

The background of the slide is a light gray gradient. It is decorated with numerous realistic water droplets of various sizes. Some droplets are large and prominent, while others are small and subtle. They are scattered across the slide, with a higher concentration in the top-left and bottom-right corners. Each droplet has a soft highlight and a slight shadow, giving it a three-dimensional appearance.

CIS 55 - iOS Programming

Manish Goel

Lecture Objectives

- Introductions
 - About the Course
 - About the Instructor
- iOS Development
 - iOS Overview
 - Development Needs
- “Hello World !!”
 - Hands-on Lab

Class Basics

- Already laid out in “Things to Remember” on Canvas
- Asynchronous online class
 - Lectures and Videos posted on Canvas for self/ advance study
 - Online 1:1 Office Hours MTWTh 4:30 – 5:20pm
- Mostly design and visualizations class with lots of drag and drop
 - Some code writing to make the app usable – will be shown and explained
 - Prior Object Oriented Programming experience is a plus

Meet the Instructor

- Worked in Silicon Valley startups for the first 10 years of my career
- Branched out solo and started a small consulting practice in Legal Technology
- Programmer and Application Designer at heart
- Started teaching at De Anza in 2013
 - Mostly C++ and iOS
 - Started teaching iOS from Swift v1



Why iOS

- iOS programming is a large paradigm and constantly evolving
 - Introduced with the first iPhone in 2007, expanded to iPads in 2010
 - iOS Interface Builder, UIKit and Cocoa Touch released in 2008 to allow third party apps development – based on Objective-C
 - iOS Storyboards released with Swift v1.0 in 2013 – gained maturity over 10 years, has over a billion apps in use
 - iOS concepts extended to watchOS, iPadOS, macOS, tvOS over the last decade
 - SwiftUI released in 2019 – declarative syntax, tighter integration between user interface and related code where one auto-generates the other, WidgetKit replaces UIKit, Canvas replaces Storyboards
 - SwiftUI is the future of apps development for Apple products

Textbooks and References

- There is no standardized textbook for iOS Programming as they become obsolete almost as soon as they are released
 - The following slide shows the recommended reference text – not necessary to purchase but one of the better texts available on the web
 - It comes as a bundle of two text books, one each for UIKit and SwiftUI
 - Can be purchased as eBook from 'appcoda.com' – select the 'Book Only' option for \$49
 - Anyone purchasing textbooks via Financial Aid should contact De Anza bookstore
- Web research will be key to learning iOS programming well – some useful sites
 - appcoda.com
 - raywenderlich.com
 - hackingwithswift.com
 - Bignerdranch.com
 - Apple online documentation



Beginning iOS Programming with Swift and SwiftUI

Learn iOS Programming in Swift and SwiftUI by
building a real world app from scratch

Fully Supports
Xcode 13 & iOS 15



SIMON NG
APPCODA



Beginning iOS Programming with Swift and UIKit

Learn iOS Programming in Swift and UIKit by
building a real world app from scratch

Fully Supports
Xcode 13 & iOS 15



SIMON NG
APPCODA

iOS Development Needs

- macOS 12.3 (Monterrey)
 - Xcode 13.3 with iOS 15.4
 - Download from AppStore, includes iOS Simulator
- Alternately, macOS 11.x (Big Sur) can also be used
 - With Xcode 13.1/13.2 and iOS 15.2
- macOS with Xcode is a resource hog
 - If running slow, consider upgrading RAM
- For those not having Macs, checkout www.macincloud.com



iOS Development Needs - 2

- To download, individual Apple Developer accounts are needed
 - Apple developer accounts are free
 - Need an AppleID first – go to developer.apple.com
 - Use the same email as for the course
 - Xcode includes simulators for iOS, iPad, Apple watch, Apple TV
 - Alternately, apps can be published to the App Store for testing

iOS Development – Optionals

- Enrollment in iOS Developer Program
 - Enroll with the same email as Apple Developer registration
 - Allows device based testing – otherwise simulator only option
 - \$99 annual fee
- De Anza has joined the iPhone Developer University Program
 - \$99 annual fee waived for enrolled students
 - Do not register – accept iOS developer invite sent by me
 - Invites *MAY* be sent out after Week 3 – after all add/drops have been processed
 - Allows publishing your code for your classmates only, not for general release

