software products require a project. The project organizes the files and resources needed to build one or more products, such as applications, plug-ins, and command-line tools.

The New Project dialog displays platforms, template families, project templates, and a description for the selected project template. In the project options pane you enter information required by the template to generate the project, such as the product name.

Note: The New Project dialog appears in the workspace window for the workspace to which Xcode will add the project. When you create a project with no workspace window active, the New Project dialog is attached to a new workspace window that contains only the new project.

The project location in your file system and its container in the workspace window are both derived from your selection in the project navigator when you initiated the New Project command. That is, if you have a project selected in the project navigator, Xcode

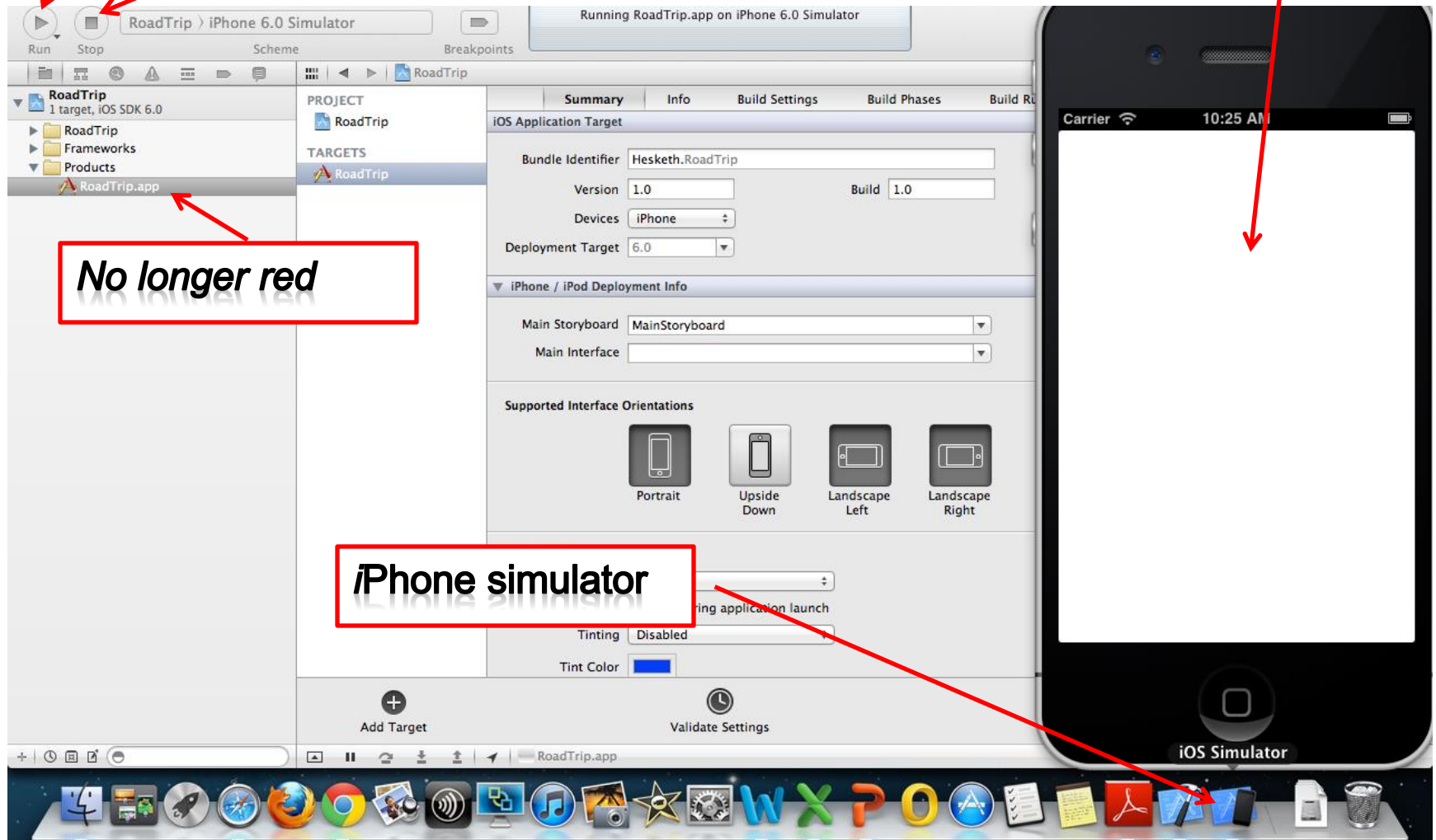


Run the Code

Stop Code

RUN!

