

# Intro to Object-Oriented Programming: Part 3

LAB 13bX:  
Explicit Directions: Color Bar Subclass

# You're going to create a subclass.

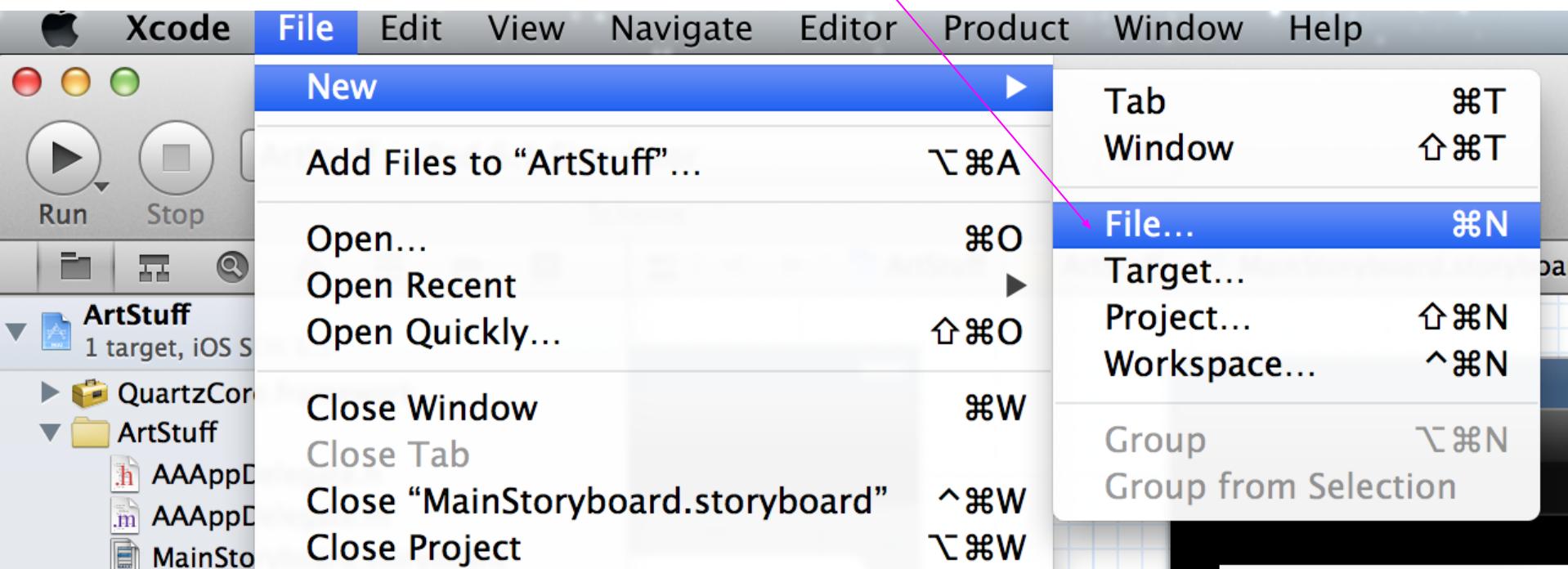
This is the same as for LAB 15a. This one is just a lot more explicit and has pictures.

# Do this (with pictures).

1. Open your **ArtStuff** project in Xcode.
2. Run it to make sure it's working.
3. Create a new class:
  - a. **File > New > File...**
  - b. **Cocoa Touch > Objective-C Class > Next**
  - c. Class: **AAGrayscaleView**
  - d. Subclass of: **ACColorView**
  - e. **Next > Create**
4. Add a new **- (void)changeColorForPercentage:(CGFloat)percentage** method to your new **AAGrayscaleView** class' implementation (.m) file.
5. Instead of using the **[UIColor colorWithHue:...]** method, use:
  - a. **[UIColor colorWithWhite:percentage alpha:1.0f]**
6. Go to your Storyboard, and add a new UIView.
7. Place the new UIView under the color bar that's already there.
8. Select your new UIView in the Storyboard
9. Make the new UIView an instance of **AAGrayscaleView**.
  - a. Do this by selecting the new UIView and using the **Identity inspector** on the right-hand menu.
  - b. In the **Custom Class > Class** field, enter **AAGrayscaleView**
10. Open the **Assistant editor**
11. Connect the new **AAGrayscaleView** to the **@interface** section of the **ACColorsVC.m** file.
  - a. Use control drag and release in the **@interface** section.
  - b. Create a new outlet, named **grayscaleColorView**.
  - c. Create a new **#import "AAGrayscaleColorView.h"** statement at the top of the file.
12. Update the new **grayscaleColorView** right after you update the existing **secondsColorView**:
  - a. **[self.grayscaleColorView changeColorForPercentage:percentage];**
13. Run your app
  - a. Remember, the new color bar starts black (at 0 seconds) and ends up white (at 59 seconds).

