CS121 Tutorial 5

Intro to testing in Xcode!

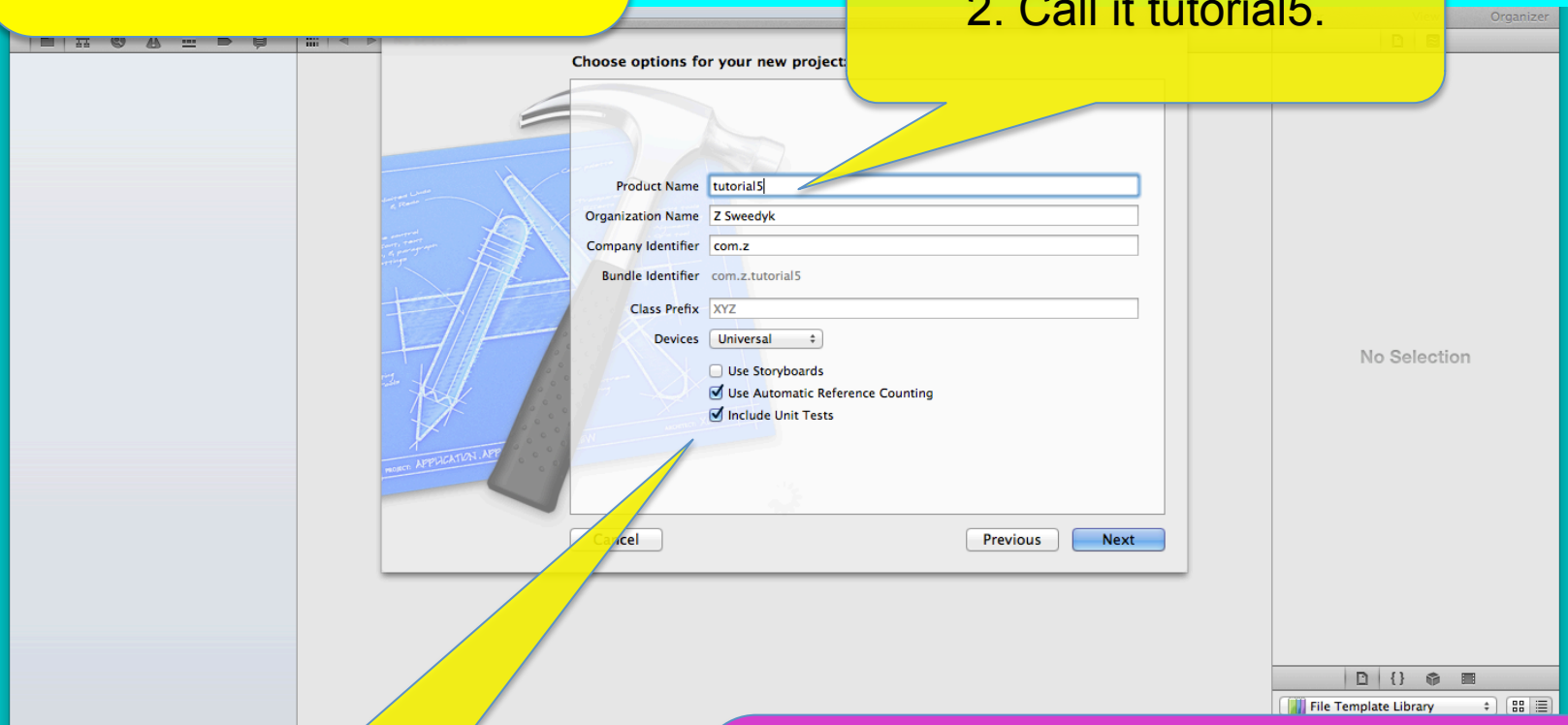
Purple bubbles give you information you'll need to know.

Yellow Bubbles tell you what to do.

Orange bubbles tell you what you're not expected to understand yet. ☺

1. Create a new IOS single view app for the iPad.

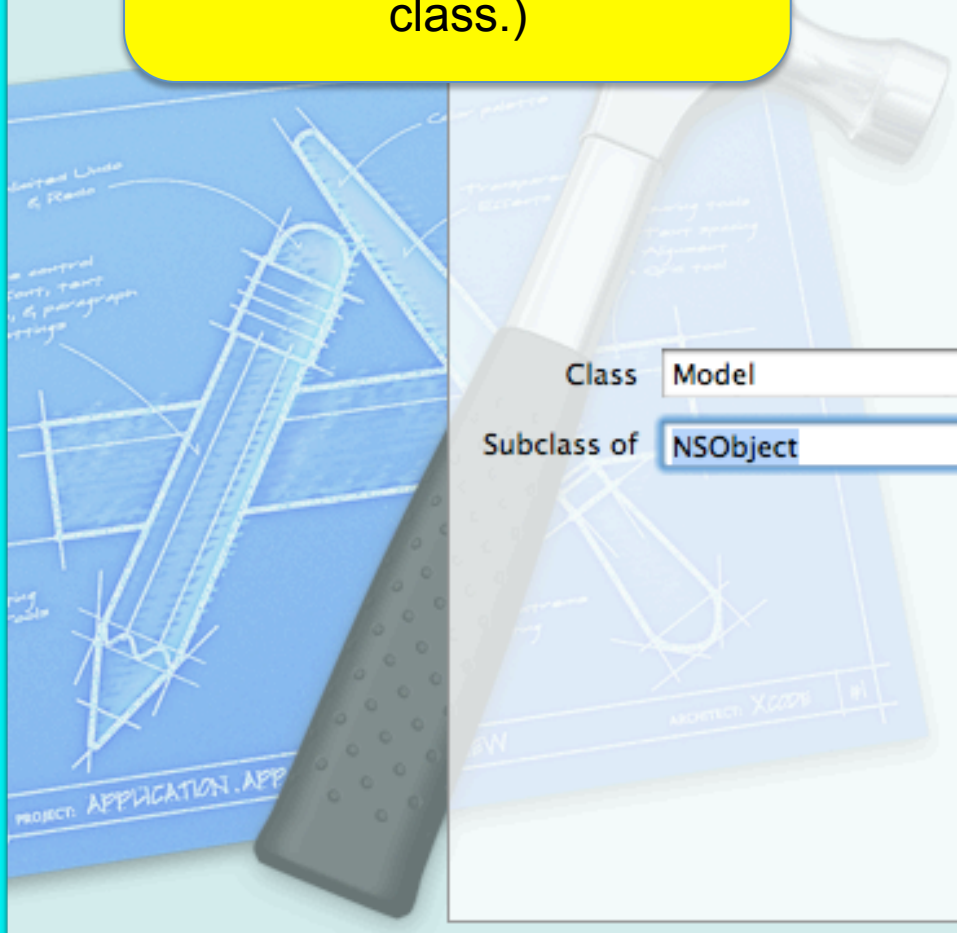
2. Call it tutorial5.



3. Check ARC and unit tests.

Xcode will set up the unit testing framework for you. But in this tutorial you'll learn how to add unit tests to an existing project that isn't set up for the tests.

Add a new Model class to the object. (It should use NSObject as its base class.)