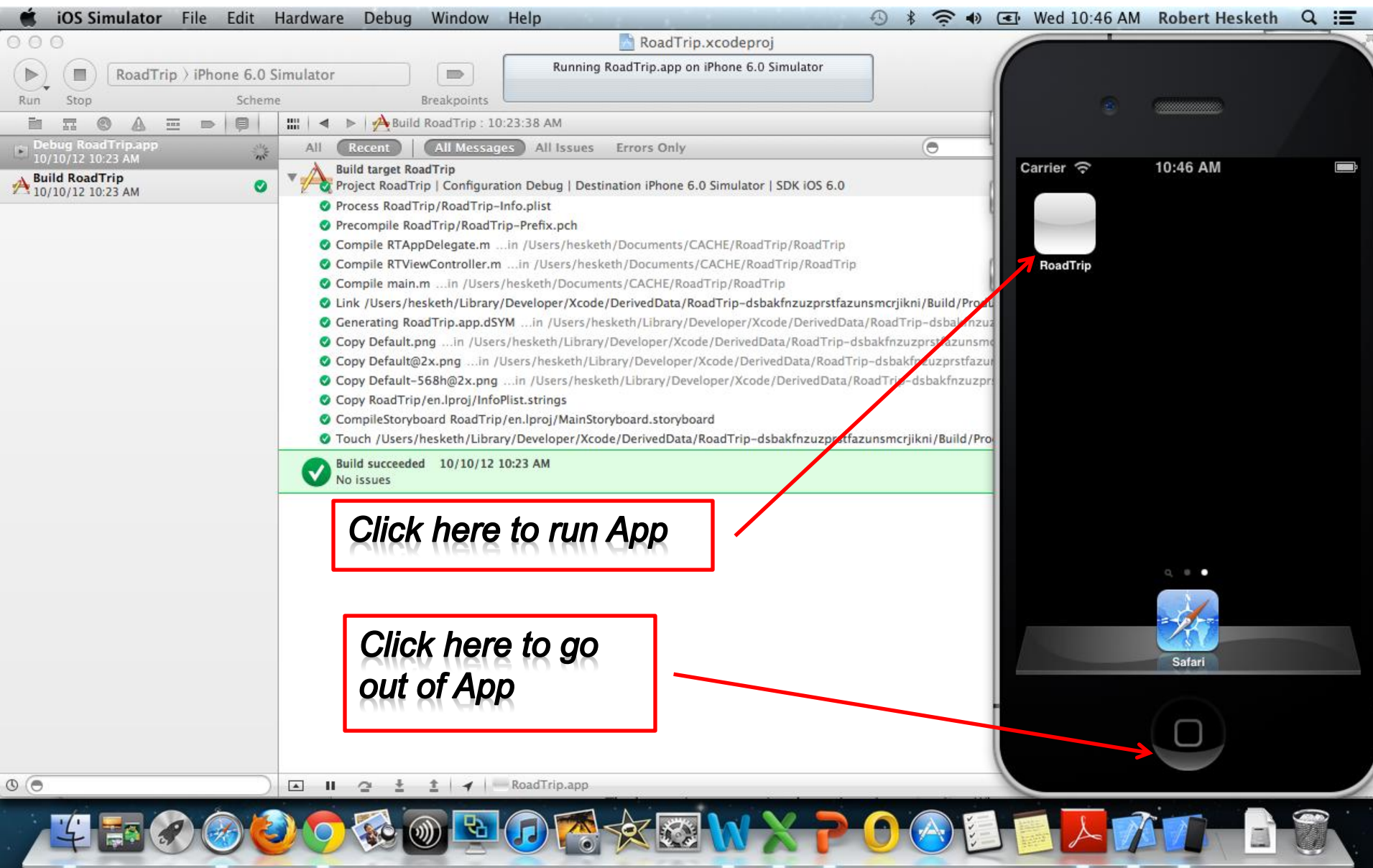
iPhone simulator



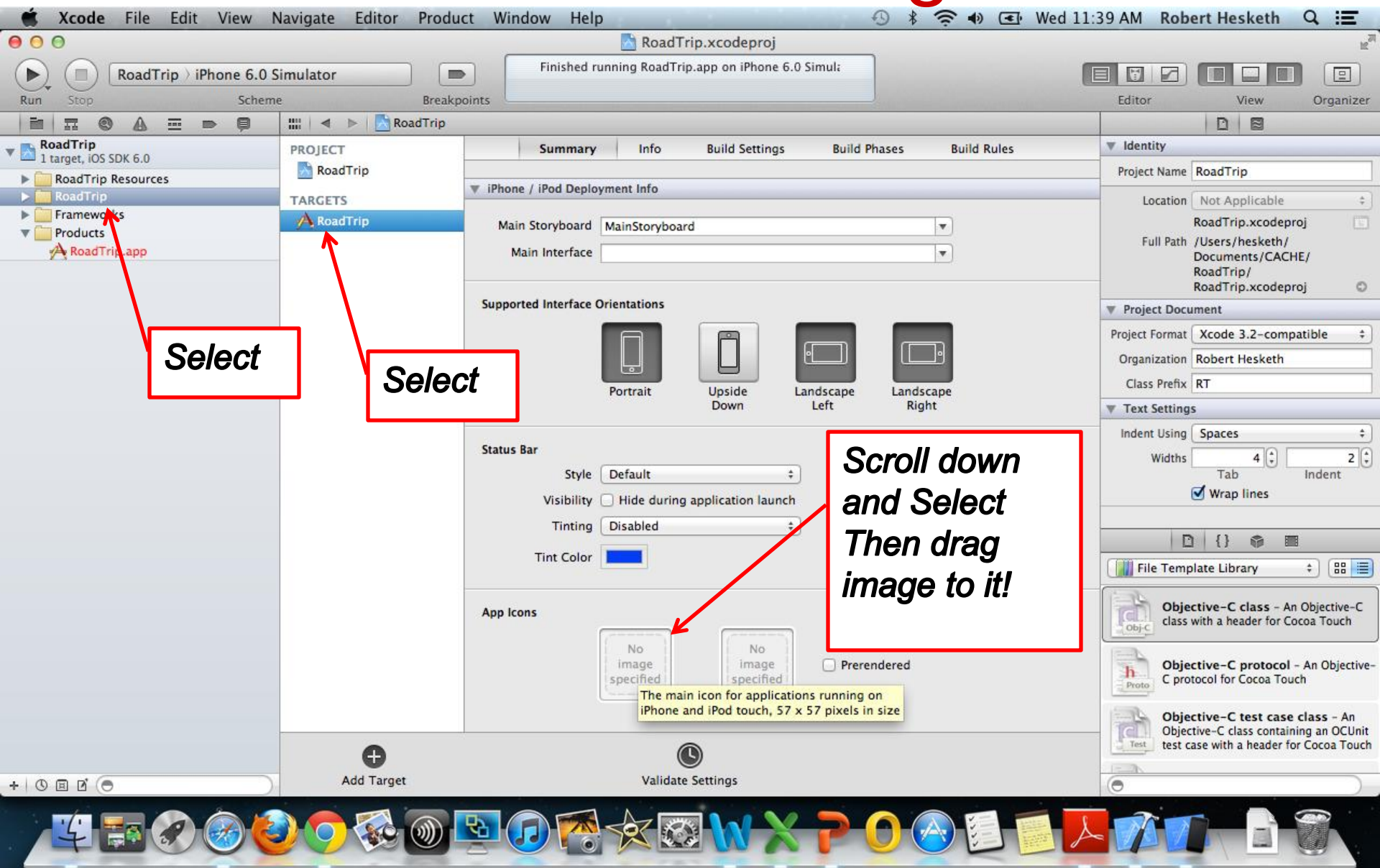
No longer red

iPhone simulator

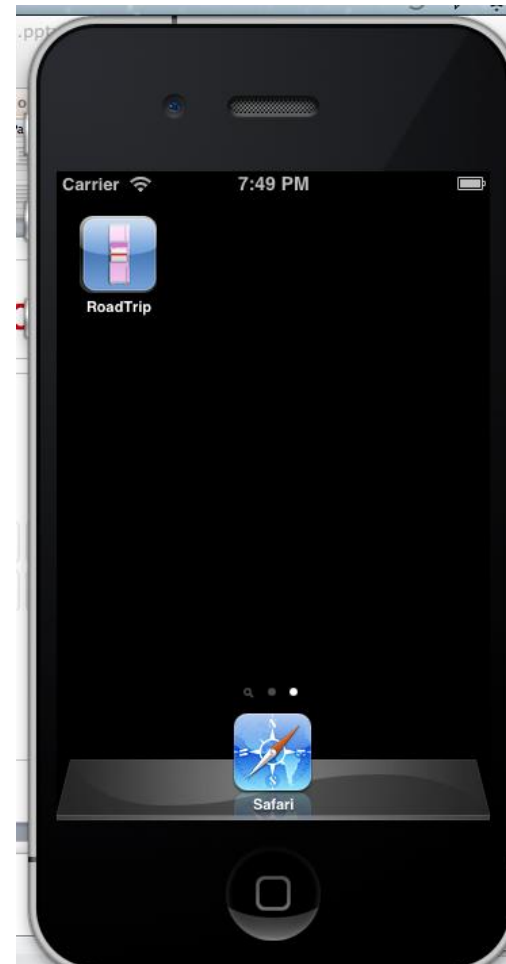