# Create a new class.

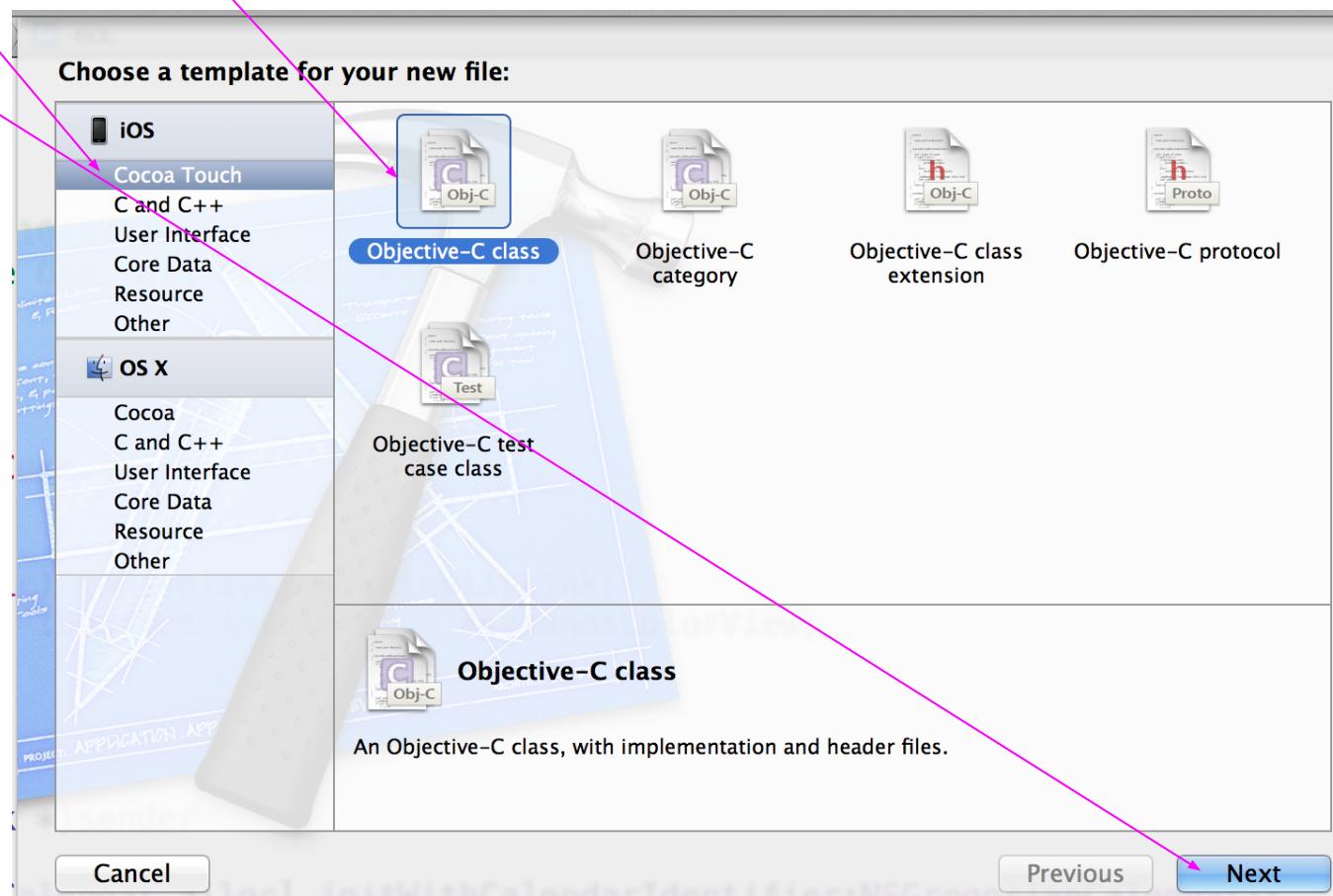
Create a new class by going to **File > New > File...**



# Create a new class.

Select **Cocoa Touch > Objective-C class**

Click **Next**.