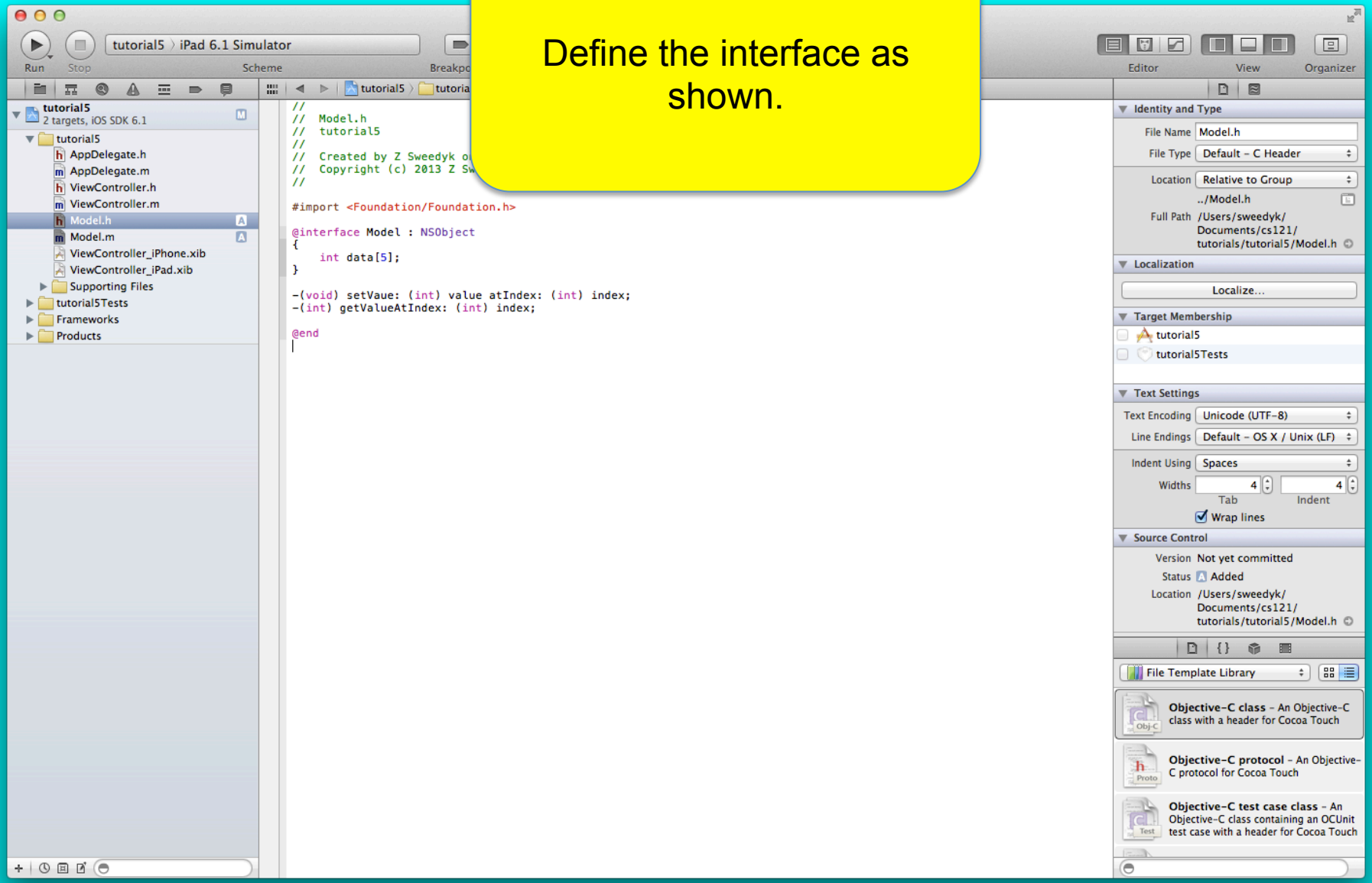


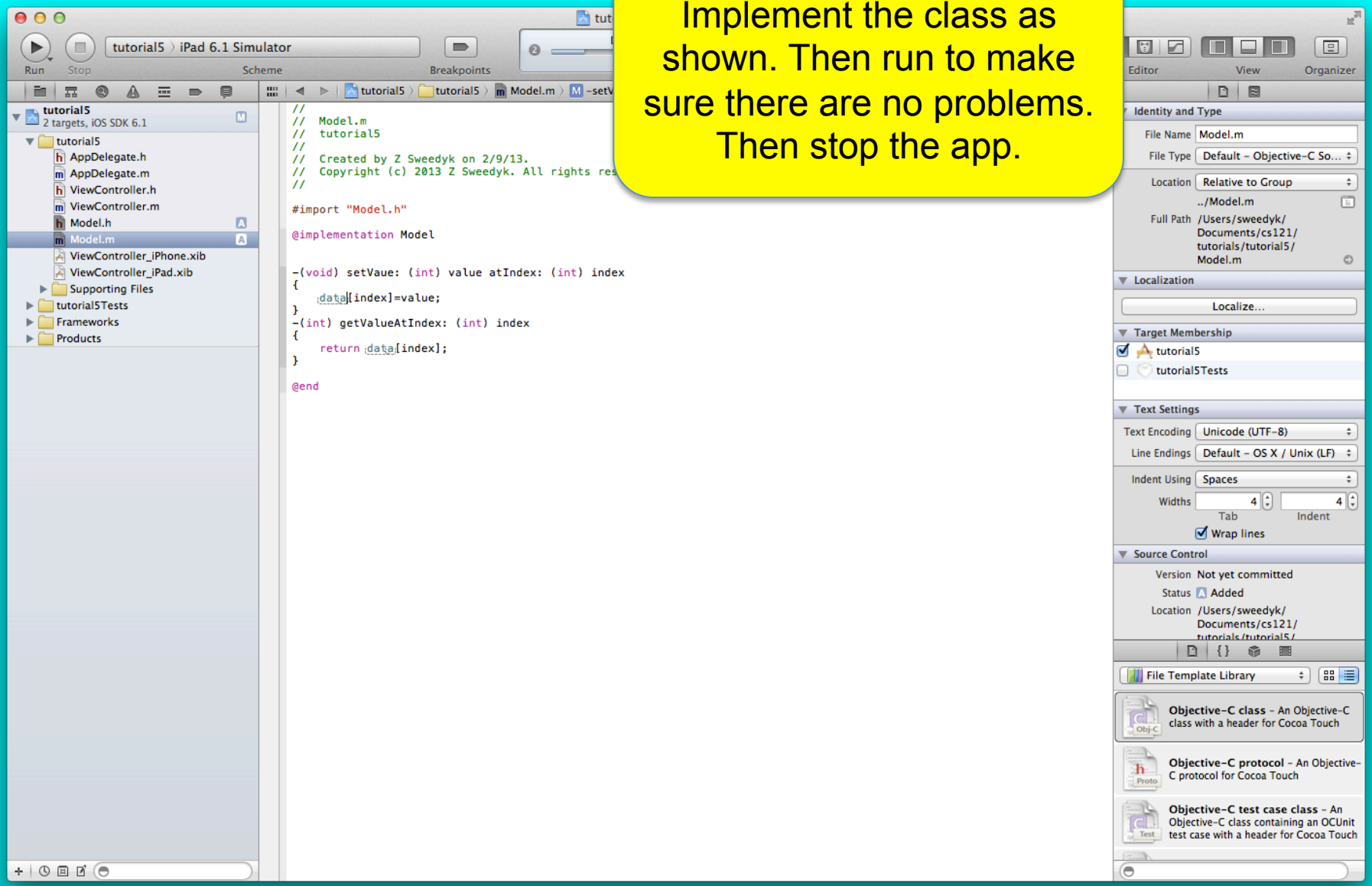
your new file:

Class: Model

Subclass of: NSObject

Cancel | Previous | Next


Define the interface as shown.
tutorial5 〉 iPad 6.1 Simulator
Run
Stop
Scheme
Editor
View
Organizer
tutorial5
2 targets, iOS SDK 6.1
tutorial5
AppDelegate.h
AppDelegate.m
ViewController.h
ViewController.m
Model.h
Model.m
ViewController_iPhone.xib
ViewController_iPad.xib
Supporting Files
tutorial5Tests
Frameworks
Products
//
// Model.h
// tutorial5
//
// Created by Z Sweedyk o
// Copyright (c) 2013 Z Sw
//
#import <Foundation/Foundation.h>
@interface Model : NSObject
{
int data[5];
}
-(void) setVaue: (int) value atIndex: (int) index;
-(int) getValueAtIndex: (int) index;
@end
Identity and Type
File Name Model.h
File Type Default – C Header
Location Relative to Group
../Model.h
Full Path /Users/sweedyk/Documents/cs121/tutorials/tutorial5/Model.h
Localization
Localize...
Target Membership
tutorial5
tutorial5Tests
Text Settings
Text Encoding Unicode (UTF-8)
Line Endings Default – OS X / Unix (LF)
Indent Using Spaces
Widths 4 4
Tab
Indent
Wrap lines
Source Control
Version Not yet committed
Status Added
Location /Users/sweedyk/Documents/cs121/tutorials/tutorial5/Model.h
File Template Library
Objective-C class – An Objective-C class with a header for Cocoa Touch
Objective-C protocol – An Objective-C protocol for Cocoa Touch
Objective-C test case class – An Objective-C class containing an OCUnit test case with a header for Cocoa Touch