iPhone Simulator



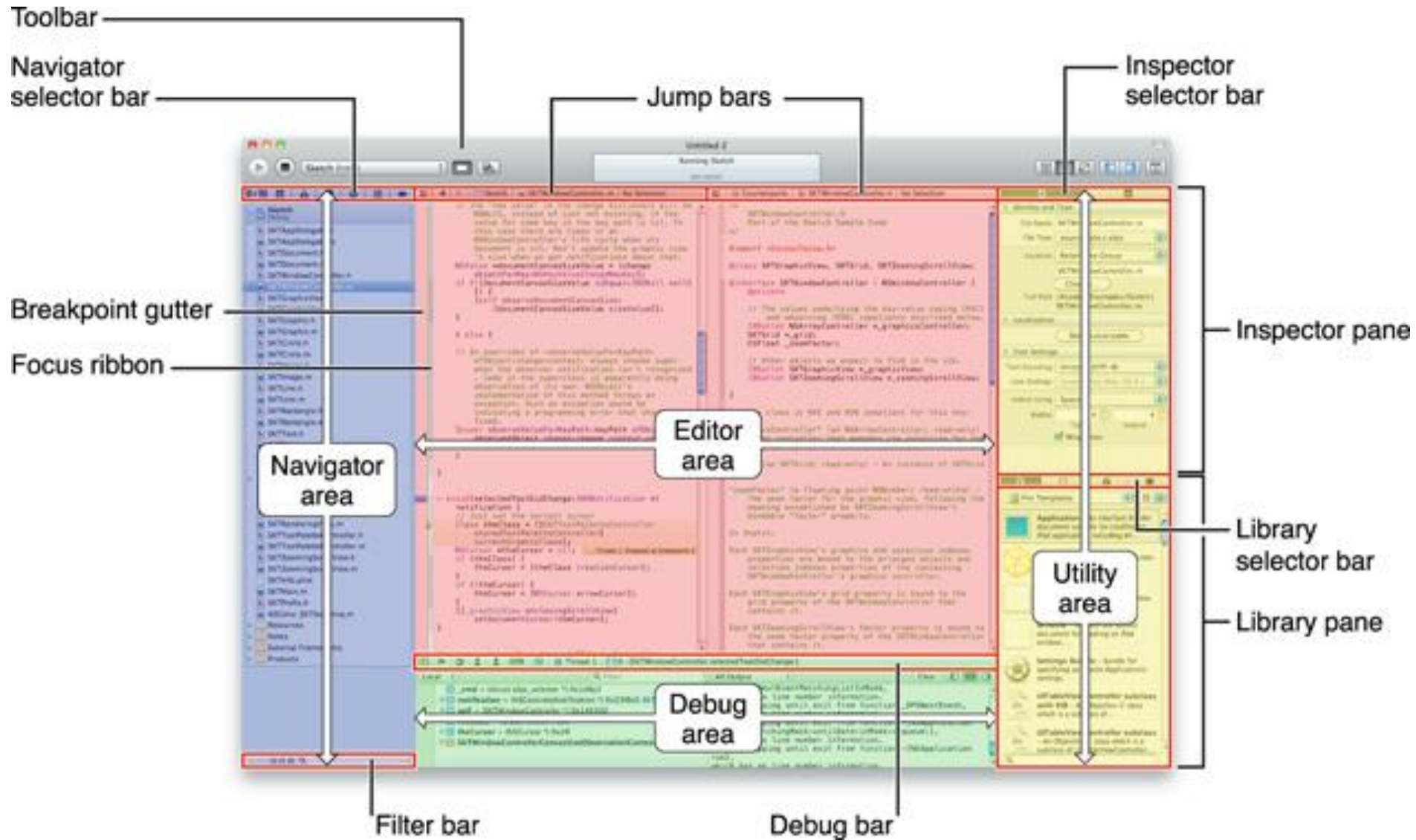
Add Icon Image



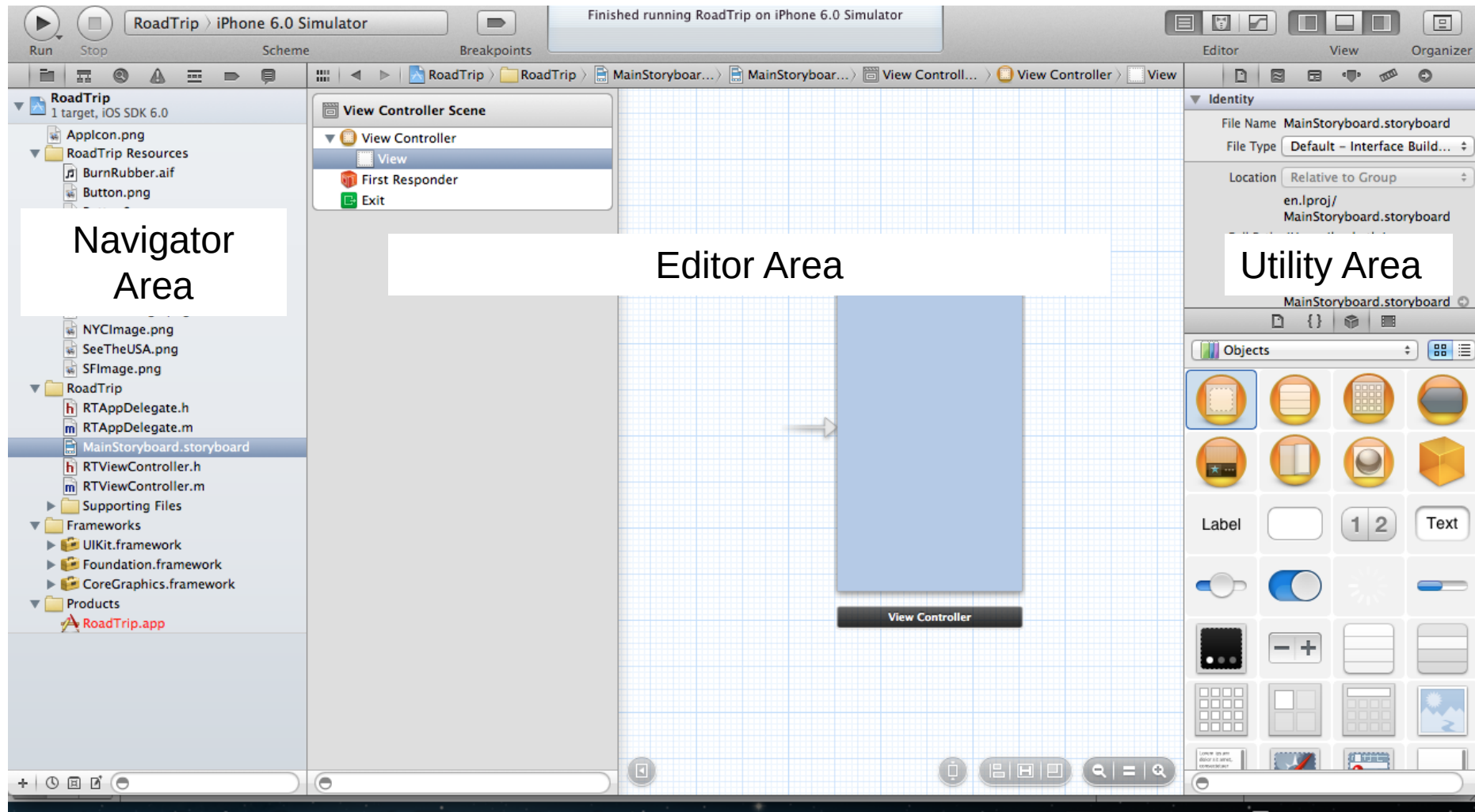
Icon Created



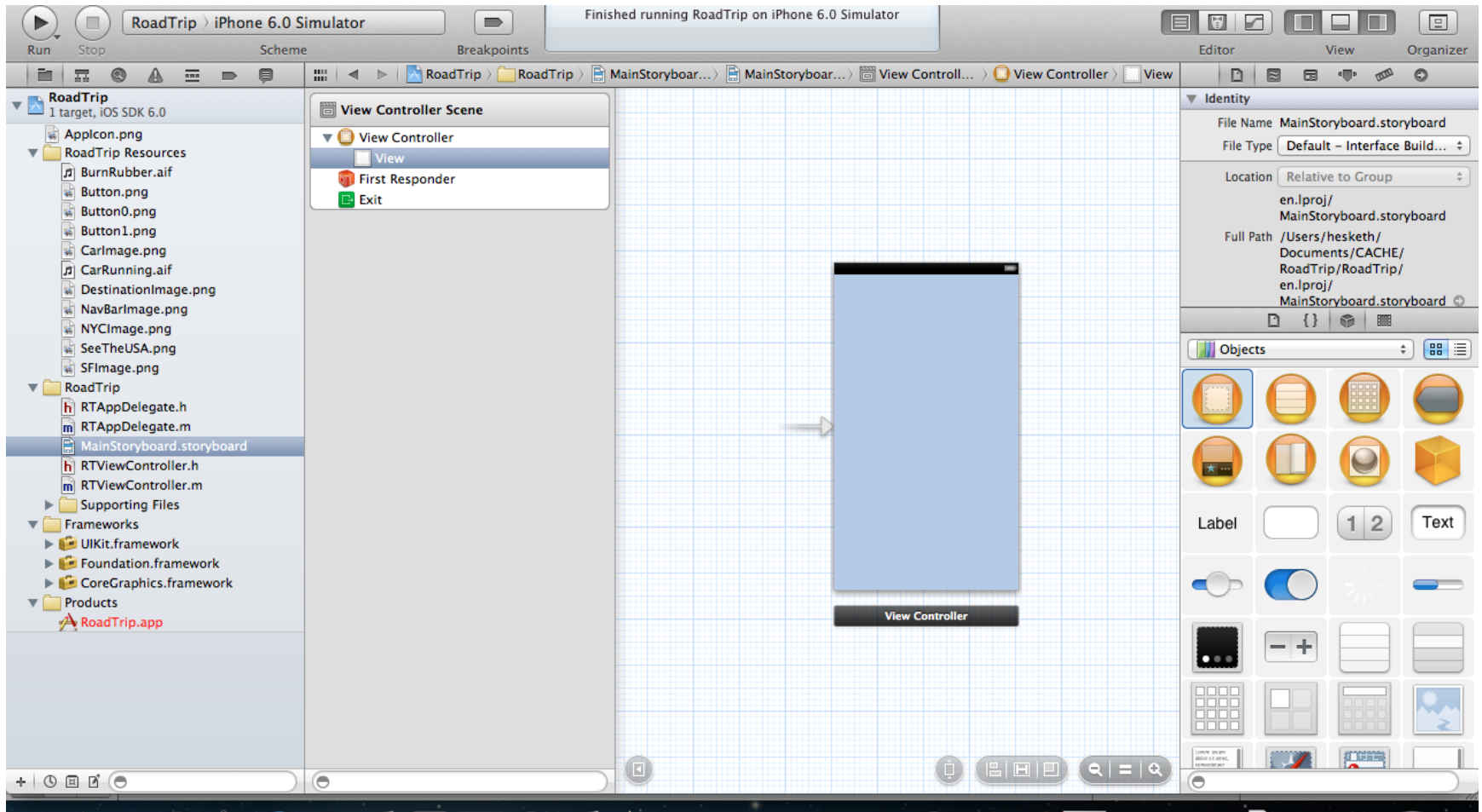