Before We Begin

- iOS Programming is Visual:
 - Apps are designed top-down, i.e. UI first, code later
 - UI is designed by putting UI elements on a Storyboard
 - UI elements are predefined controls provided by Xcode
 - Once UI looks good, define what those controls will do
- Outlets and Actions
 - Outlets allow data to be interchanged between the user and app – I/O
 - Actions do some work in relation to some event

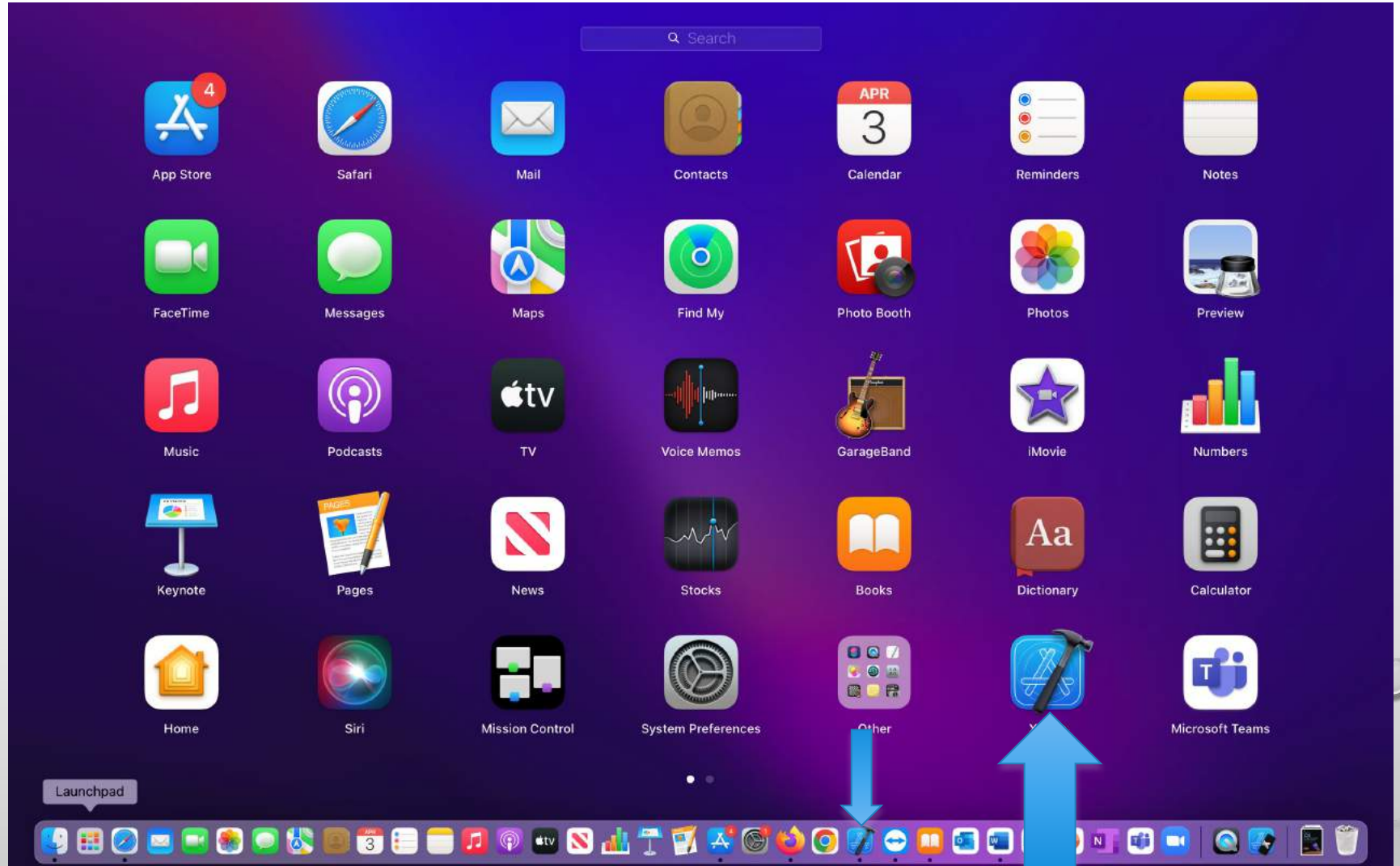
Hello World !!