Implement the class as shown. Then run to make sure there are no problems. Then stop the app.
tutorial5 › iPad 6.1 Simulator
Run
Stop
Scheme
Breakpoints
Editor
View
Organizer
tutorial5
2 targets, iOS SDK 6.1
tutorial5
AppDelegate.h
AppDelegate.m
ViewController.h
ViewController.m
Model.h
Model.m
ViewController_iPhone.xib
ViewController_iPad.xib
Supporting Files
tutorial5Tests
Frameworks
Products
//
// Model.m
// tutorial5
//
// Created by Z Sweedyk on 2/9/13.
// Copyright (c) 2013 Z Sweedyk. All rights res
//
#import "Model.h"
@implementation Model
-(void) setVaue: (int) value atIndex: (int) index
{
data[index]=value;
}
-(int) getValueAtIndex: (int) index
{
return data[index];
}
@end
Identity and Type
File Name Model.m
File Type Default – Objective-C So...
Location Relative to Group
../Model.m
Full Path /Users/sweedyk/Documents/cs121/tutorials/tutorial5/Model.m
Localization
Localize...
Target Membership
tutorial5
tutorial5Tests
Text Settings
Text Encoding Unicode (UTF-8)
Line Endings Default – OS X / Unix (LF)
Indent Using Spaces
Widths 4 4
Tab Indent
Wrap lines
Source Control
Version Not yet committed
Status Added
Location /Users/sweedyk/Documents/cs121/tutorials/tutorial5/
File Template Library
Objective-C class – An Objective-C class with a header for Cocoa Touch
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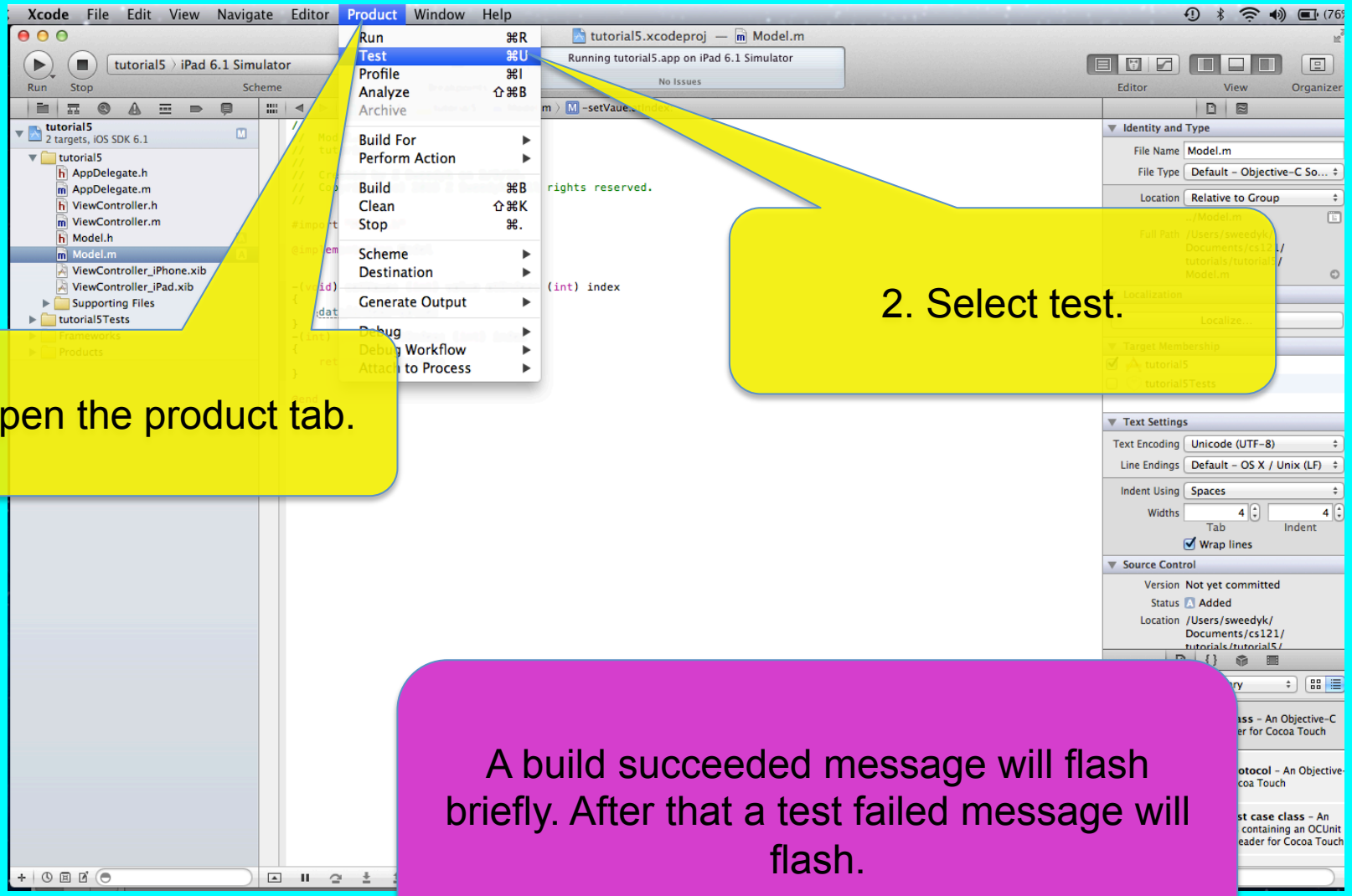
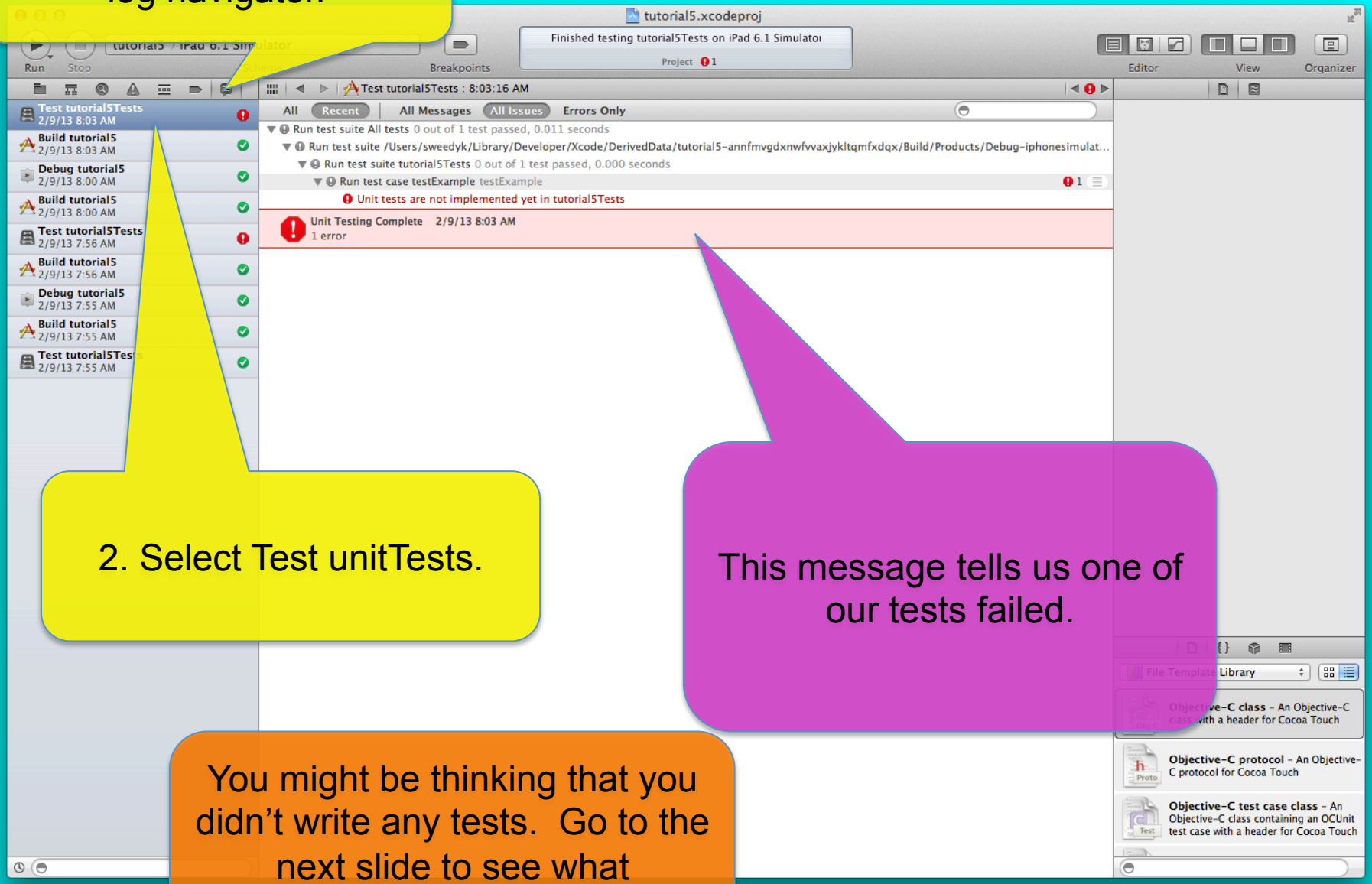
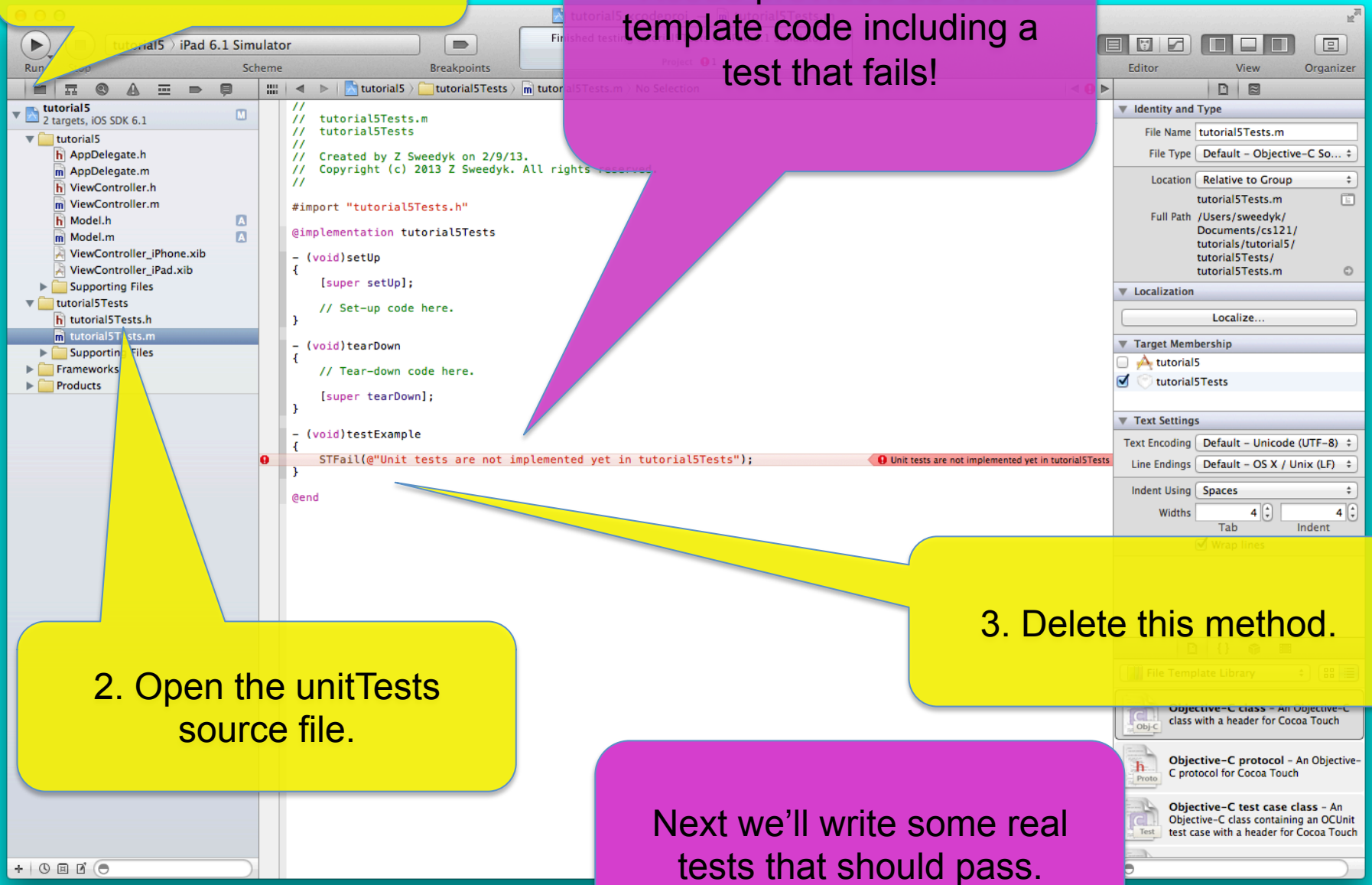

Xcode File Edit View Navigate Editor Product Window Help
Run ⌘R
Test ⌘U
Profile ⌘I
Analyze ⇧⌘B
Archive
Build For
Perform Action
Build ⌘B
Clean ⇧⌘K
Stop ⌘.
Scheme
Destination
Generate Output
tutorial5.xcodeproj — Model.m
Running tutorial5.app on iPad 6.1 Simulator
No Issues
tutorial5 › iPad 6.1 Simulator
Run Stop Scheme
Editor View Organizer
tutorial5
2 targets, iOS SDK 6.1
AppDelegate.h
AppDelegate.m
ViewController.h
ViewController.m
Model.h
Model.m
ViewController_iPhone.xib
ViewController_iPad.xib
Supporting Files
tutorial5Tests
Frameworks
Products
Identity and Type
File Name Model.m
File Type Default – Objective-C So...
Location Relative to Group
Target Membership
Text Settings
Text Encoding Unicode (UTF-8)
Line Endings Default – OS X / Unix (LF)
Indent Using Spaces
Widths 4 4
Tab Indent
Wrap lines
Source Control
Version Not yet committed
Status Added
Location /Users/sweedyk/
Documents/cs121/
1. Open the product tab.
2. Select test.
A build succeeded message will flash briefly. After that a test failed message will flash.