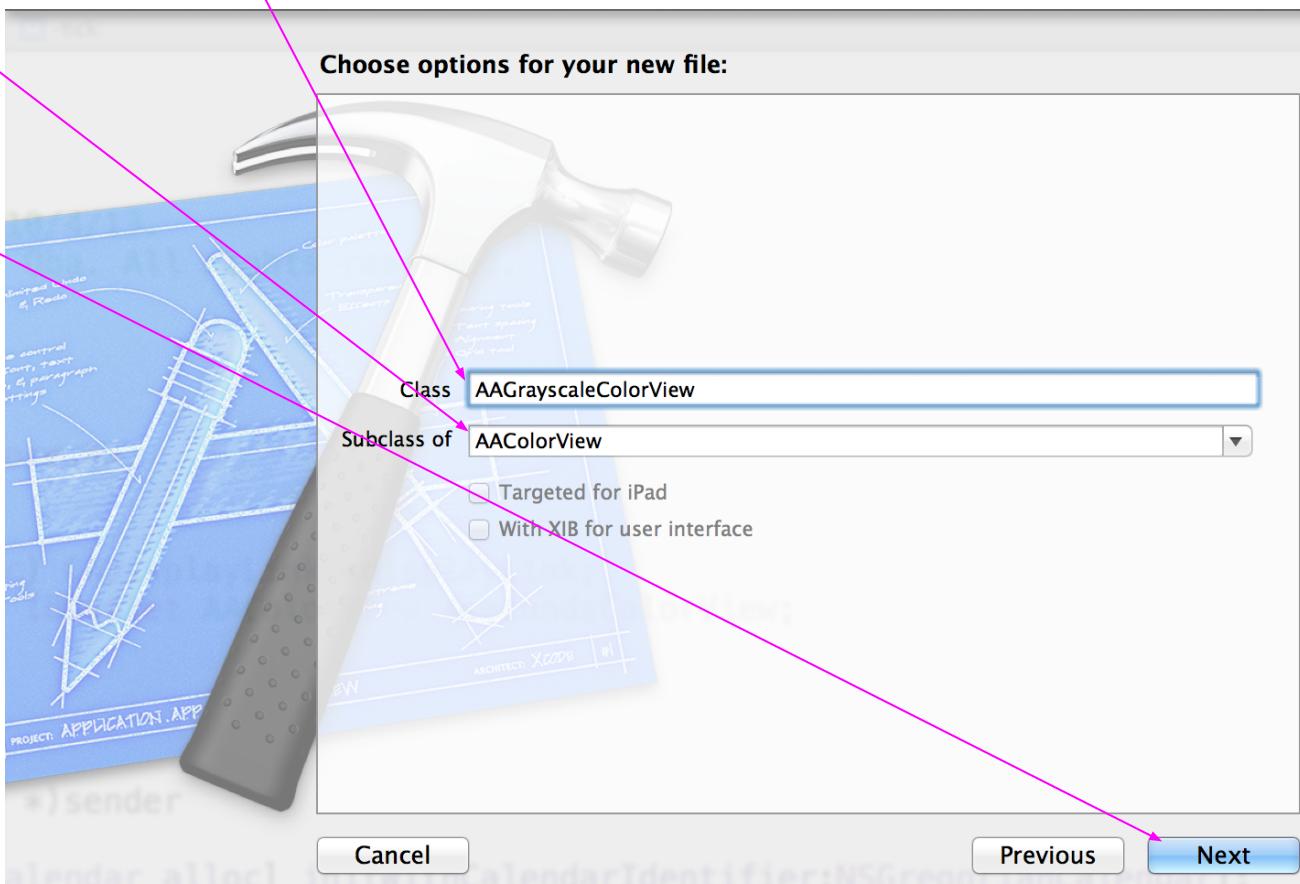
# Create a new class.

The order is a little screwy, but enter the Subclass first:

**AAColorView**

Then enter the Class name: **AAGayscaleColorView**

Click **Next**.