Xcode Setup



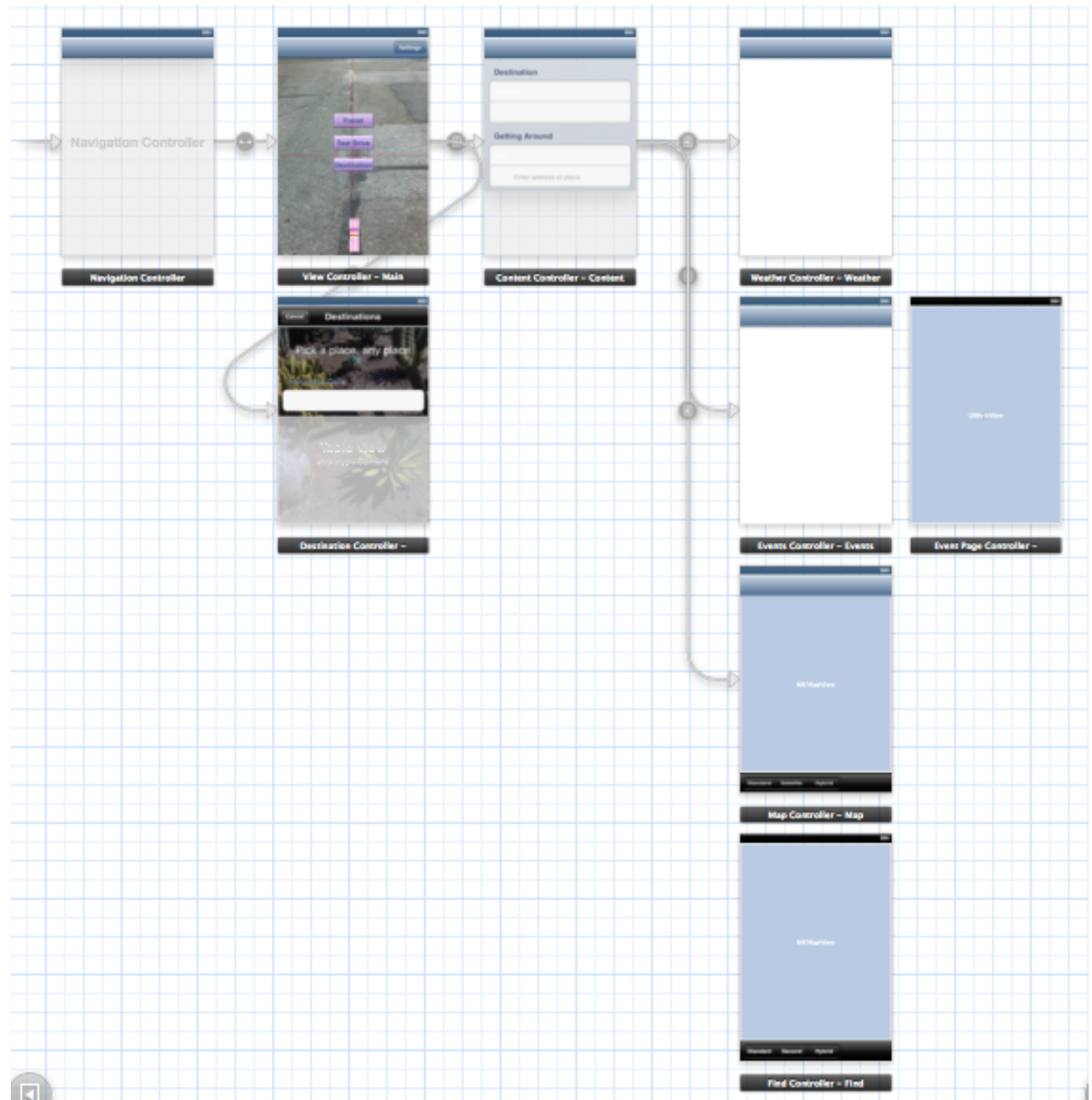
Xcode Layout with Storyboards



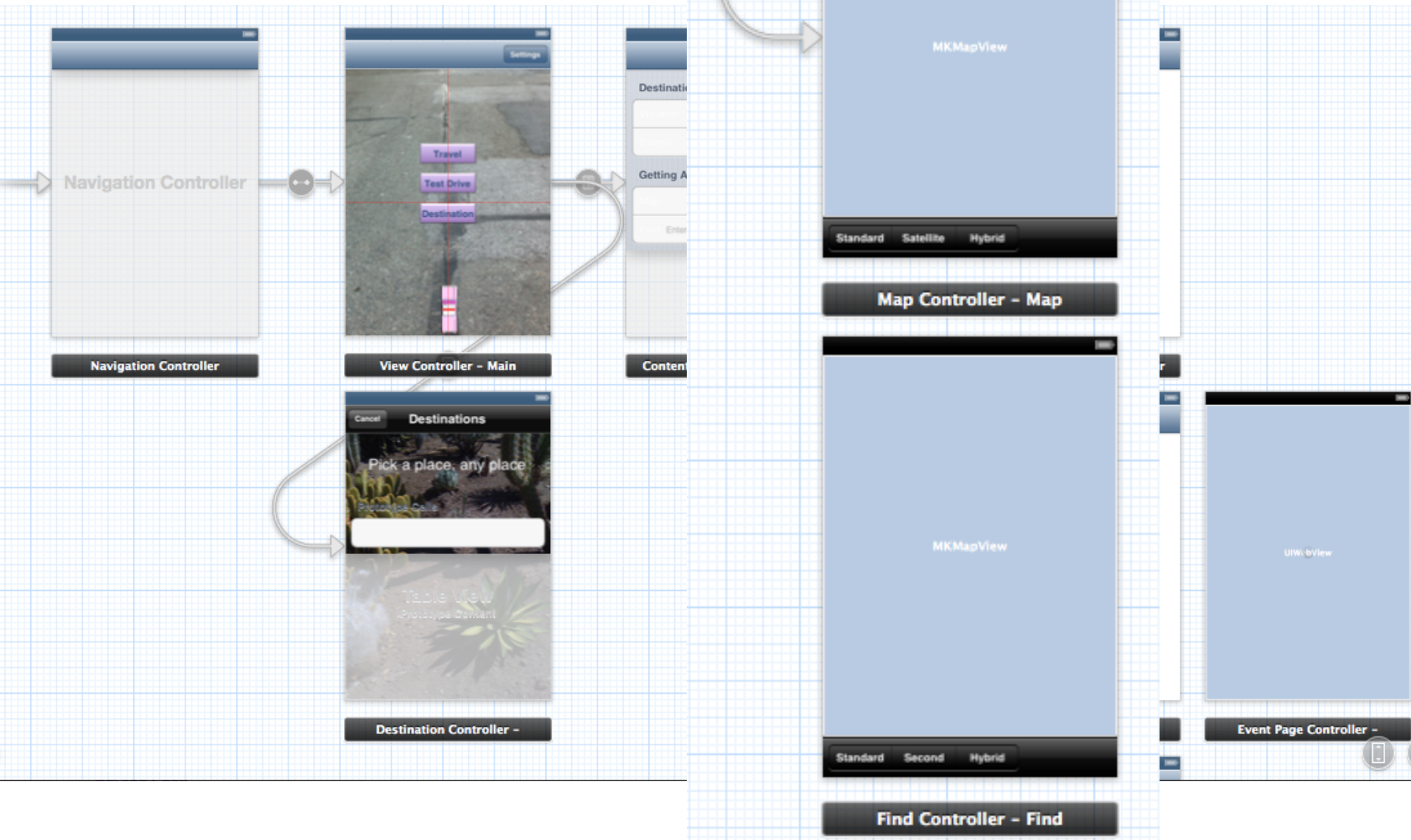
Story Boards



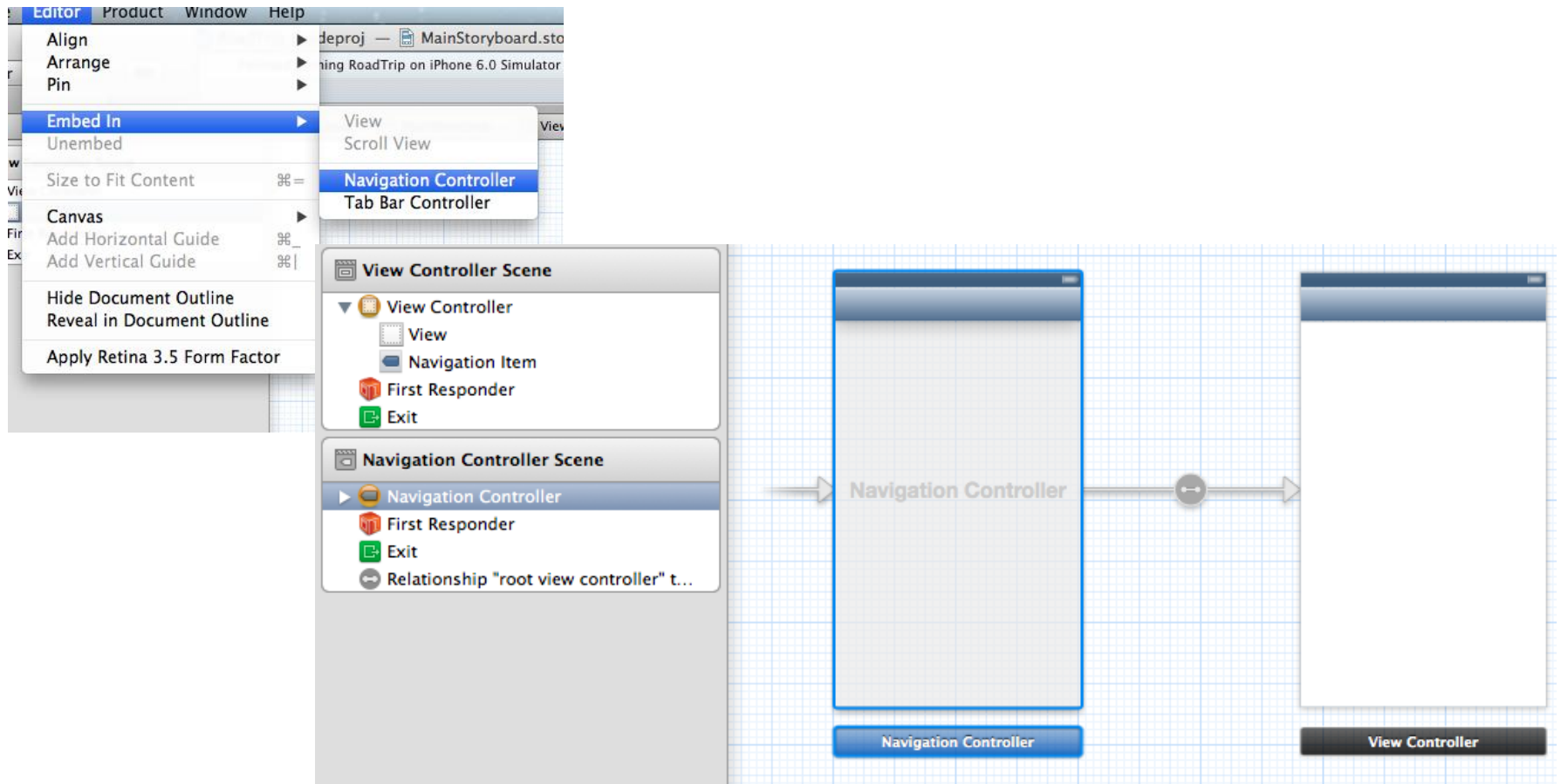