1. Click here to open the log navigator.
tutorial5.xcodeproj
Finished testing tutorial5Tests on iPad 6.1 Simulator
Project 1
Run
Stop
Breakpoints
Editor
View
Organizer
Test tutorial5Tests : 8:03:16 AM
All
Recent
All Messages
All Issues
Errors Only
Run test suite All tests 0 out of 1 test passed, 0.011 seconds
Run test suite /Users/sweedyk/Library/Developer/Xcode/DerivedData/tutorial5-annfmvgdxnwfvvaxjykltqmfxdqx/Build/Products/Debug-iphonesimulat...
Run test suite tutorial5Tests 0 out of 1 test passed, 0.000 seconds
Run test case testExample testExample
Unit tests are not implemented yet in tutorial5Tests
Unit Testing Complete 2/9/13 8:03 AM
1 error
Test tutorial5Tests 2/9/13 8:03 AM
Build tutorial5 2/9/13 8:03 AM
Debug tutorial5 2/9/13 8:00 AM
Build tutorial5 2/9/13 8:00 AM
Test tutorial5Tests 2/9/13 7:56 AM
Build tutorial5 2/9/13 7:56 AM
Debug tutorial5 2/9/13 7:55 AM
Build tutorial5 2/9/13 7:55 AM
Test tutorial5Tests 2/9/13 7:55 AM
2. Select Test unitTests.
This message tells us one of our tests failed.
You might be thinking that you didn't write any tests. Go to the next slide to see what happened.
Library
Objective-C class - An Objective-C class with a header for Cocoa Touch
Objective-C protocol - An Objective-C protocol for Cocoa Touch
Objective-C test case class - An Objective-C class containing an OCUnit test case with a header for Cocoa Touch

1. Open the project navigator.

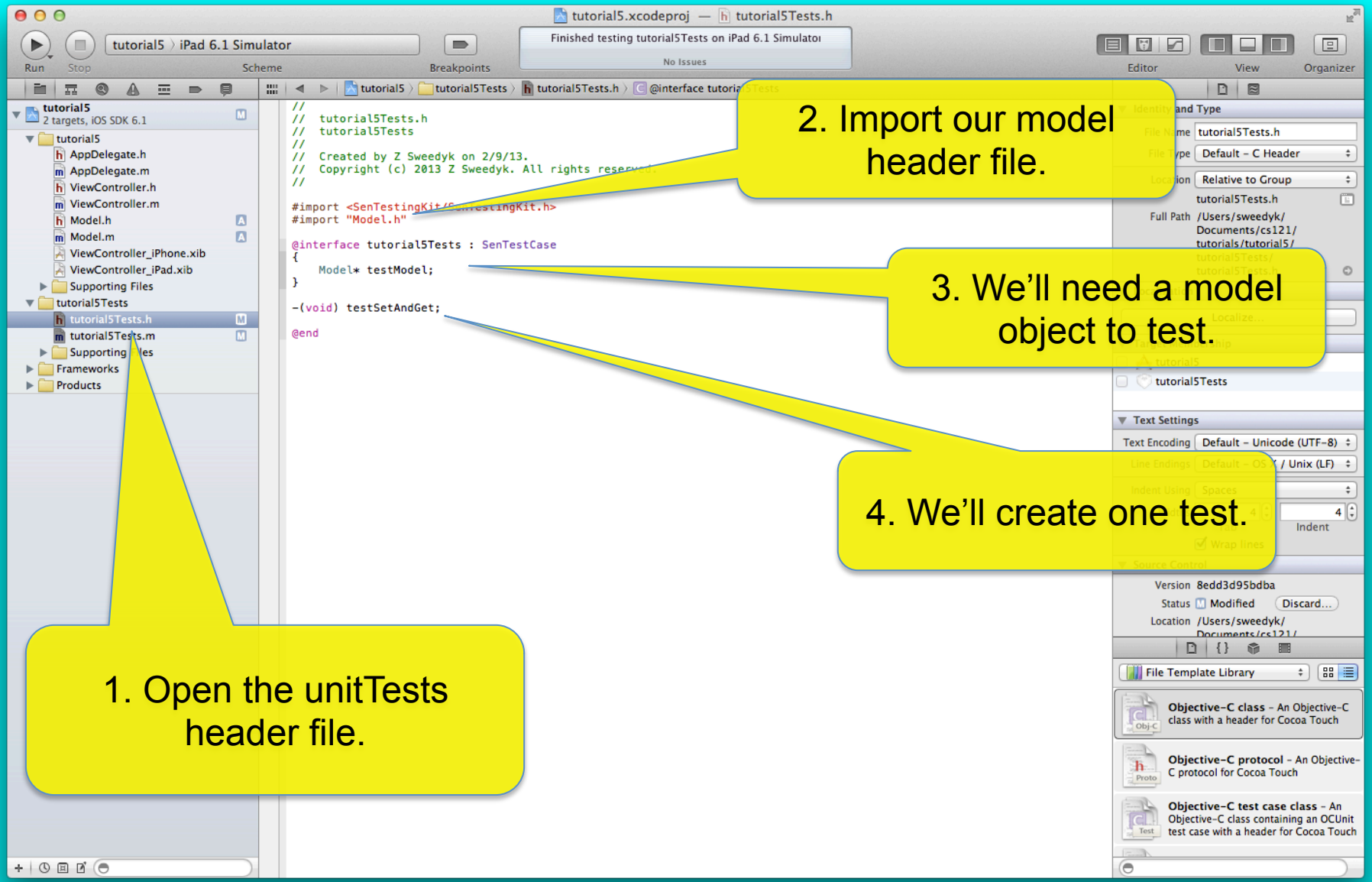
Xcode provided us with template code including a test that fails!