# Override the color change method.

Delete the other methods in **AAGrayscaleColorView.m**

Create a new version of **changeColorForPercentage**:

Notice how we're still using the **percentage** parameter, but we're now changing the color's white value (instead of the hue).

The screenshot shows the Xcode interface with the following details:

- Project Navigator:** Shows the project structure for "ArtStuff". It includes the main target "ArtStuff" (1 target, iOS SDK 6.1), the "QuartzCore.framework" dependency, and the "ArtStuff" group which contains files like "AAAppDelegate.h", "AAAppDelegate.m", "MainStoryboard.storyboard", "AAColorsVC.h", "AAColorsVC.m", "AAColorView.h", "AAColorView.m", "AAGrayscaleColorView.h", and "AAGrayscaleColorView.m".
- Editor:** Displays the code for "AAGrayscaleColorView.m". The code is as follows:

```
// AAGrayscaleColorView.m
// ArtStuff
//
// Created by Kyle Oba on 10/9/13.
// Copyright (c) 2013 Kyle Oba. All rights reserved.

#import "AAGrayscaleColorView.h"

@implementation AAGrayscaleColorView

- (void)changeColorForPercentage:(CGFloat)percentage
{
    self.backgroundColor = [UIColor colorWithWhite:percentage alpha:1.0];
}

@end
```

Annotations:

- Two magenta arrows point from the text "Delete the other methods in AAGrayscaleColorView.m" to the "AAAppDelegate.h" and "AAAppDelegate.m" files in the Project Navigator.
- Two magenta arrows point from the text "Create a new version of changeColorForPercentage:" to the "AAGrayscaleColorView.h" and "AAGrayscaleColorView.m" files in the Project Navigator.
- Two magenta arrows point from the text "Notice how we're still using the percentage parameter, but we're now changing the color's white value (instead of the hue)." to the "AAColorView.h" and "AAColorView.m" files in the Project Navigator.

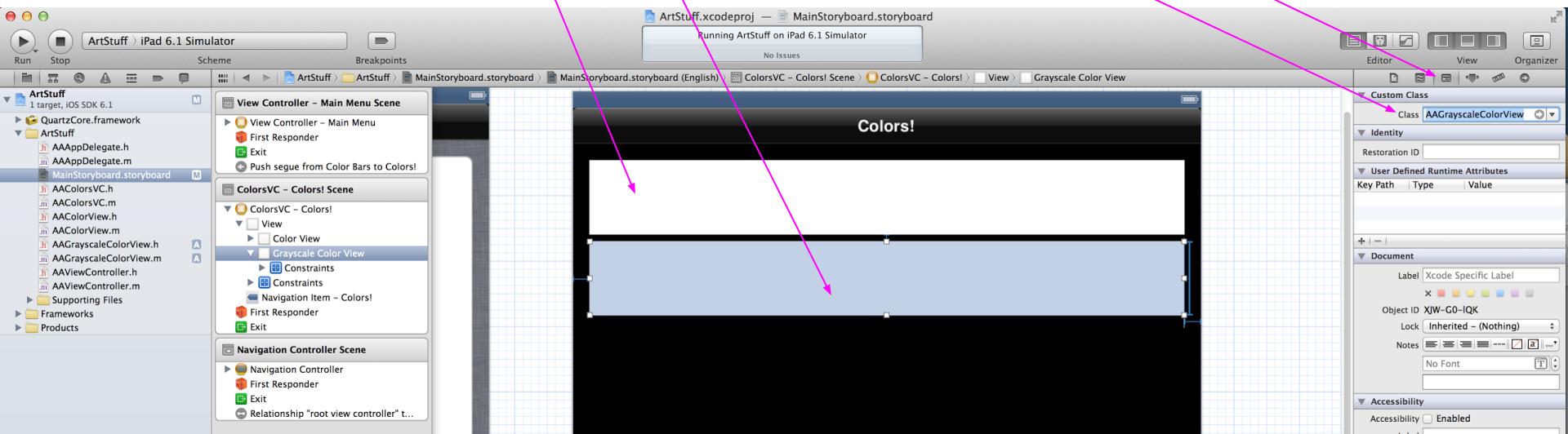
# Create a new color bar.

Select the original color bar. Hit **⌘-c** followed by **⌘-v** to cut and paste the bar.

Move the new bar into a lower position.

With the new bar selected, hit the **Identity inspector**.

Change the new color bar's class to **AAGrayscaleColorView**.