Final Look



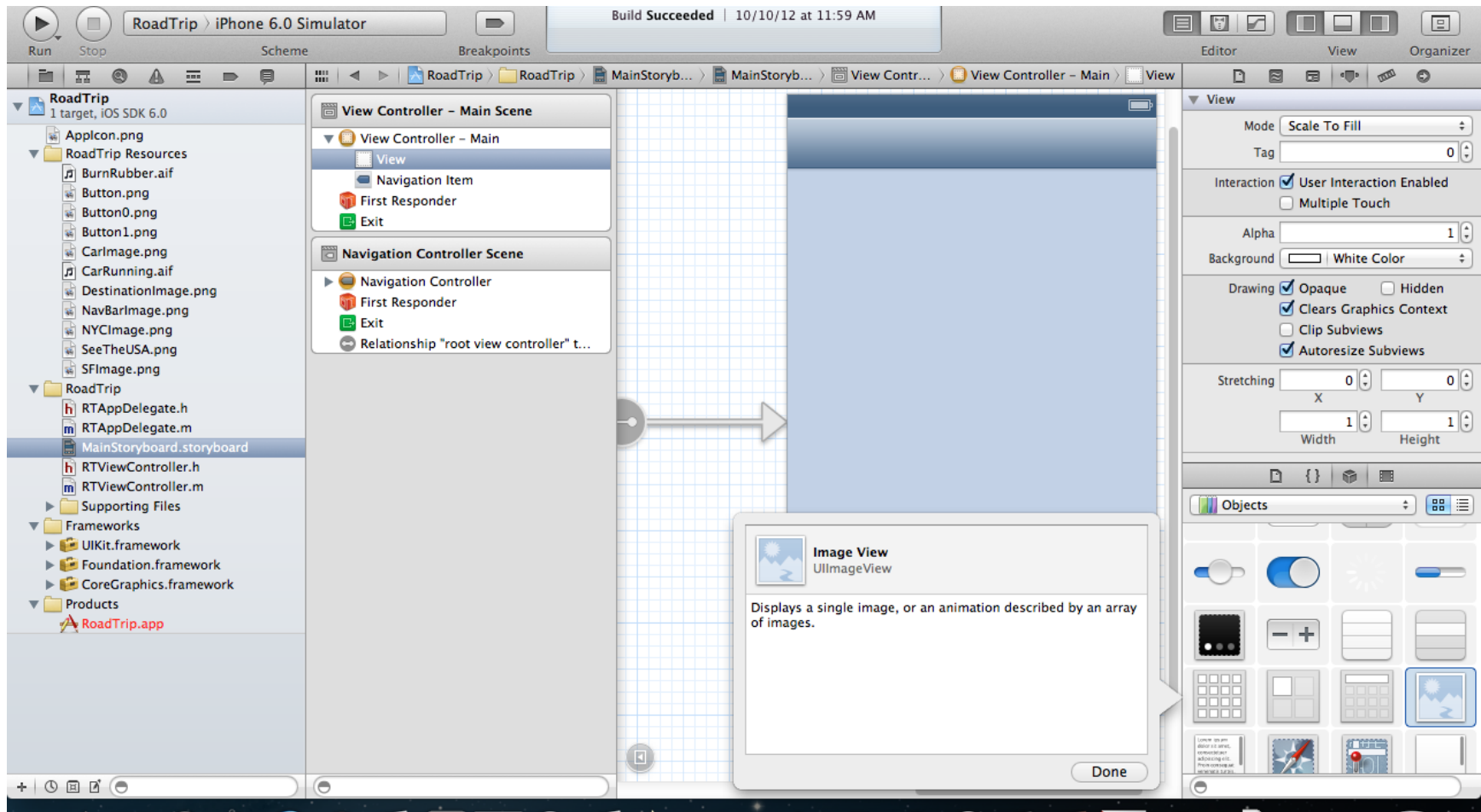
Close up on



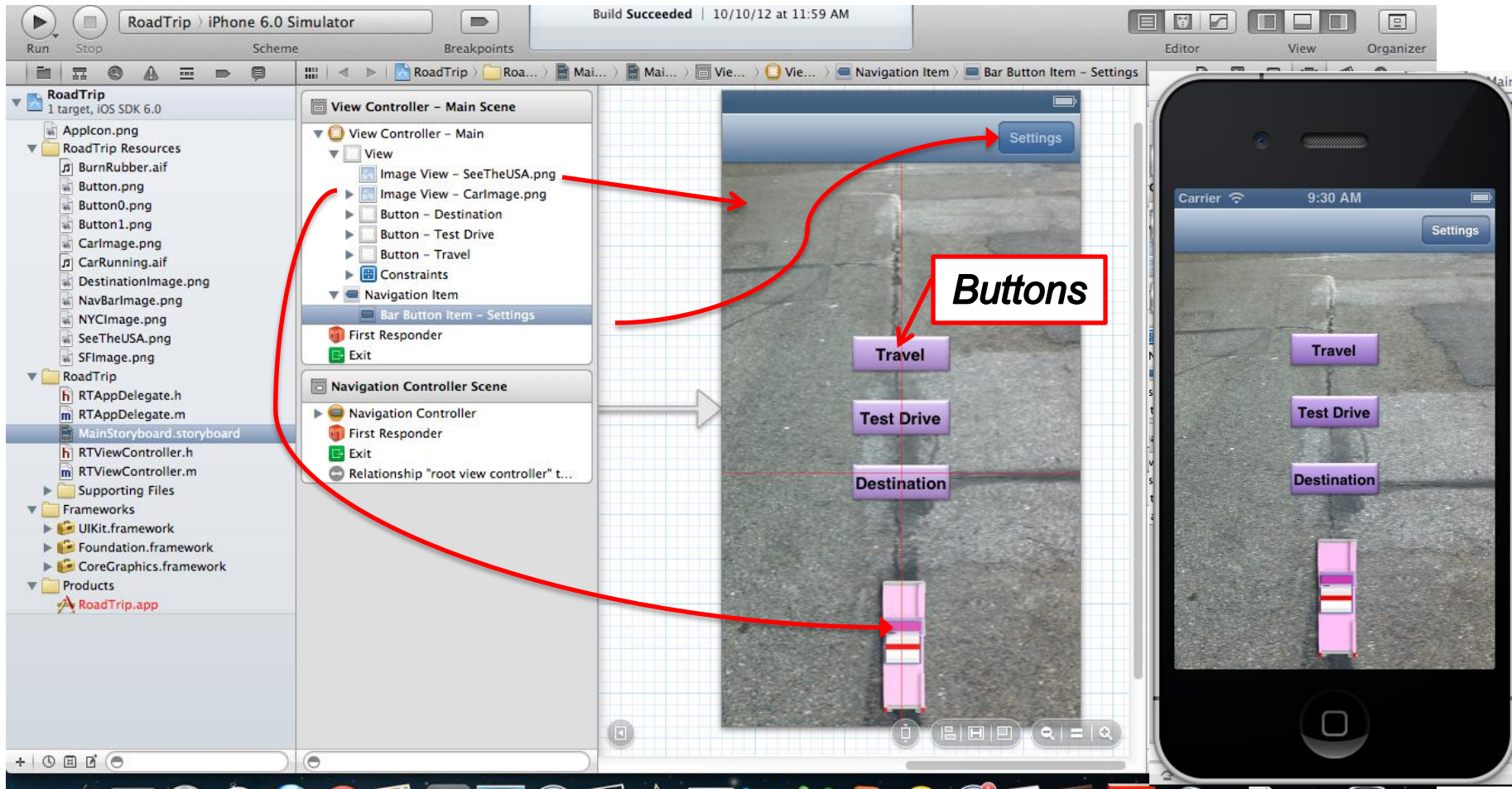
Navigation Controller



Add Image view (Drag to Story Board)