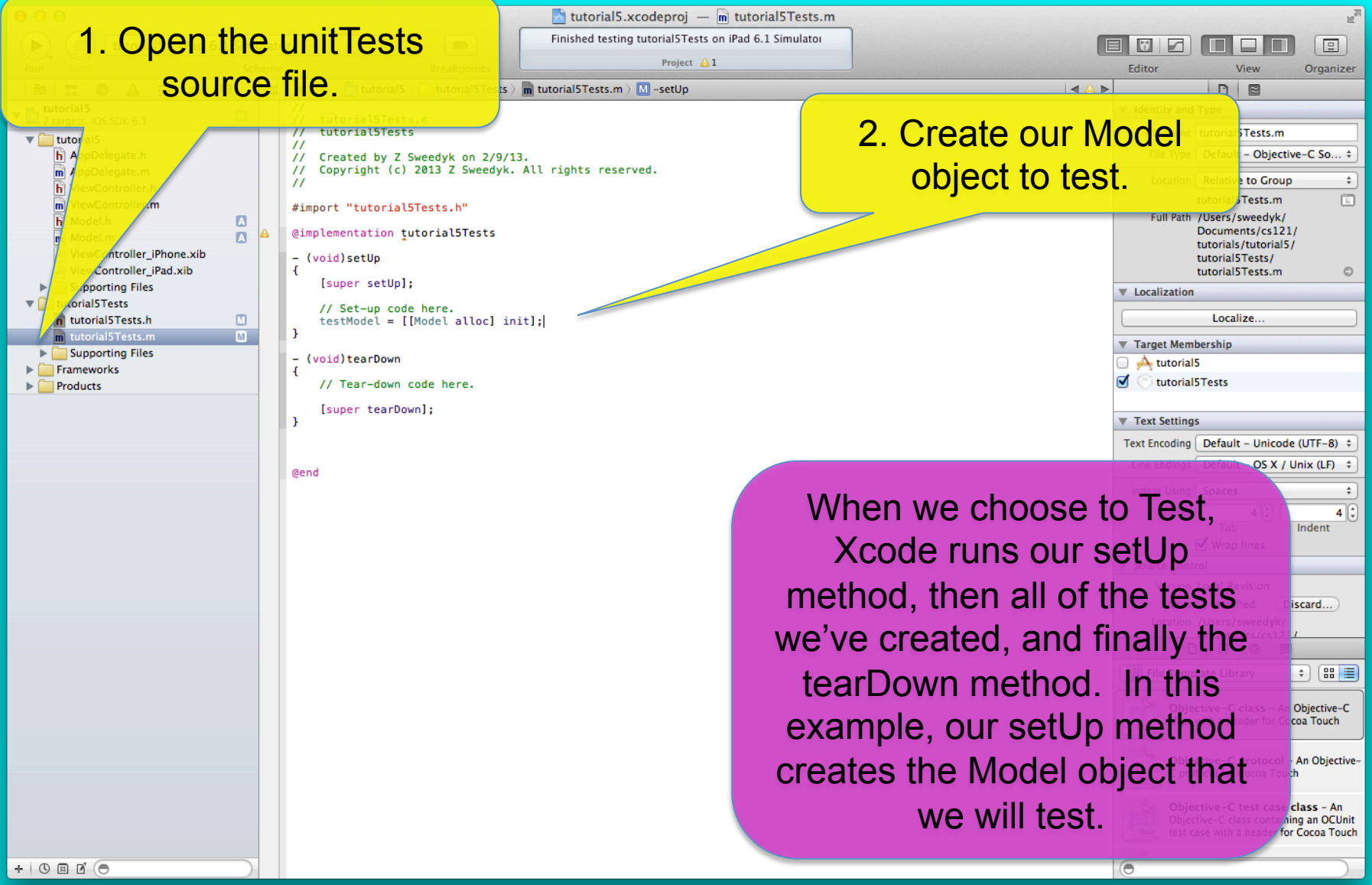


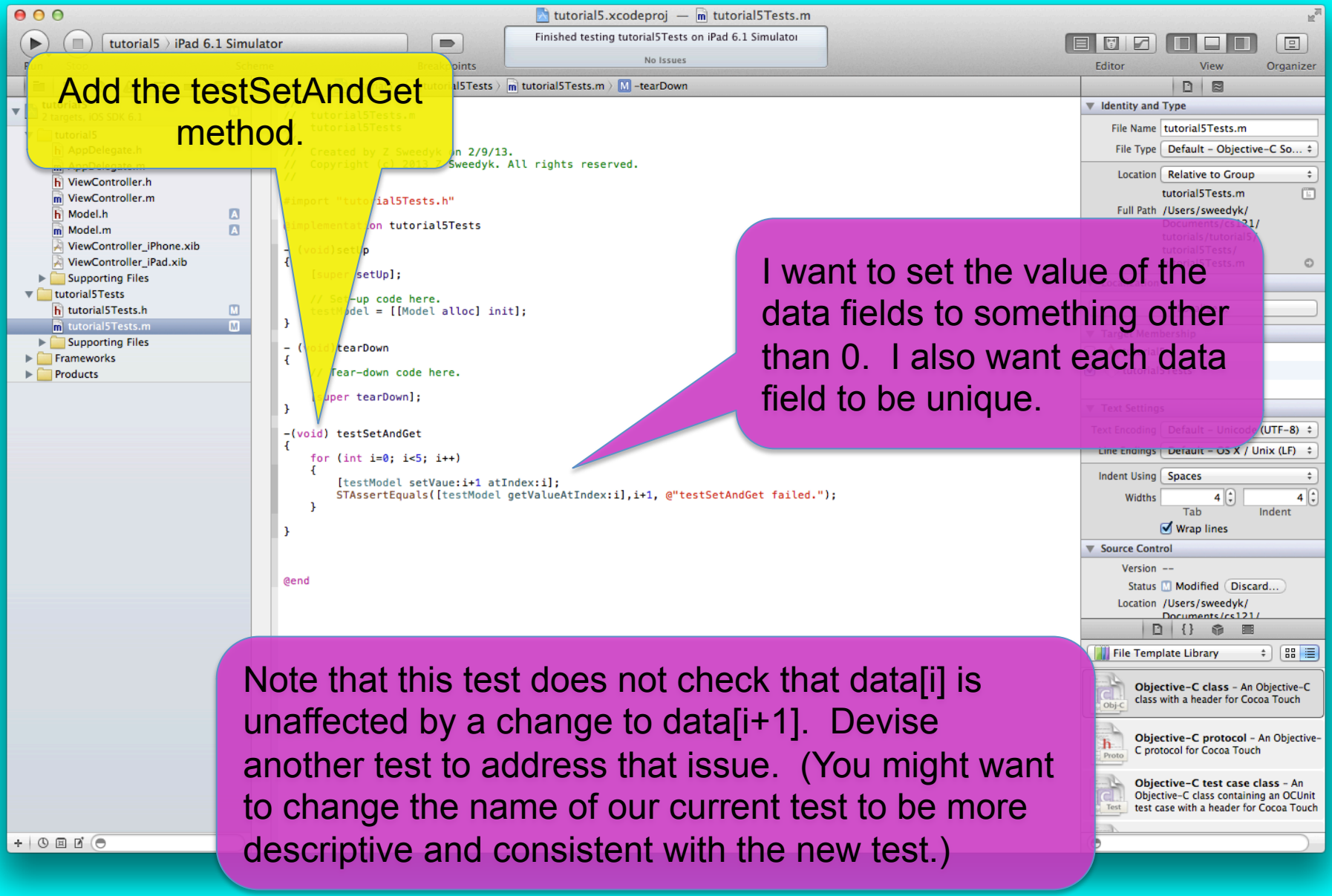
2. Open the unitTests source file.

3. Delete this method.

Next we'll write some real tests that should pass.


tutorial5.xcodeproj — tutorial5Tests.h
Run
Stop
tutorial5 〉 iPad 6.1 Simulator
Scheme
Breakpoints
Finished testing tutorial5Tests on iPad 6.1 Simulator
No Issues
Editor
View
Organizer
tutorial5
2 targets, iOS SDK 6.1
tutorial5
AppDelegate.h
AppDelegate.m
ViewController.h
ViewController.m
Model.h
Model.m
ViewController_iPhone.xib
ViewController_iPad.xib
Supporting Files
tutorial5Tests
tutorial5Tests.h
tutorial5Tests.m
Supporting Files
Frameworks
Products
tutorial5 〉 tutorial5Tests 〉 tutorial5Tests.h 〉 @interface tutorial5Tests
//
// tutorial5Tests.h
// tutorial5Tests
//
// Created by Z Sweedyk on 2/9/13.
// Copyright (c) 2013 Z Sweedyk. All rights reserved.
//
#import <SenTestingKit/SenTestingKit.h>
#import "Model.h"
@interface tutorial5Tests : SenTestCase
{
Model* testModel;
}
-(void) testSetAndGet;
@end
2. Import our model header file.
3. We'll need a model object to test.
4. We'll create one test.
1. Open the unitTests header file.
Identity and Type
Name tutorial5Tests.h
Type Default – C Header
Location Relative to Group
tutorial5Tests.h
Full Path /Users/sweedyk/Documents/cs121/tutorials/tutorial5/tutorial5Tests/tutorial5Tests.h
Localize...
tutorial5
tutorial5Tests
Text Settings
Text Encoding Default – Unicode (UTF-8)
Line Endings Default – OS X / Unix (LF)
Indent Using Spaces
Indent
Wrap lines
Source Control
Version 8edd3d95bdba
Status Modified
Discard...
Location /Users/sweedyk/Documents/cs121/
File Template Library
Objective-C class – An Objective-C class with a header for Cocoa Touch
Objective-C protocol – An Objective-C protocol for Cocoa Touch
Objective-C test case class – An Objective-C class containing an OCUnit test case with a header for Cocoa Touch


1. Open the unitTests source file.
2. Create our Model object to test.
When we choose to Test, Xcode runs our setUp method, then all of the tests we've created, and finally the tearDown method. In this example, our setUp method creates the Model object that we will test.
tutorial5.xcodeproj — tutorial5Tests.m
Finished testing tutorial5Tests on iPad 6.1 Simulator
Editor
View
Organizer
tutorial5Tests.m
-setUp
//
// tutorial5Tests
//
// Created by Z Sweedyk on 2/9/13.
// Copyright (c) 2013 Z Sweedyk. All rights reserved.
//
#import "tutorial5Tests.h"
@implementation tutorial5Tests
- (void)setUp
{
[super setUp];
// Set-up code here.
testModel = [[Model alloc] init];
}
- (void)tearDown
{
// Tear-down code here.
[super tearDown];
}
@end
tutorial5Tests.h
tutorial5Tests.m
Supporting Files
Frameworks
Products
Localization
Localize...
Target Membership
tutorial5
tutorial5Tests
Text Settings
Text Encoding
Default - Unicode (UTF-8)
Full Path /Users/sweedyk/Documents/cs121/tutorials/tutorial5/tutorial5Tests/tutorial5Tests.m