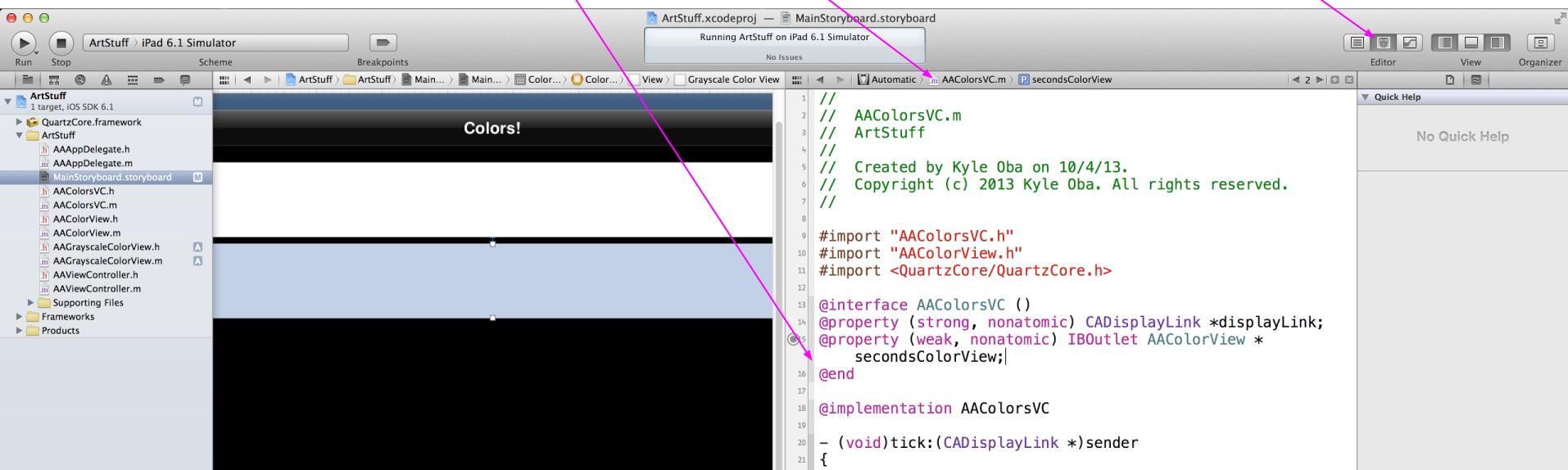
# Connect the grayscale color bar.

With the new color bar selected, open up the **Assistant** editor.

Select the **AAColorsVC.m** implementation file.

Hold down **control** key and click and drag from the new color bar to the **@interface** section.

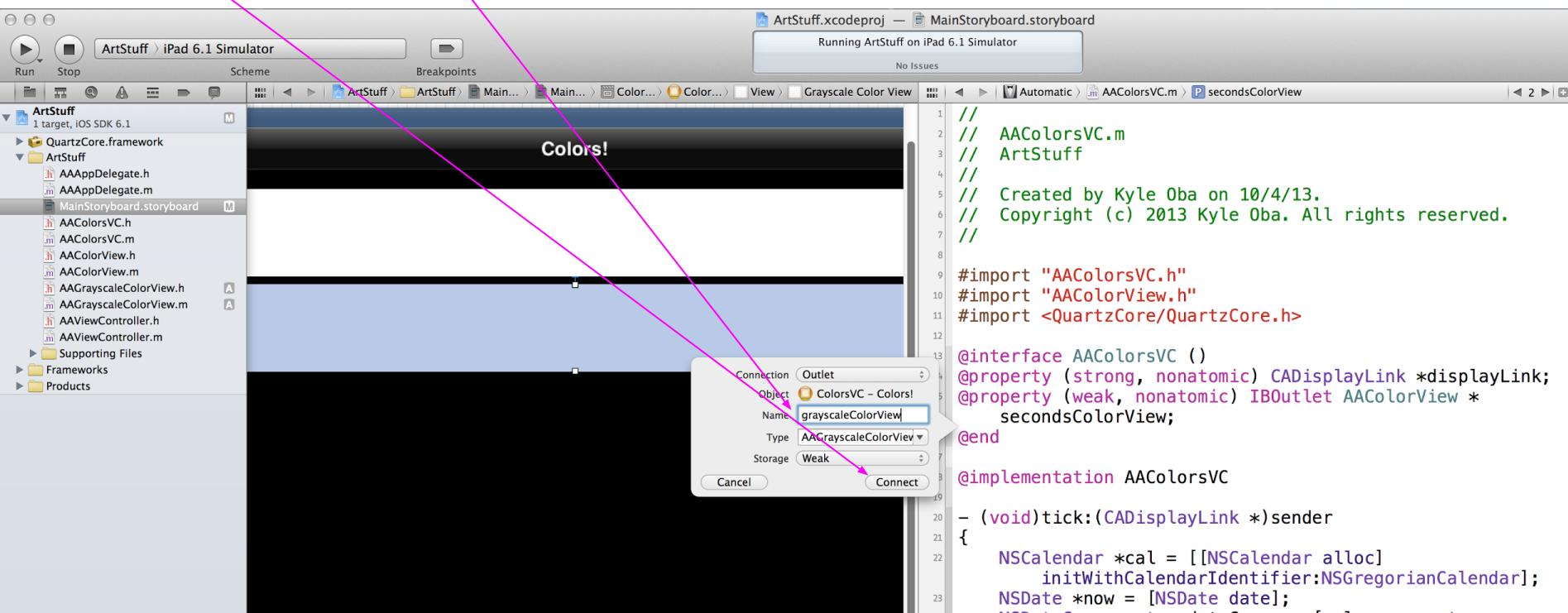
You want to create a new property.