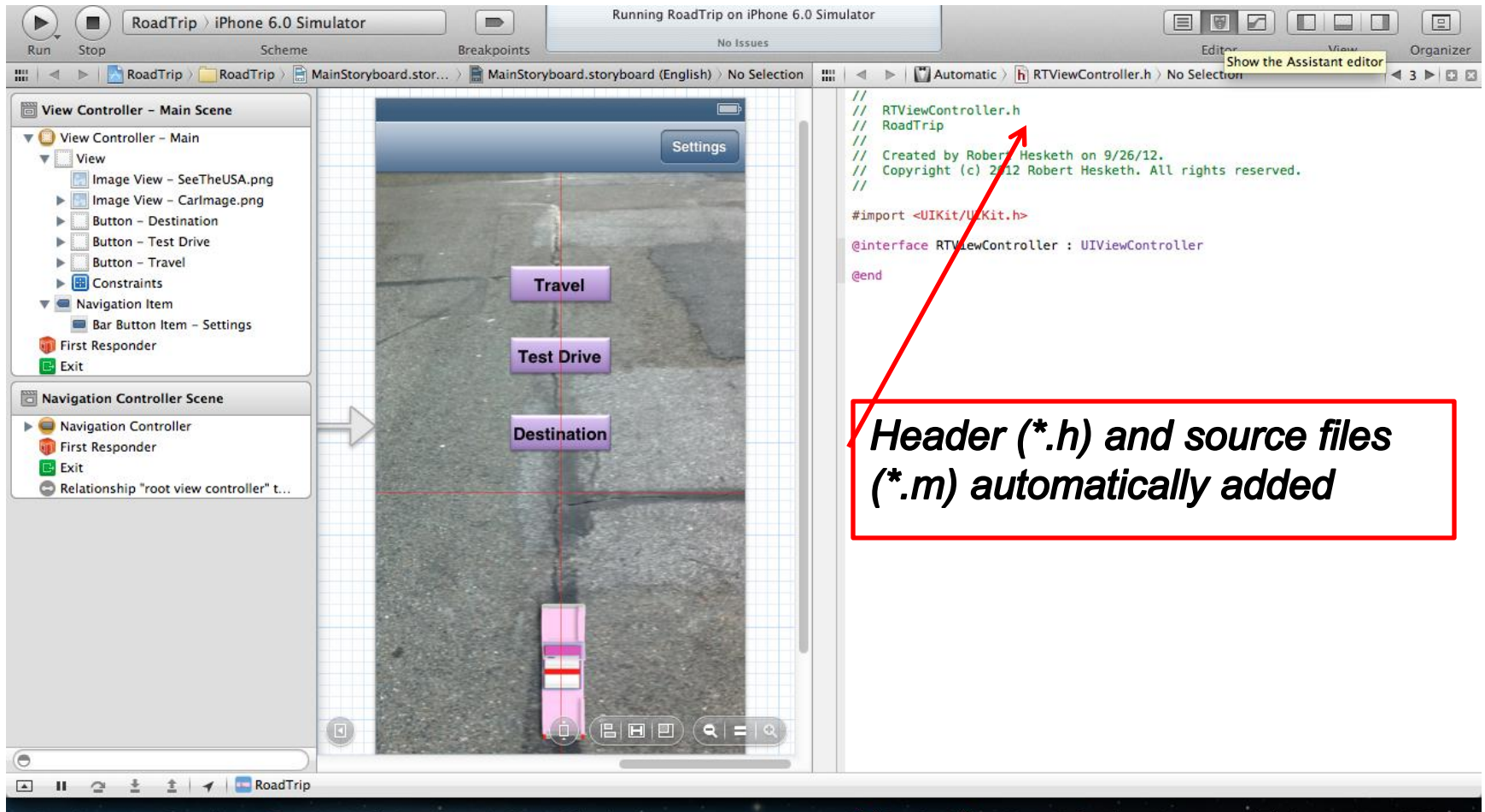


Adding Buttons

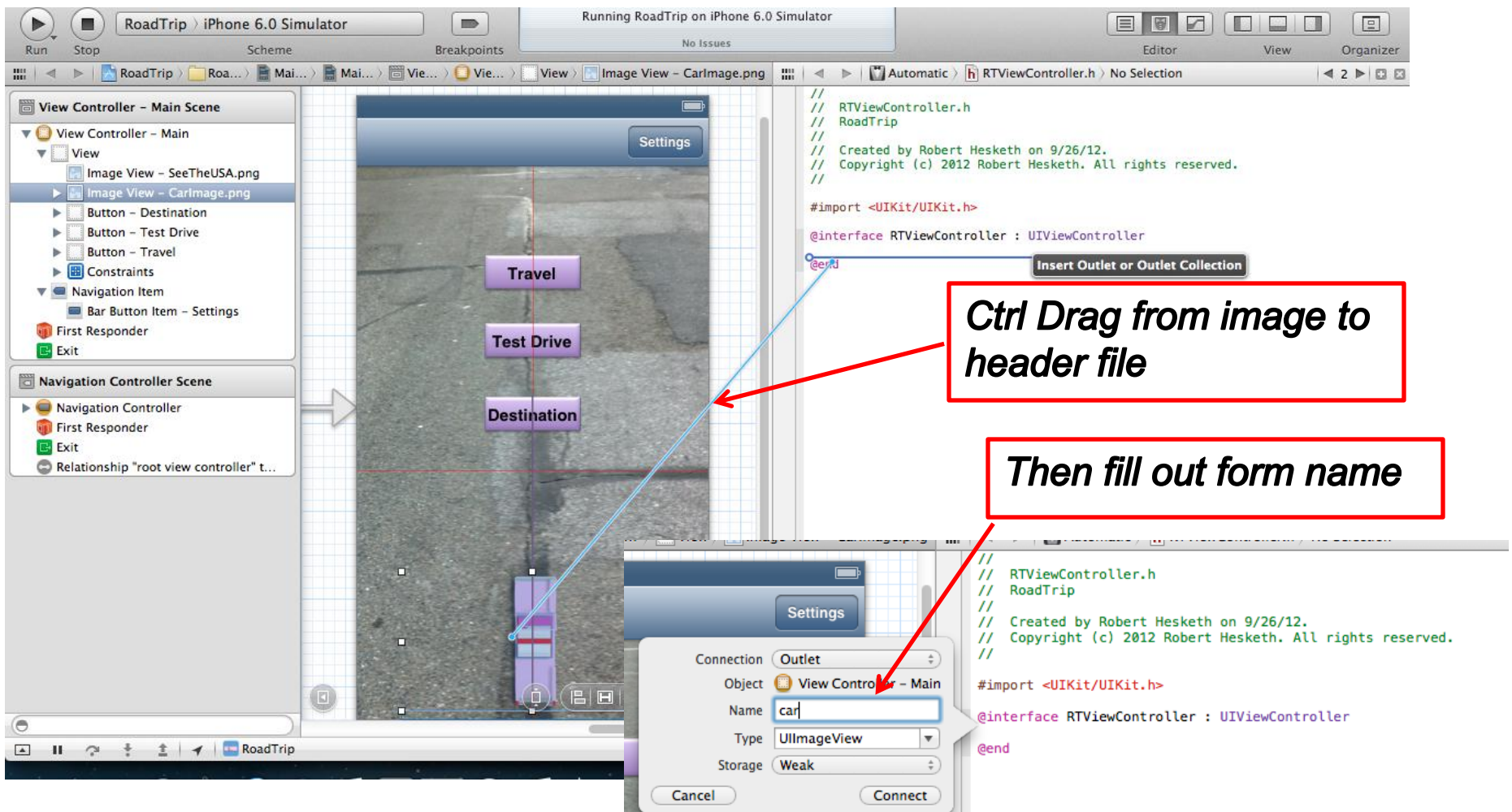


All added using drag and drop and filling out labels

Adding Outlets (How to make the button do something)