Add the testSetAndGet method.
I want to set the value of the data fields to something other than 0. I also want each data field to be unique.
Note that this test does not check that data[i] is unaffected by a change to data[i+1]. Devise another test to address that issue. (You might want to change the name of our current test to be more descriptive and consistent with the new test.)
tutorial5.xcodeproj — tutorial5Tests.m
Finished testing tutorial5Tests on iPad 6.1 Simulator
No Issues
tutorial5 〉 iPad 6.1 Simulator
Editor
View
Organizer
tutorial5Tests 〉 tutorial5Tests.m 〉 -tearDown
ViewController.h
ViewController.m
Model.h
Model.m
ViewController_iPhone.xib
ViewController_iPad.xib
Supporting Files
tutorial5Tests
tutorial5Tests.h
tutorial5Tests.m
Supporting Files
Frameworks
Products
// Created by Z Sweedyk on 2/9/13.
// Copyright (c) 2013 Z Sweedyk. All rights reserved.
#import "tutorial5Tests.h"
@implementation tutorial5Tests
- (void)setUp
{
[super setUp];
// Set-up code here.
testModel = [[Model alloc] init];
}
- (void)tearDown
{
// Tear-down code here.
[super tearDown];
}
-(void) testSetAndGet
{
for (int i=0; i<5; i++)
{
[testModel setVaue:i+1 atIndex:i];
STAssertEquals([testModel getValueAtIndex:i],i+1, @"testSetAndGet failed.");
}
}
@end
Identity and Type
File Name tutorial5Tests.m
File Type Default - Objective-C So...
Location Relative to Group
tutorial5Tests.m
Full Path /Users/sweedyk/
Indent Using Spaces
Widths 4 4
Tab Indent
Wrap lines
Source Control
Version --
Status Modified Discard...
Location /Users/sweedyk/
File Template Library
Objective-C class - An Objective-C class with a header for Cocoa Touch
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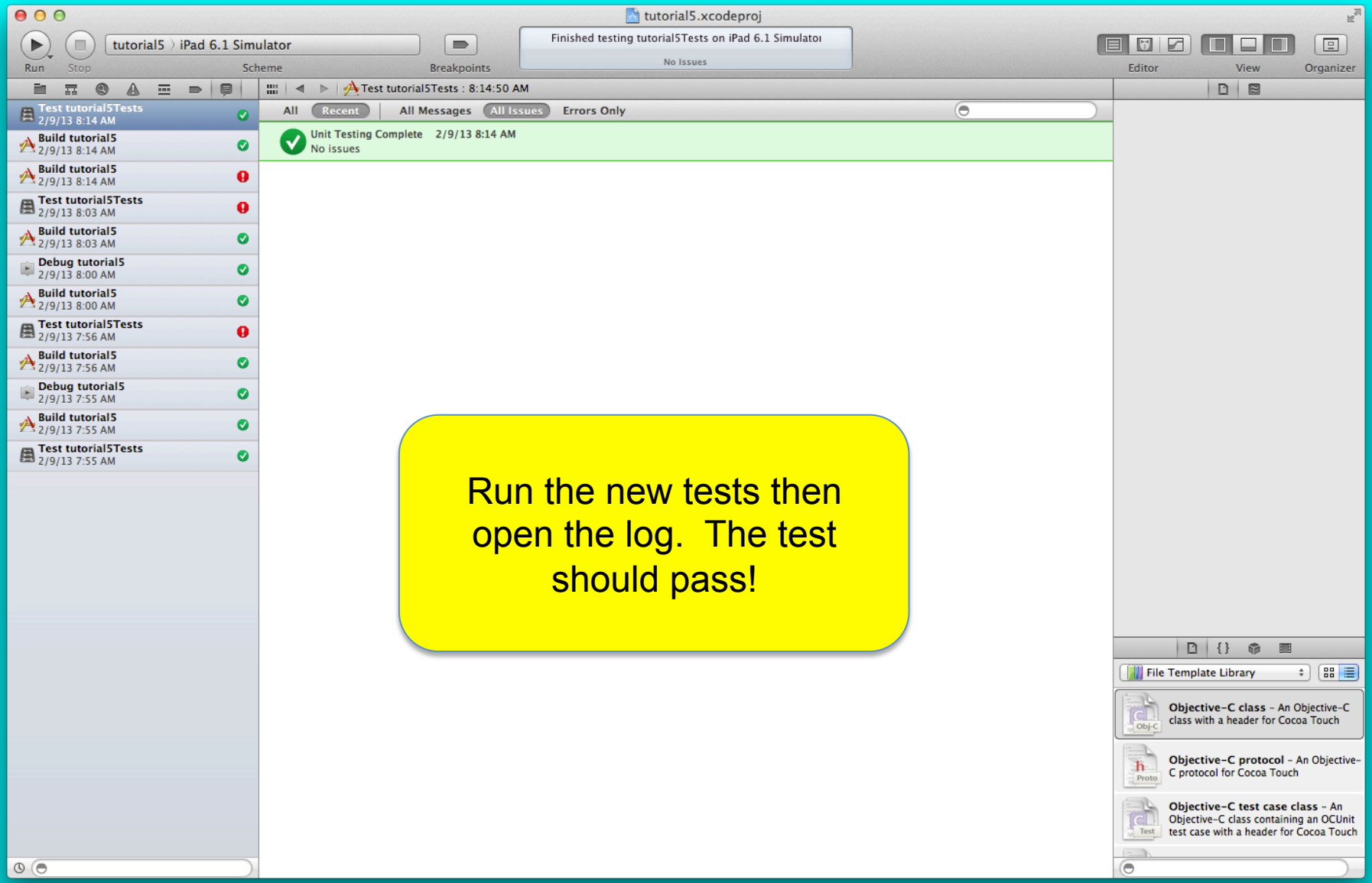
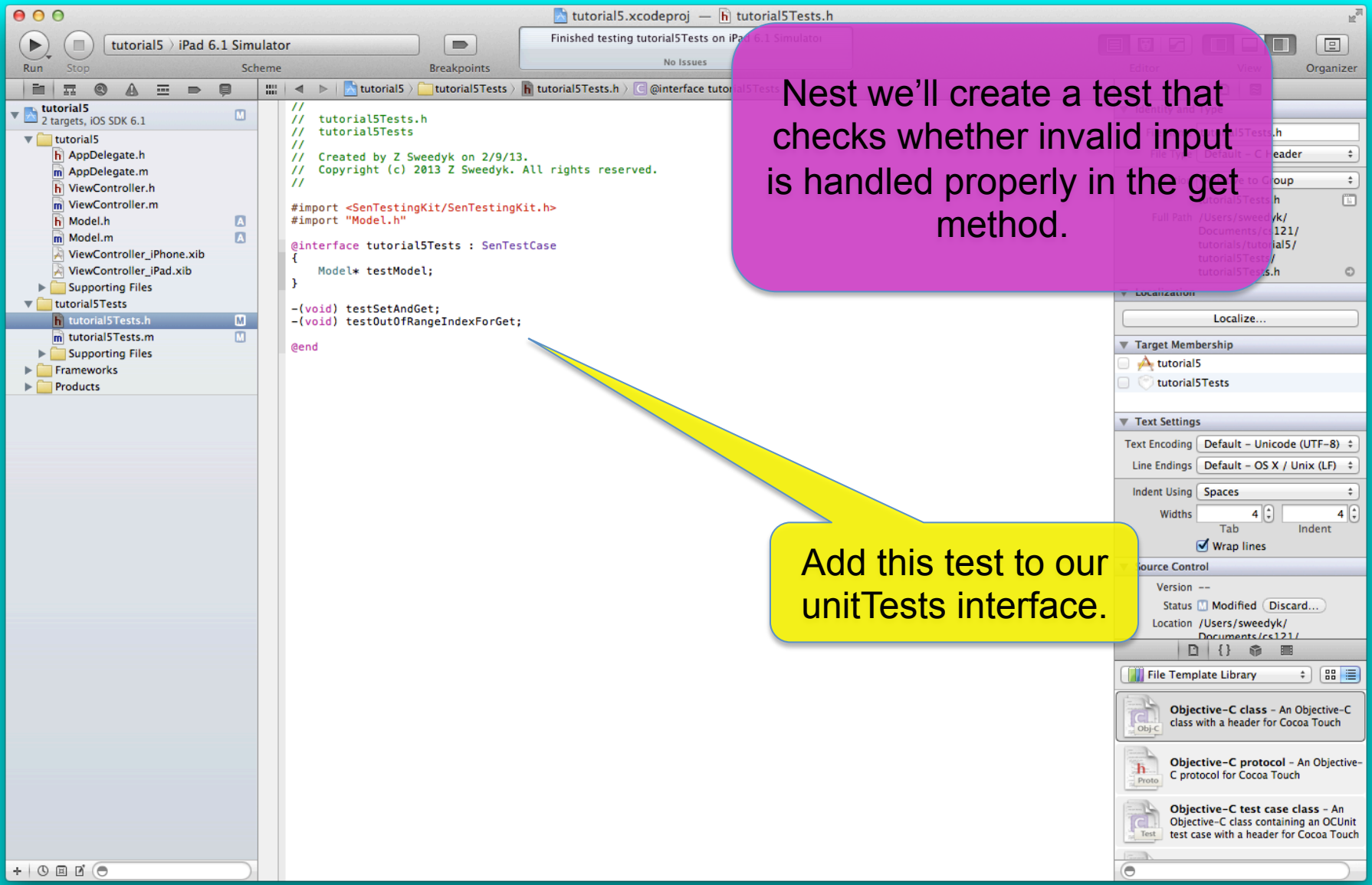
Objective-C test case class - An Objective-C class containing an OCUnit test case with a header for Cocoa Touch


tutorial5.xcodeproj
Run
Stop
tutorial5 〉 iPad 6.1 Simulator
Scheme
Breakpoints
Finished testing tutorial5Tests on iPad 6.1 Simulator
No Issues
Editor
View
Organizer
Test tutorial5Tests : 8:14:50 AM
All
Recent
All Messages
All Issues
Errors Only
Unit Testing Complete 2/9/13 8:14 AM
No issues
Test tutorial5Tests 2/9/13 8:14 AM
Build tutorial5 2/9/13 8:14 AM
Build tutorial5 2/9/13 8:14 AM
Test tutorial5Tests 2/9/13 8:03 AM
Build tutorial5 2/9/13 8:03 AM
Debug tutorial5 2/9/13 8:00 AM
Build tutorial5 2/9/13 8:00 AM
Test tutorial5Tests 2/9/13 7:56 AM
Build tutorial5 2/9/13 7:56 AM
Debug tutorial5 2/9/13 7:55 AM
Build tutorial5 2/9/13 7:55 AM
Test tutorial5Tests 2/9/13 7:55 AM
Run the new tests then open the log. The test should pass!
File Template Library
Objective-C class – An Objective-C class with a header for Cocoa Touch
Objective-C protocol – An Objective-C protocol for Cocoa Touch
Objective-C test case class – An Objective-C class containing an OCUnit test case with a header for Cocoa Touch


tutorial5.xcodeproj — tutorial5Tests.h
Run
Stop
tutorial5 〉 iPad 6.1 Simulator
Scheme
Breakpoints
Finished testing tutorial5Tests on iPad 6.1 Simulator
No Issues
Organizer
tutorial5
2 targets, iOS SDK 6.1
tutorial5
AppDelegate.h
AppDelegate.m
ViewController.h
ViewController.m
Model.h
Model.m
ViewController_iPhone.xib
ViewController_iPad.xib
Supporting Files
tutorial5Tests
tutorial5Tests.h
tutorial5Tests.m
Supporting Files
Frameworks
Products
//
// tutorial5Tests.h
// tutorial5Tests
//
// Created by Z Sweedyk on 2/9/13.
// Copyright (c) 2013 Z Sweedyk. All rights reserved.
//
#import <SenTestingKit/SenTestingKit.h>
#import "Model.h"
@interface tutorial5Tests : SenTestCase
{
Model* testModel;
}
-(void) testSetAndGet;
-(void) testOutOfRangeIndexForGet;
@end
Nest we'll create a test that checks whether invalid input is handled properly in the get method.
Add this test to our unitTests interface.
Localize...
Target Membership
tutorial5
tutorial5Tests
Text Settings
Text Encoding Default – Unicode (UTF-8)
Line Endings Default – OS X / Unix (LF)
Indent Using Spaces
Widths 4 4
Tab Indent
Wrap lines
Source Control
Version --
Status Modified Discard...
Location /Users/sweedyk/
File Template Library
Objective-C class – An Objective-C class with a header for Cocoa Touch
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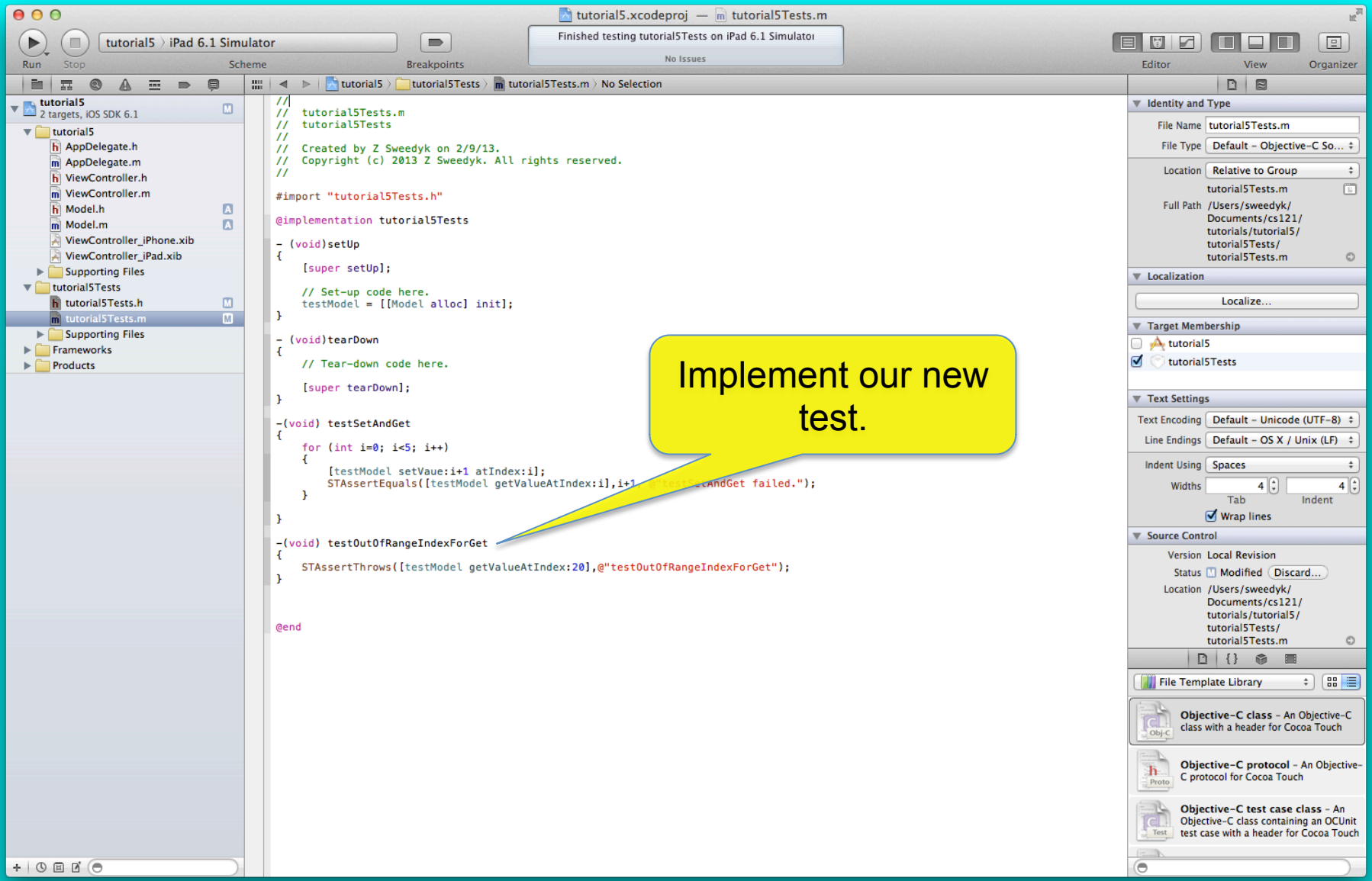
Objective-C test case class – An Objective-C class containing an OCUnit test case with a header for Cocoa Touch