# Create a grayscale color bar outlet.

Add the Name field value of `grayscaleColorView`.

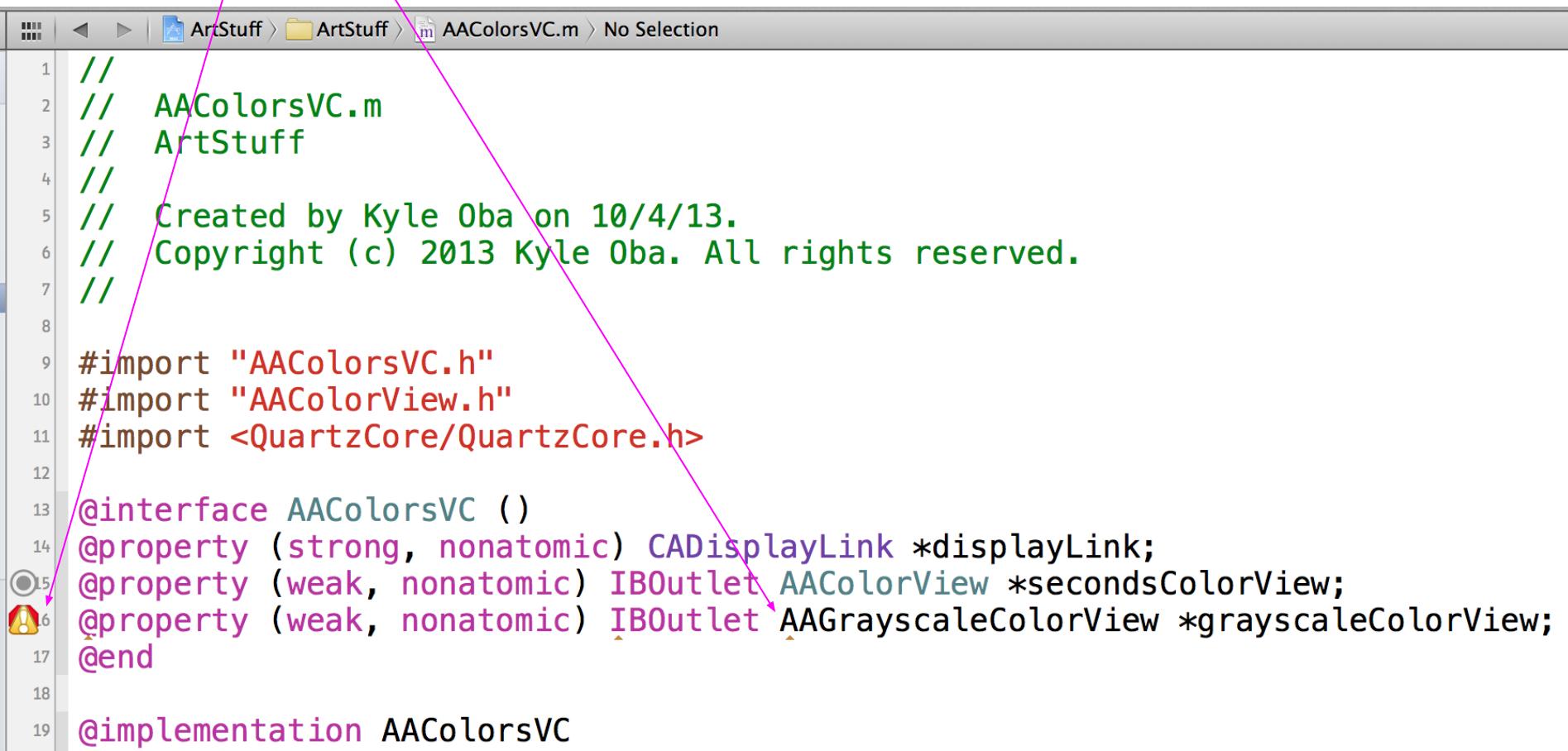
Click the Connect button.