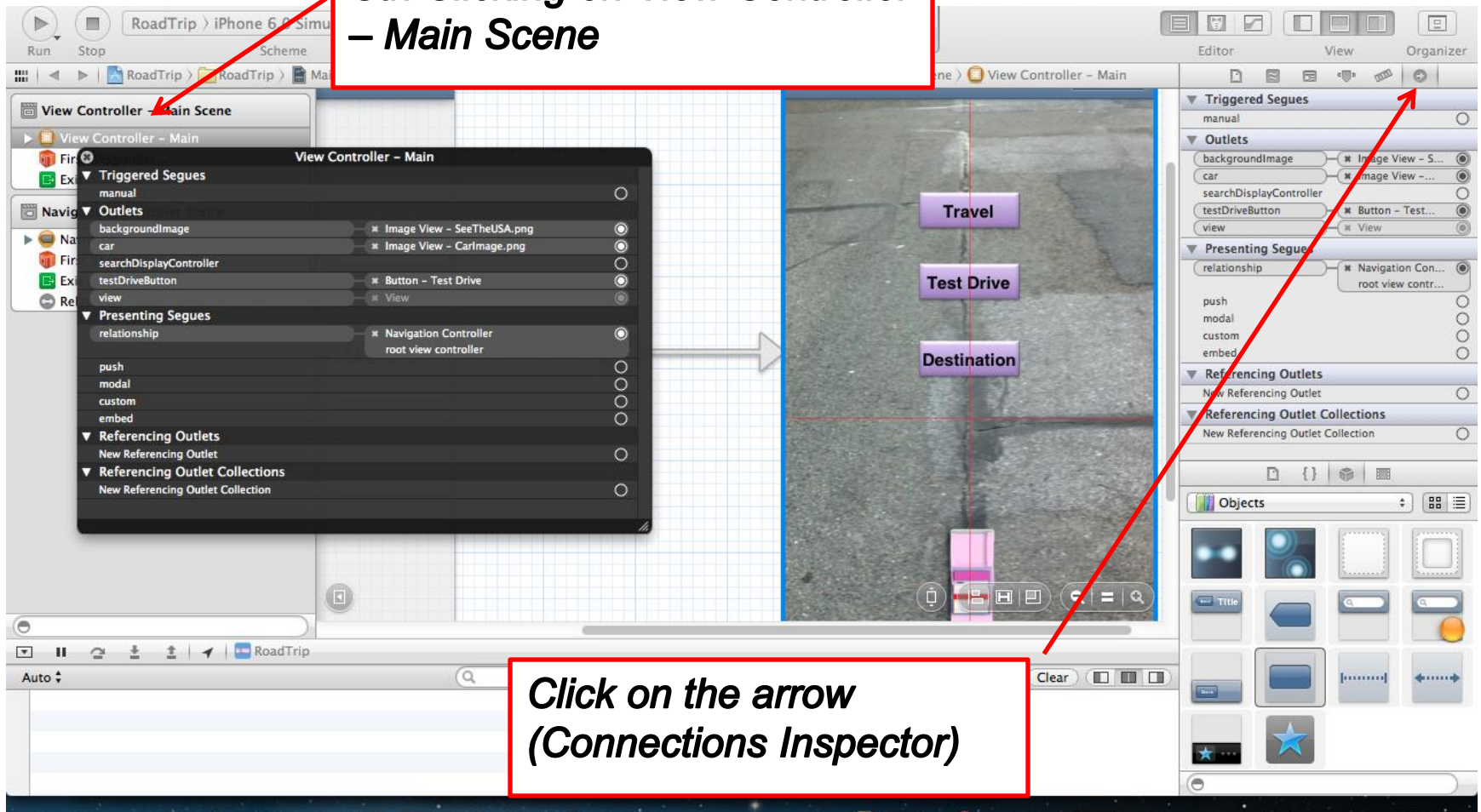


OUTLET: Car



Showing connections

***Ctrl Clicking on View Controller
– Main Scene***



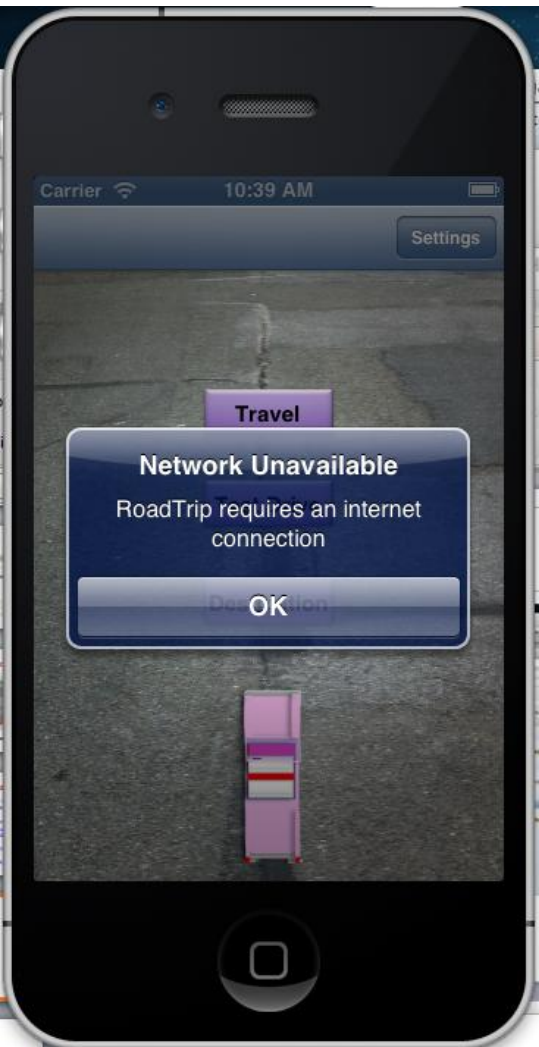
***Click on the arrow
(Connections Inspector)***

Is the internet available?

- All Apps must have this (otherwise rejected)
- Download Reachability code from Apple Dev. Website and add to xcode project
- Add system Configuration.framework to project
- Remove ARC (Automatic Reference Counting) to Reachability.m in Build Phases dialog with command: `-fno-objc-arc`
- Add `#import <netinet/in.h>` to Reachability.h code
- Add reachability check code to RTAppDelegate

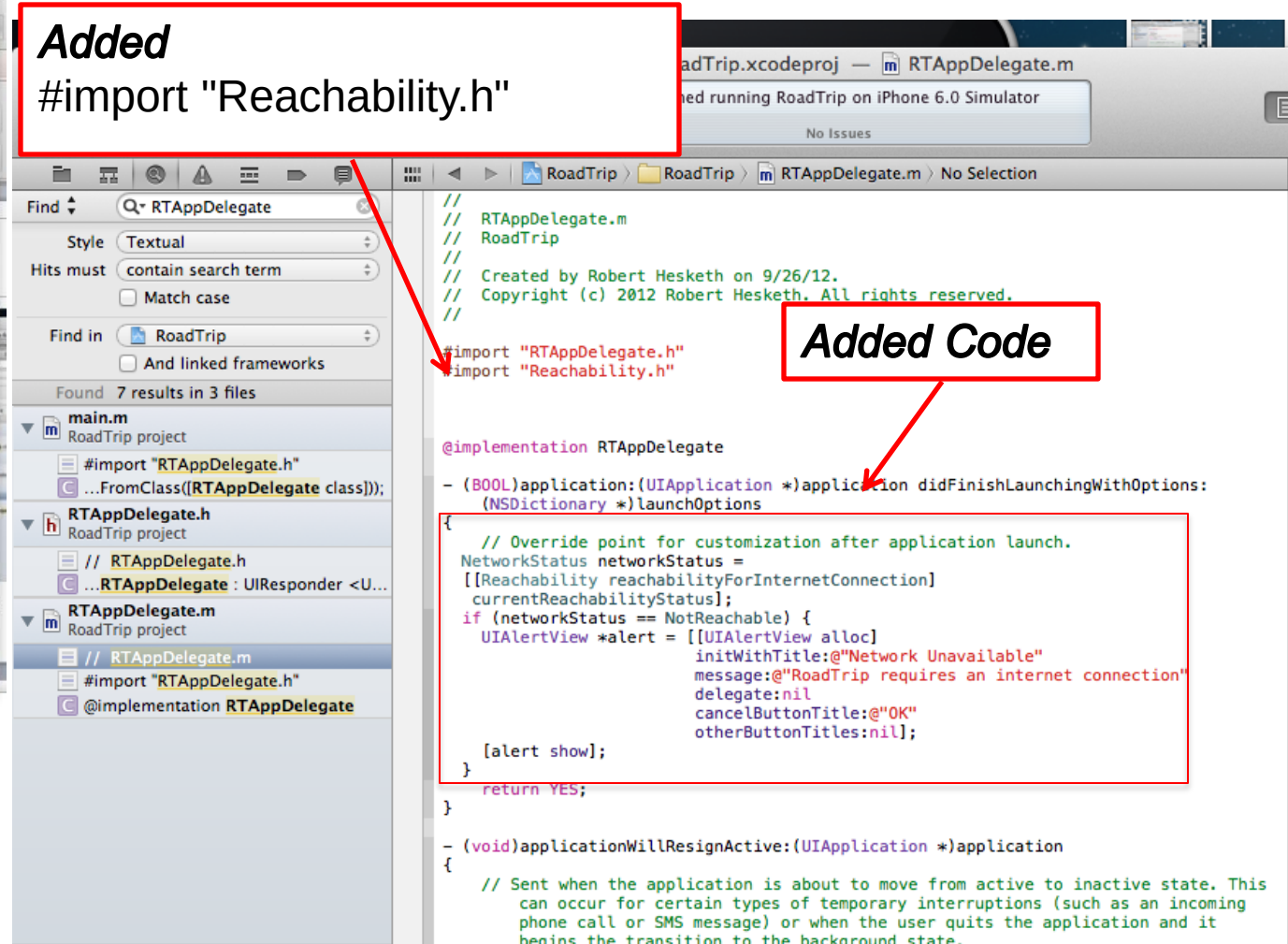
Code Added

Turn off wi-fi on computer and run code!!