tutorial5.xcodeproj — tutorial5Tests.m
Finished testing tutorial5Tests on iPad 6.1 Simulator
No Issues
Run
Stop
tutorial5 › iPad 6.1 Simulator
Scheme
Breakpoints
Editor
View
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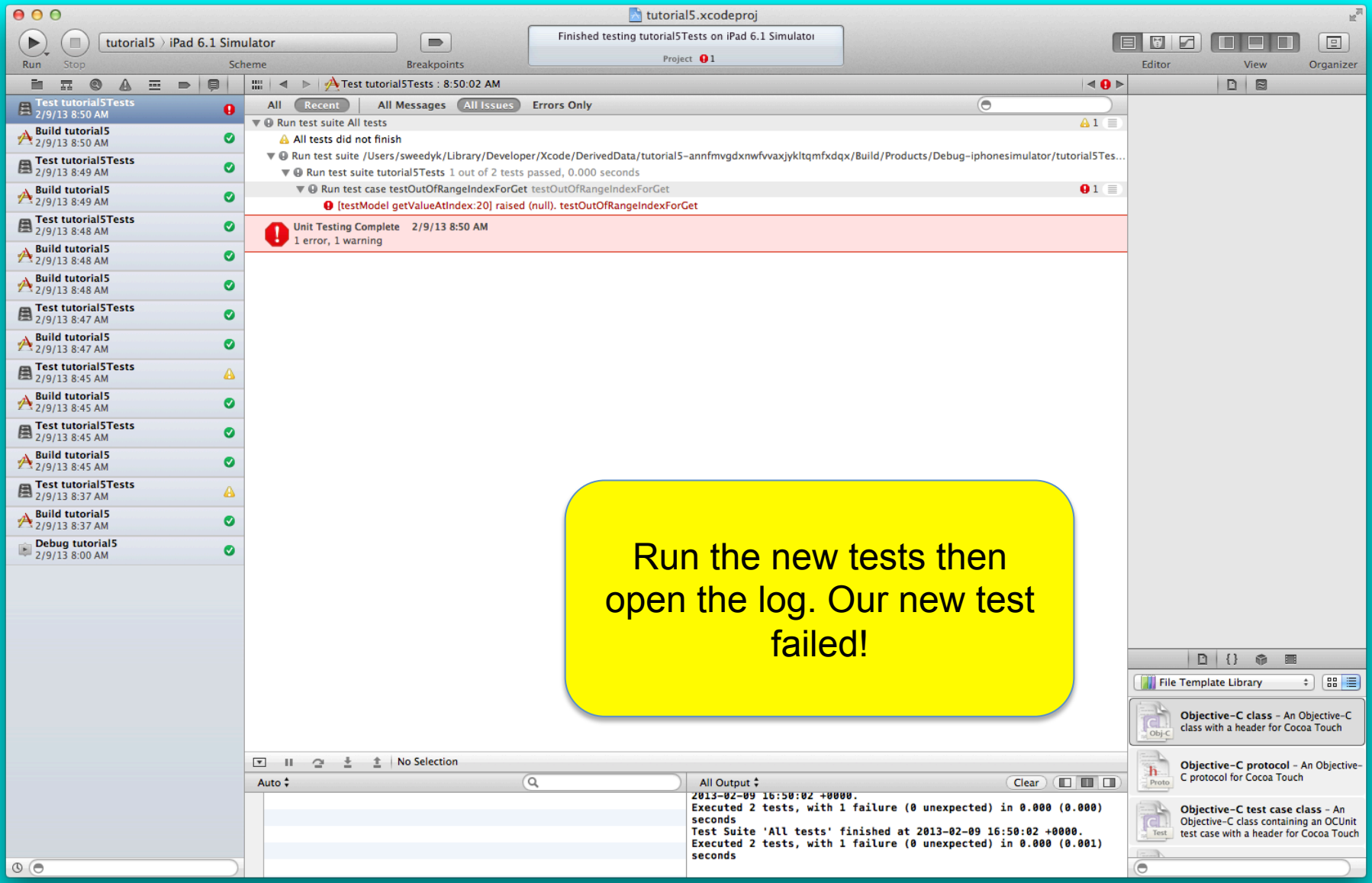
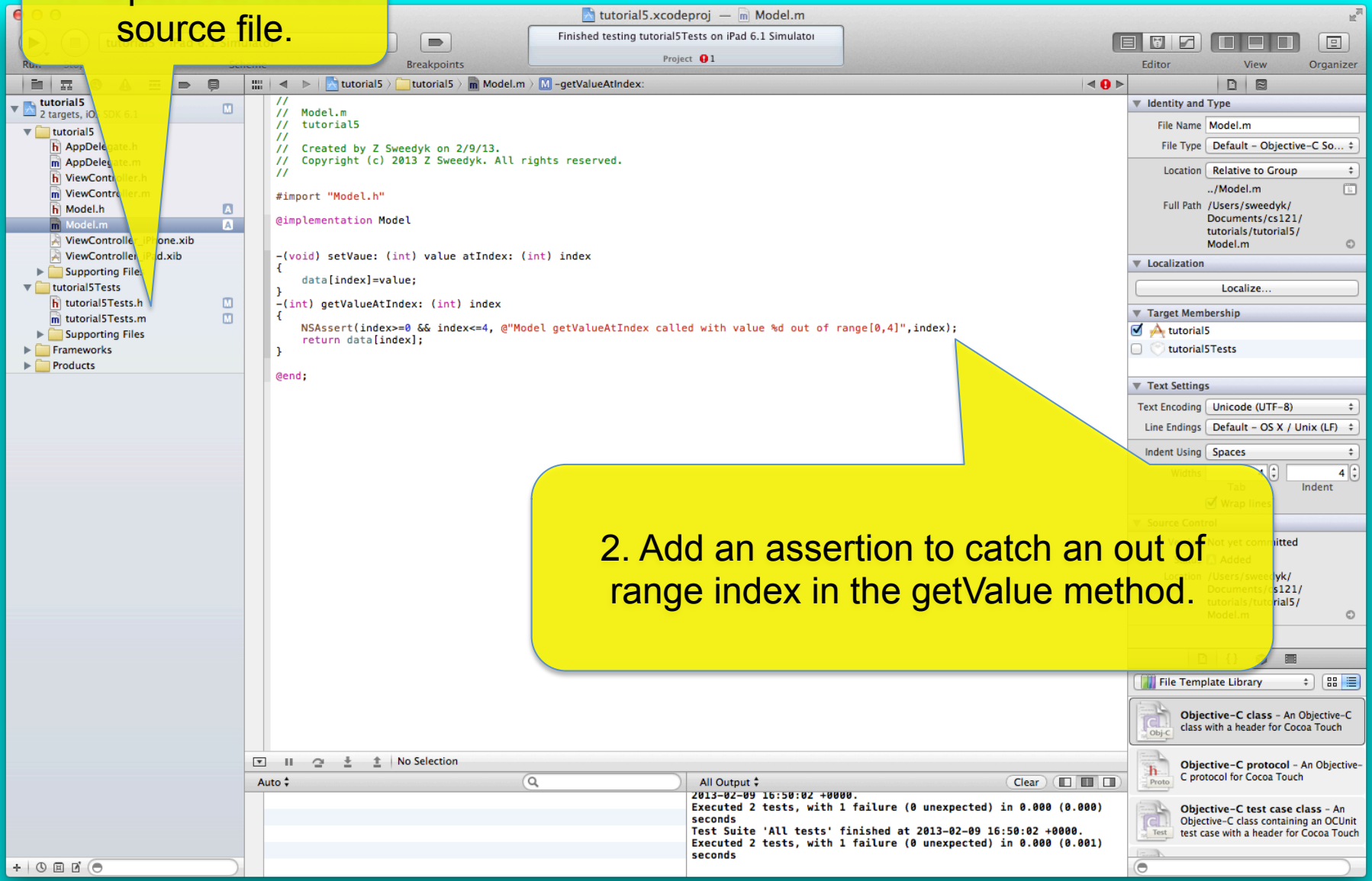
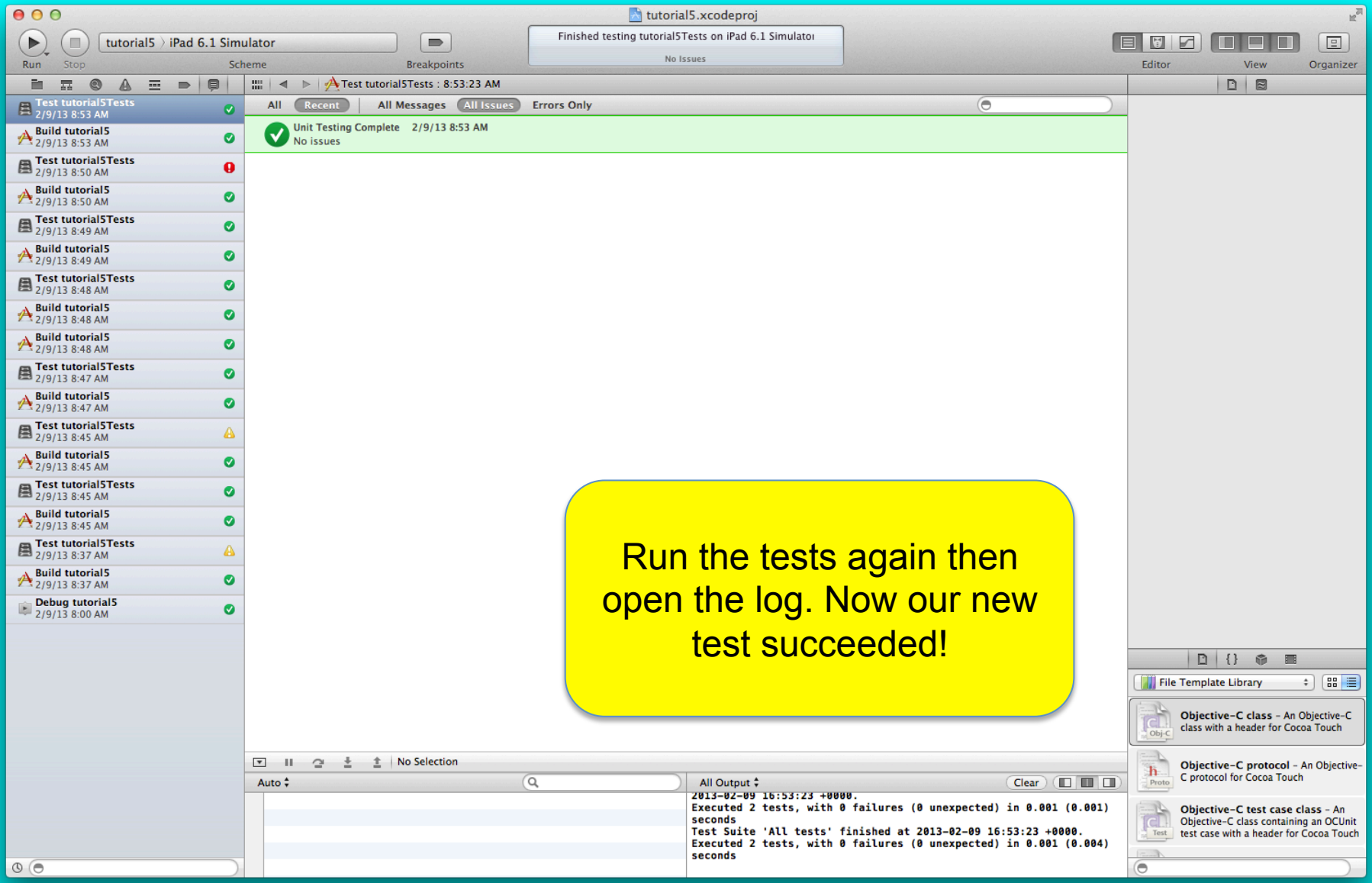
tutorial5
2 targets, iOS SDK 6.1
tutorial5
AppDelegate.h
AppDelegate.m
ViewController.h
ViewController.m
Model.h
Model.m
ViewController_iPhone.xib
ViewController_iPad.xib
Supporting Files
tutorial5Tests
tutorial5Tests.h
tutorial5Tests.m
Supporting Files
Frameworks
Products
tutorial5 › tutorial5Tests › tutorial5Tests.m › No Selection
//
// tutorial5Tests.m
// tutorial5Tests
//
// Created by Z Sweedyk on 2/9/13.
// Copyright (c) 2013 Z Sweedyk. All rights reserved.
//
#import "tutorial5Tests.h"
@implementation tutorial5Tests
- (void)setUp
{
[super setUp];
// Set-up code here.
testModel = [[Model alloc] init];
}
- (void)tearDown
{
// Tear-down code here.
[super tearDown];
}
-(void) testSetAndGet
{
for (int i=0; i<5; i++)
{
[testModel setVaue:i+1 atIndex:i];
STAssertEquals([testModel getValueAtIndex:i],i+1,@"testSetAndGet failed.");
}
}
-(void) testOutOfRangeIndexForGet
{
STAssertThrows([testModel getValueAtIndex:20],@"testOutOfRangeIndexForGet");
}
@end
Implement our new test.
Identity and Type
File Name tutorial5Tests.m
File Type Default – Objective-C So...
Location Relative to Group
tutorial5Tests.m
Full Path /Users/sweedyk/Documents/cs121/tutorials/tutorial5/tutorial5Tests/tutorial5Tests.m
Localization
Localize...
Target Membership
tutorial5
tutorial5Tests
Text Settings
Text Encoding Default – Unicode (UTF-8)
Line Endings Default – OS X / Unix (LF)
Indent Using Spaces
Widths 4 Tab 4 Indent
Wrap lines
Source Control
Version Local Revision
Status Modified Discard...
Location /Users/sweedyk/Documents/cs121/tutorials/tutorial5/tutorial5Tests/tutorial5Tests.m
File Template Library
Objective-C class – An Objective-C class with a header for Cocoa Touch
Objective-C protocol – An Objective-C protocol for Cocoa Touch
Objective-C test case class – An Objective-C class containing an OCUnit test case with a header for Cocoa Touch