# Error. You haven't imported this class.

See this error?

Xcode is saying that **AAColorsVC** doesn't know what this  
**AAGrayscaleColorView** class is.



```
1 //  
2 // AAColorsVC.m  
3 // ArtStuff  
4 //  
5 // Created by Kyle Oba on 10/4/13.  
6 // Copyright (c) 2013 Kyle Oba. All rights reserved.  
7 //  
8  
9 #import "AAColorsVC.h"  
10 #import "AAColorView.h"  
11 #import <QuartzCore/QuartzCore.h>  
12  
13 @interface AAColorsVC()  
14 @property (strong, nonatomic) CADisplayLink *displayLink;  
15 @property (weak, nonatomic) IBOutlet AAColorView *secondsColorView;  
16 @property (weak, nonatomic) IBOutlet AAGrayscaleColorView *grayscaleColorView;  
17 @end  
18  
19 @implementation AAColorsVC
```

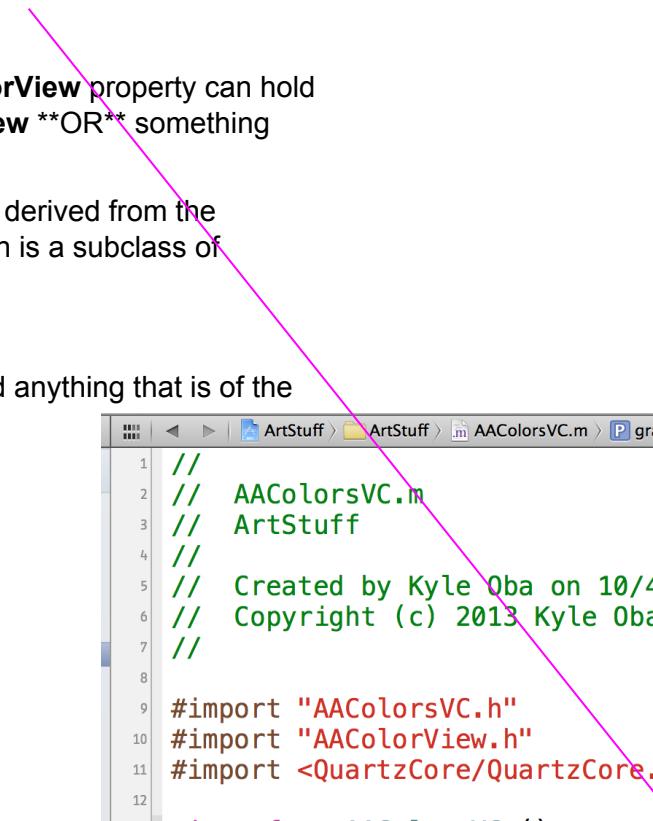
# This is crazy, but...

You can fix this by changing the property from **AAGayscaleColorView** to **AAColorView**.

Why does this work? Well, a **AAColorView** property can hold any object that is of type **AAColorView** **OR** something that is derived from a subclass.

**AAGayscaleColorView** objects are derived from the **AAGayscaleColorView** class, which is a subclass of **AAColorView**.