- Hello World – the first program for any new platform
- Demonstrates concepts to provide a feel for the paradigm
- For iOS – can be done in two ways:
 - Objective-C based Hello World – mainly for iOS 7 or earlier
 - Swift based Hello World – for iOS8 or later
 - Swift syntax is more intuitive – far easier to understand and work with
 - This class will primarily focus on Swift programming paradigm only

Hello World !!

Launch Xcode
either from

- Toolbar
- Launchpad
- Applications Folder



Hello World !!



Welcome to Xcode

Version 13.3 (13E113)



-  **Create a new Xcode project**
Create an app for iPhone, iPad, Mac, Apple Watch, or Apple TV.
-  **Clone an existing project**
Start working on something from a Git repository.
-  **Open a project or file**
Open an existing project or file on your Mac.

☒ Show this window when Xcode launches



ToDoList

...cuments/Deanza Courses/2021_02/CIS 55



StateListsApp

~/Downloads/EnhanceListsApp



MyPlayground01

...cuments/Deanza Courses/2021_02/CIS 55



GetCoreDataSettings

...cuments/Deanza Courses/2021_02/CIS 55



BasicAnimation

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MovingCar

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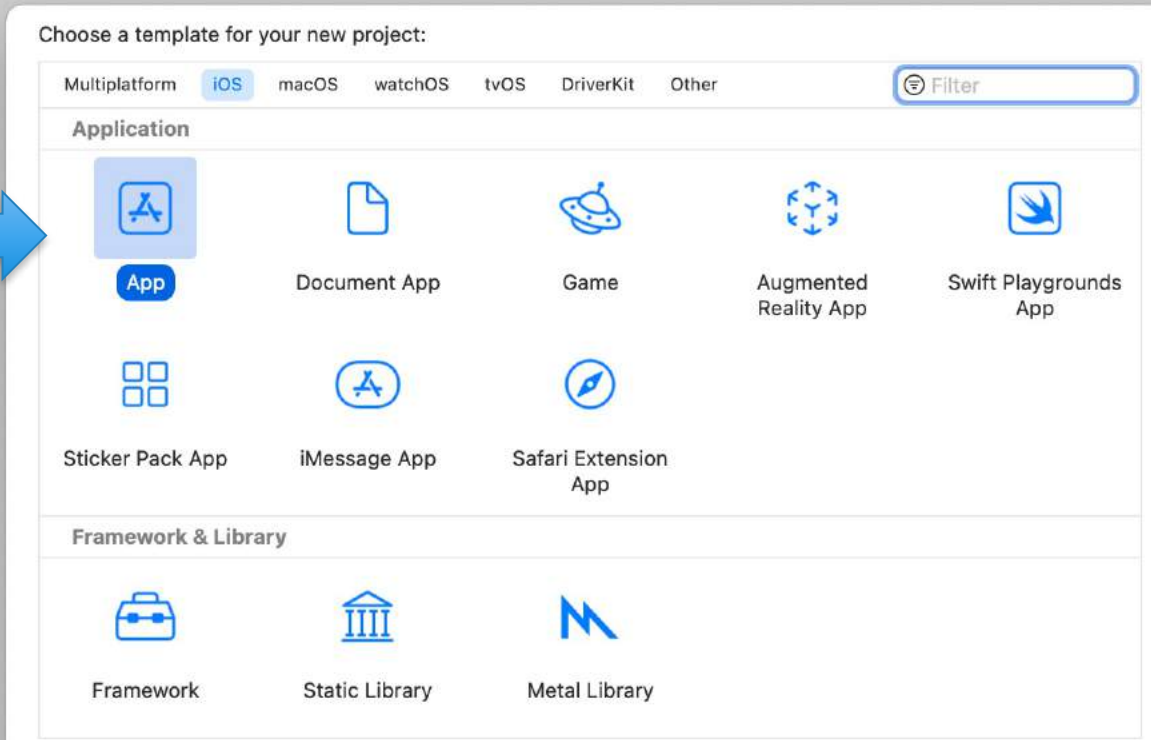
CarsAnimation