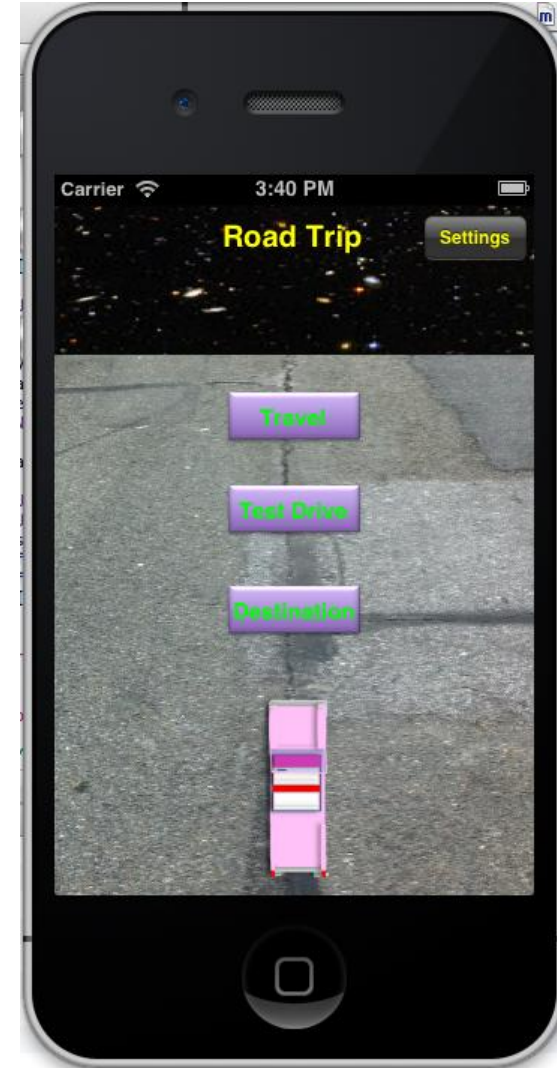
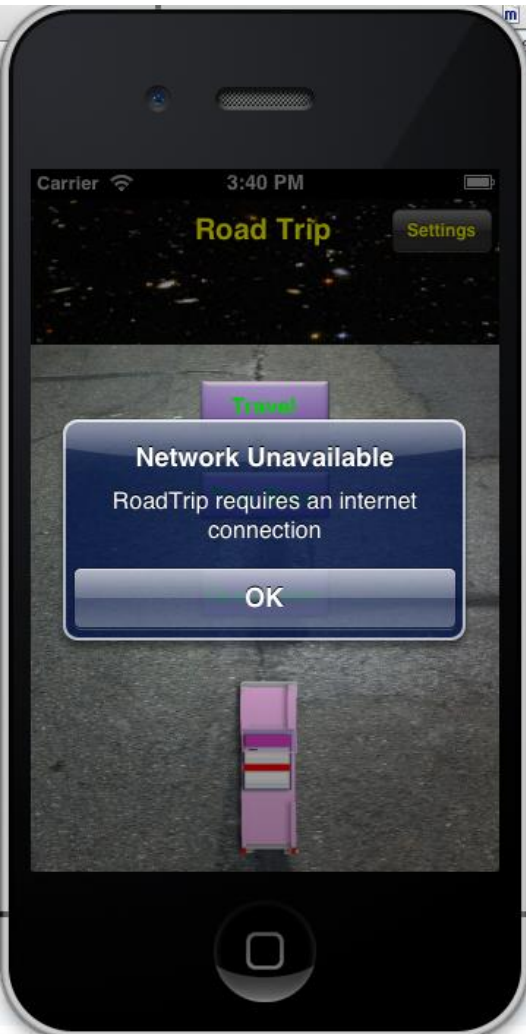
Added

```
#import "Reachability.h"
```



Yellow Titles

- Faded Yellow Road Trip title when error message appears
- Yellow with no error message



Yellow Titles

Added to didFinishLaunchingWithOptions in RTAppDelegate.m

```
[[UIApplication sharedApplication] setStatusBarStyle:UIStatusBarStyleBlackOpaque animated:NO];
UINavigationController *navigationController = (UINavigationController *)
self.window.rootViewController;
navigationController.navigationBar.barStyle = UIBarStyleBlack;
[navigationController.navigationBar
setTitleTextAttributes:
[NSDictionary dictionaryWithObject: [UIColor yellowColor]
                                forKey:UITextAttributeTextColor]];
[navigationController.navigationBar setBackgroundImage:[UIImage
imageName:@"@NavBarImage.png"]
                                forBarMetrics:UIBarMetricsDefault];
[[UIButton appearance] setTitleColor:[UIColor greenColor] forState:UIControlStateNormal];
[[UIBarButtonItem appearanceWhenContainedIn:[UINavigationController class], nil]
setTitleTextAttributes:[NSDictionary dictionaryWithObject:[UIColor yellowColor]
                                forKey:UITextAttributeTextColor]
forState:UIControlStateNormal];
[[UIButton appearanceWhenContainedIn:
[UIAlertView class], nil] setTitleColor: [UIColor whiteColor] forState:UIControlStateNormal];
```


And it continues

Now after testing on simulator

- To load your App to a real phone
Subscribe to the iPhone Developer Program (\$99 + sales tax!)
- Obtain a certificate: See this youtube **iOS Development: Certificate Signing Request**
<http://www.youtube.com/watch?v=HIRI30F6-Ek>
- Provisioning profile.

Summary

Encourage Students to Start
Working on their APP today

- ✓ Form a multidisciplinary team –
recruit both ChE's and ECE's
and CS's
- ✓ Decide on operating system and
download appropriate
software
- ✓ Brainstorm Ideas and search
what is similar
- ✓ Start writing by creating an
outline and then programming



Test Device on iPhone

▼ To get a device ID using iTunes

1. Launch iTunes.
2. Connect your device to your Mac.
3. In the Devices section, select the device.
4. In the Summary pane, click the Serial Number label under Summary.
The label Serial Number changes to Identifier and displays the device ID.

In iTunes click on serial number and it changes to Identifier.



Command-C to copy

5. To copy the device ID, position the pointer over the device ID and press Command-C.

Student AIChE/CACHE Mobile Device APP Competition

- CACHE

The screenshot displays the website of The Multimedia Education Laboratory (MEL) and an embedded 'Equipment Module' window. The website header includes the URL che.engin.umich.edu/mel/MEL_HOME.html and the title 'THE MULTIMEDIA EDUCATION LABORATORY'. The MEL logo is on the left, with a vertical navigation menu containing buttons for 'MEL HOME', 'CHE EQUIPMENT', 'M&E BALANCES', 'BIO SYSTEMS', 'SOFTWARE', 'PEOPLE', and 'CONTACT INFO'. The main content area describes MEL as a multimedia educational laboratory in the Chemical Engineering department at the University of Michigan, creating computer-based modules for chemical engineering education. It lists 'The Visual Encyclopedia of Chemical Engineering Equipment' as one of its offerings. The 'Equipment Module' window, titled 'Equipment Module' with a menu bar 'File Options', shows a 'Main Menu' for 'CHEMICAL ENGINEERING EQUIPMENT'. The menu features a central oval with the text 'Welcome to the Encyclopedia of Chemical Engineering Equipment! Mouse over each category for a more detailed description of its content.' Surrounding this oval are ten categories: 'TRANSPORT AND STORAGE', 'HEAT TRANSFER', 'REACTORS', 'FLOWMETERS', 'POLYMER PROCESSING', 'SEPARATIONS: CHEMICAL', 'SEPARATIONS: MECHANICAL', 'MATERIALS HANDLING', 'PROCESS PARAMETERS', and 'POLYMER PROCESSING'. At the bottom right of the module window are links for 'Index', 'Help', and 'Quit'. The website footer indicates it was last updated on June 14, 2010, and is copyrighted by the University of Michigan in 2010.

THE MULTIMEDIA EDUCATION LABORATORY

MEL is the Multimedia Educational Laboratory in the [Chemical Engineering department, University of Michigan](#). We create computer based modules for the advancement of Chemical Engineering understanding. These modules include:

The Visual Encyclopedia of Chemical Engineering Equipment

Equipment Module

File Options

CHEMICAL ENGINEERING EQUIPMENT: Main Menu

Welcome to the Encyclopedia of Chemical Engineering Equipment!
Mouse over each category for a more detailed description of its content.

TRANSPORT AND STORAGE

HEAT TRANSFER

REACTORS

FLOWMETERS

POLYMER PROCESSING

SEPARATIONS: CHEMICAL

SEPARATIONS: MECHANICAL

MATERIALS HANDLING

PROCESS PARAMETERS

Index
Help
Quit

Last Updated
Jun 14, 2010.

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