This is like saying properties can hold anything that is of the same type of any subclass' type.



```
// AACOLORSVC.m
// ArtStuff
//
// Created by Kyle Oba on 10/4/13.
// Copyright (c) 2013 Kyle Oba. All rights reserved.

#import "AACOLORSVC.h"
#import "AACOLORVIEW.h"
#import <QuartzCore/QuartzCore.h>

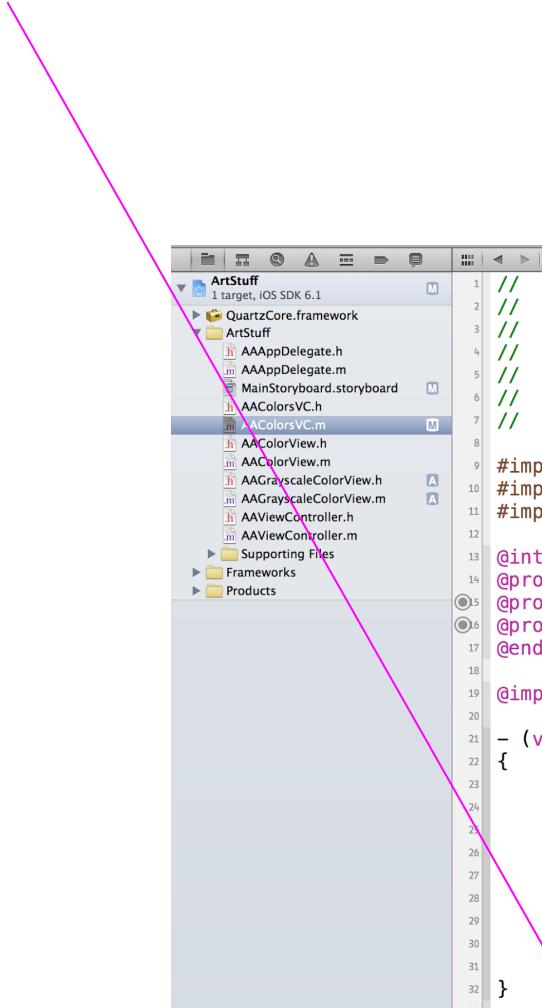
@interface AACOLORSVC ()
@property (strong, nonatomic) CADisplayLink *displayLink;
@property (weak, nonatomic) IBOutlet AACOLORVIEW *secondsColorView;
@property (weak, nonatomic) IBOutlet AACOLORVIEW grayscaleColorView;
@end

@implementation AACOLORSVC
```

# Change the color!

Now, change the color on your new color bar.

Do this in exactly the same way as for the original one.



The screenshot shows the Xcode interface with the project 'ArtStuff' open. The left sidebar displays the project structure, including files like AAAppDelegate.h, MainStoryboard.storyboard, AAClaimsVC.h, AAClaimsVC.m, AAColorView.h, AAColorView.m, AAGayscaleColorView.h, AAGayscaleColorView.m, AAVViewController.h, AAVViewController.m, and Supporting Files. The right pane shows the code for AAClaimsVC.m. A pink arrow originates from the text 'Do this in exactly the same way as for the original one.' and points to the file name 'AAClaimsVC.m' in the sidebar.

```
// AAClaimsVC.m
// ArtStuff
//
// Created by Kyle Oba on 10/4/13.
// Copyright (c) 2013 Kyle Oba. All rights reserved.

#import "AAClaimsVC.h"
#import "AAClaimsView.h"
#import <QuartzCore/QuartzCore.h>

@interface AAClaimsVC ()
@property (strong, nonatomic) CADisplayLink *displayLink;
@property (weak, nonatomic) IBOutlet AAClaimsView *secondsColorView;
@property (weak, nonatomic) IBOutlet AAClaimsView *grayscaleColorView;
@end

@implementation AAClaimsVC

- (void)tick:(CADisplayLink *)sender
{
    NSCalendar *cal = [[NSCalendar alloc] initWithCalendarIdentifier:NSGregorianCalendar];
    NSDate *now = [NSDate date];
    NSDateComponents *dateComps = [cal components:NSSecondCalendarUnit
                                             fromDate:now];
    NSLog(@"seconds: %i", [dateComps second]);

    CGFloat percentage = [dateComps second] / 60.0;
    [self.secondsColorView changeColorForPercentage:percentage];
    [self.grayscaleColorView changeColorForPercentage:percentage];
}


```

# Run it.

You can still ask questions... and you can still look at these kittens.