...cuments/Deanza Courses/2021_02/CIS 55



HelloWorld_S21

...cuments/Deanza Courses/2021_02/CIS 55



This is a set of wizards that create pre-defined constructs for drag and drop app development – click on 'Single View App' for iOS

Our app name

Programming language
and UI selection

These settings identify our app to
iOS and App Store – has four parts
– domain, org type, user info, app.

Please use 'DeAnza' for Org Name,
substitute 'mgoel' with your own info

Leave these settings
unchecked

Choose options for your new project:

Product Name: HelloWorld

Team: Add account...

Organization Name: DeAnza

Organization Identifier: edu.deanza.mgoel

Bundle Identifier: edu.deanza.mgoel.HelloWorld

Language: Swift

User Interface: Storyboard

☐ Use Core Data

☐ Use CloudKit

☐ Include Unit Tests

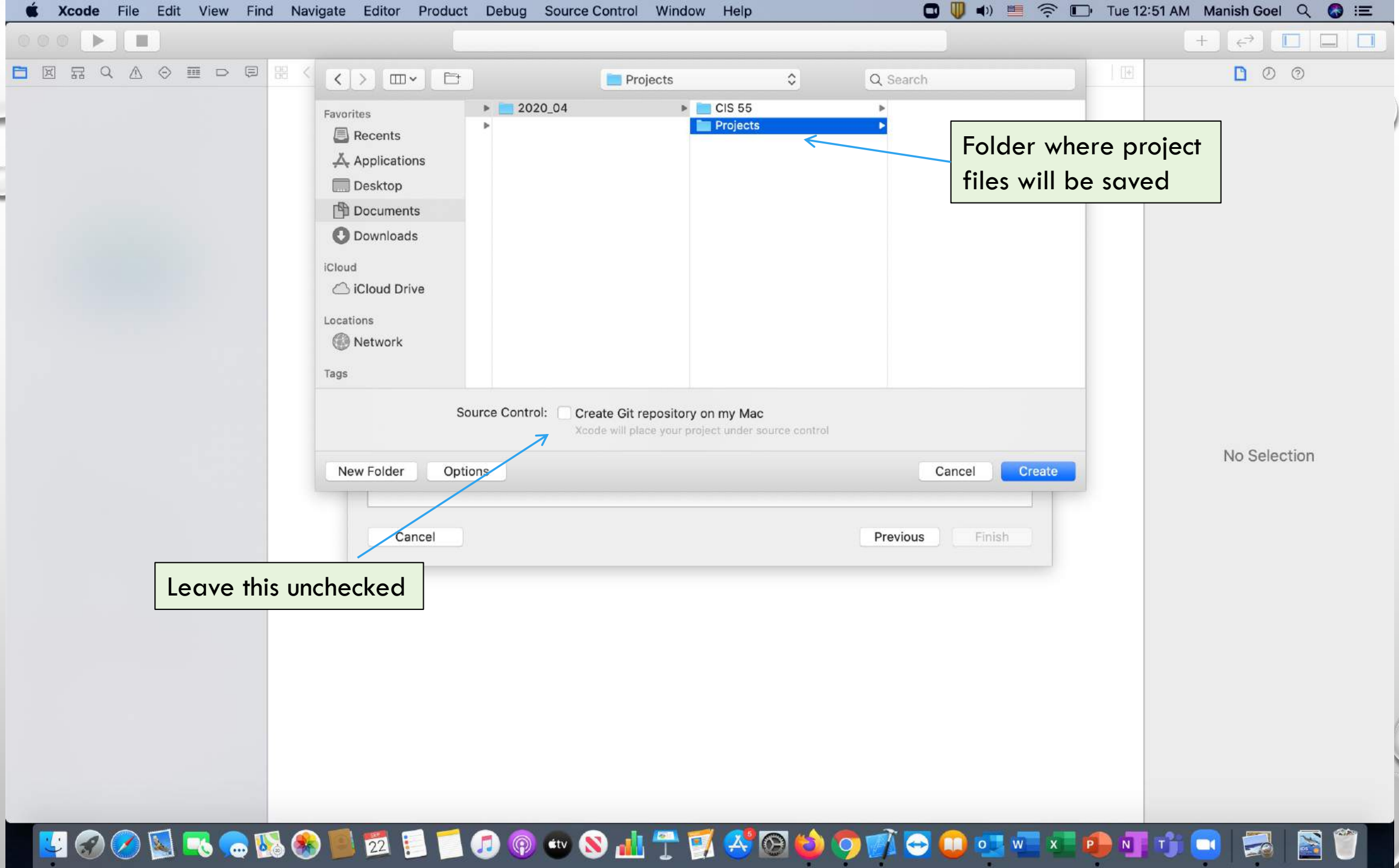
☐ Include UI Tests

Cancel

Previous

Next

No Selection



Folder where project files will be saved

Leave this unchecked

This whole window is called the project workspace

Project Navigator Pane – in Xcode 13, the file extensions have been hidden – following slides mention them

Xcode Toolbar

Project Utility Pane

Project Editor Pane



HelloWorld

HelloWorld > iPod touch (7th generation)

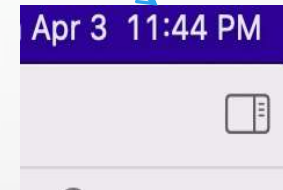
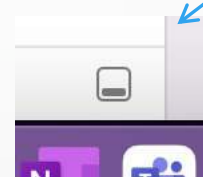
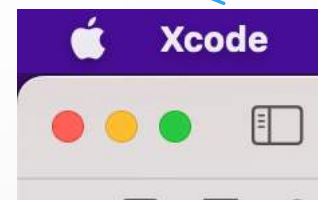
HelloWorld: **Ready** | Today at 11:35 PM

Run / Stop the app
in chosen simulator

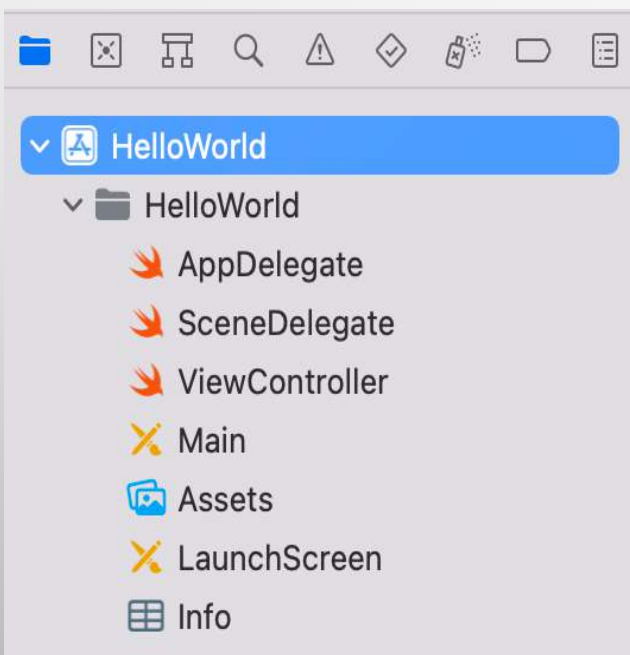
Define the scheme of
simulator to test app with