tutorial5.xcodeproj
Run
Stop
tutorial5 〉 iPad 6.1 Simulator
Scheme
Breakpoints
Finished testing tutorial5Tests on iPad 6.1 Simulator
Project 1
Editor
View
Organizer
Test tutorial5Tests : 8:50:02 AM
All
Recent
All Messages
All Issues
Errors Only
Run test suite All tests
All tests did not finish
Run test suite /Users/sweedyk/Library/Developer/Xcode/DerivedData/tutorial5-annfmvgdxnwfvvaxjykltqmfxdqx/Build/Products/Debug-iphonesimulator/tutorial5Tes...
Run test suite tutorial5Tests 1 out of 2 tests passed, 0.000 seconds
Run test case testOutOfRangeIndexForGet testOutOfRangeIndexForGet
[testModel getValueAtIndex:20] raised (null). testOutOfRangeIndexForGet
Unit Testing Complete 2/9/13 8:50 AM
1 error, 1 warning
Test tutorial5Tests 2/9/13 8:50 AM
Build tutorial5 2/9/13 8:50 AM
Test tutorial5Tests 2/9/13 8:49 AM
Build tutorial5 2/9/13 8:49 AM
Test tutorial5Tests 2/9/13 8:48 AM
Build tutorial5 2/9/13 8:48 AM
Build tutorial5 2/9/13 8:48 AM
Test tutorial5Tests 2/9/13 8:47 AM
Build tutorial5 2/9/13 8:47 AM
Test tutorial5Tests 2/9/13 8:45 AM
Build tutorial5 2/9/13 8:45 AM
Test tutorial5Tests 2/9/13 8:45 AM
Build tutorial5 2/9/13 8:45 AM
Test tutorial5Tests 2/9/13 8:37 AM
Build tutorial5 2/9/13 8:37 AM
Debug tutorial5 2/9/13 8:00 AM
Run the new tests then open the log. Our new test failed!
No Selection
Auto
All Output
Clear
2013-02-09 16:50:02 +0000.
Executed 2 tests, with 1 failure (0 unexpected) in 0.000 (0.000) seconds
Test Suite 'All tests' finished at 2013-02-09 16:50:02 +0000.
Executed 2 tests, with 1 failure (0 unexpected) in 0.000 (0.001) seconds
File Template Library
Objective-C class – An Objective-C class with a header for Cocoa Touch
Objective-C protocol – An Objective-C protocol for Cocoa Touch
Objective-C test case class – An Objective-C class containing an OCUnit test case with a header for Cocoa Touch

1. Open our Model source file.



2. Add an assertion to catch an out of range index in the getValue method.


tutorial5.xcodeproj
Finished testing tutorial5Tests on iPad 6.1 Simulator
No Issues
Run
Stop
tutorial5 〉 iPad 6.1 Simulator
Scheme
Breakpoints
Editor
View
Organizer
Test tutorial5Tests : 8:53:23 AM
All
Recent
All Messages
All Issues
Errors Only
Unit Testing Complete 2/9/13 8:53 AM
No issues
Test tutorial5Tests 2/9/13 8:53 AM
Build tutorial5 2/9/13 8:53 AM
Test tutorial5Tests 2/9/13 8:50 AM
Build tutorial5 2/9/13 8:50 AM
Test tutorial5Tests 2/9/13 8:49 AM
Build tutorial5 2/9/13 8:49 AM
Test tutorial5Tests 2/9/13 8:48 AM
Build tutorial5 2/9/13 8:48 AM
Build tutorial5 2/9/13 8:48 AM
Test tutorial5Tests 2/9/13 8:47 AM
Build tutorial5 2/9/13 8:47 AM
Test tutorial5Tests 2/9/13 8:45 AM
Build tutorial5 2/9/13 8:45 AM
Test tutorial5Tests 2/9/13 8:45 AM
Build tutorial5 2/9/13 8:45 AM
Test tutorial5Tests 2/9/13 8:37 AM
Build tutorial5 2/9/13 8:37 AM
Debug tutorial5 2/9/13 8:00 AM
Run the tests again then open the log. Now our new test succeeded!
No Selection
Auto
All Output
Clear
2013-02-09 16:53:23 +0000.
Executed 2 tests, with 0 failures (0 unexpected) in 0.001 (0.001) seconds
Test Suite 'All tests' finished at 2013-02-09 16:53:23 +0000.
Executed 2 tests, with 0 failures (0 unexpected) in 0.001 (0.004) seconds
File Template Library
Objective-C class – An Objective-C class with a header for Cocoa Touch
Objective-C protocol – An Objective-C protocol for Cocoa Touch
Objective-C test case class – An Objective-C class containing an OCUnit test case with a header for Cocoa Touch

Update the tests as follows:

1. setUp should fail if testModel is not allocated (i.e. it gets a nil pointer). Check out the link below for STAssert options that will be useful.
2. Add another test to check that the setValue method
   a. Checks that the index is valid
   b. Checks that the value is non-negative
3. Fix our Model implementation as needed so that all tests pass.

Appendix B at the following link gives the STAssert macros that are available.

https://developer.apple.com/library/ios/#documentation/DeveloperTools/Conceptual/UnitTesting/00-About_Unit_Testing/about.html