Activity Viewer for project

Show / Hide
workspace panes



Project Navigator Pane



Project Navigator Toolbar

Project Files Hierarchy

Main Project Files

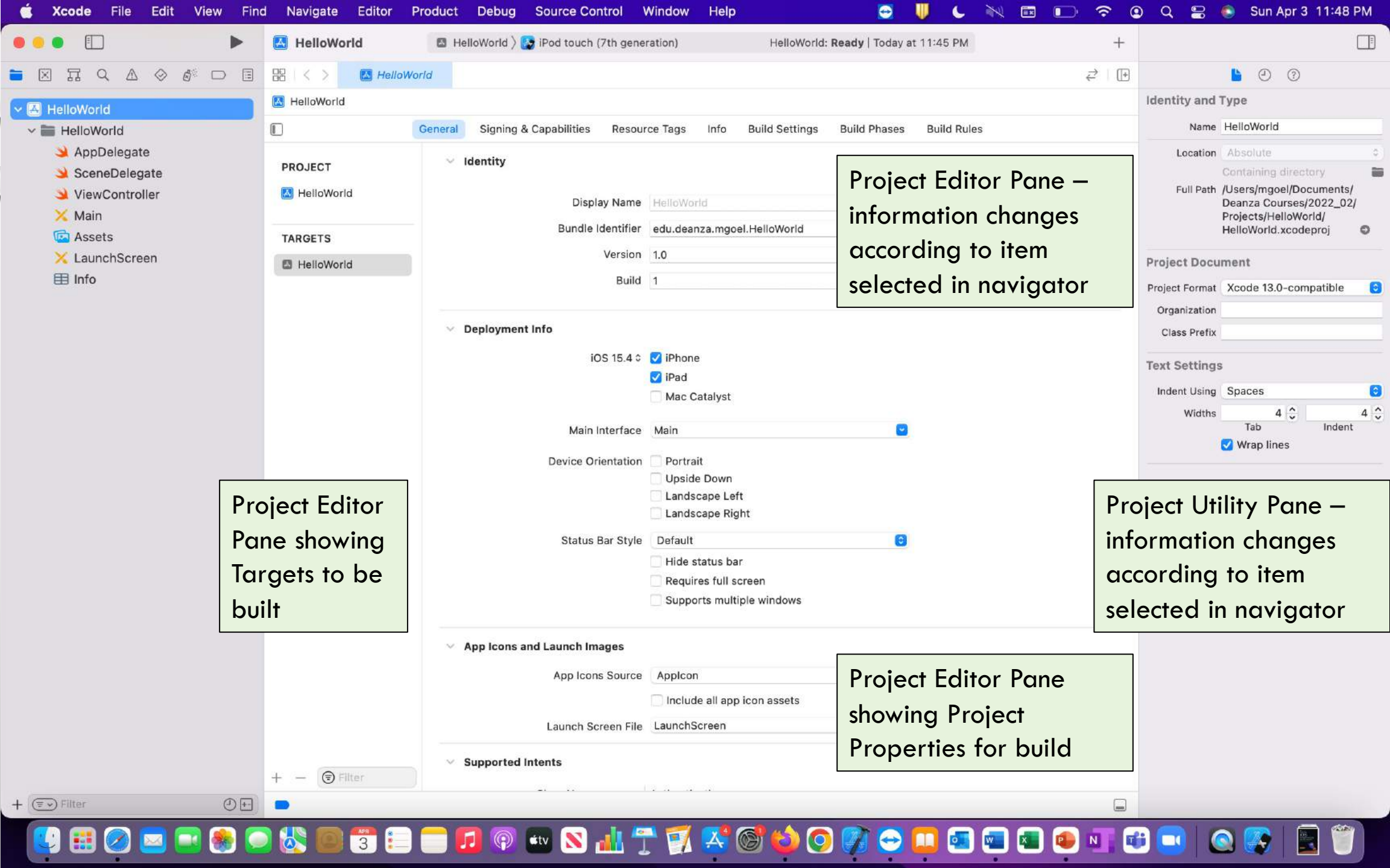
To
search
for
files or
text

To see
list of
errors
and
warnings

To work
with the
debugger
and step
thru code

To see the list of
files in the project



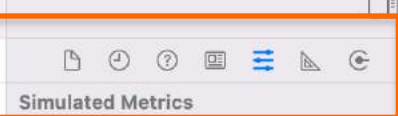
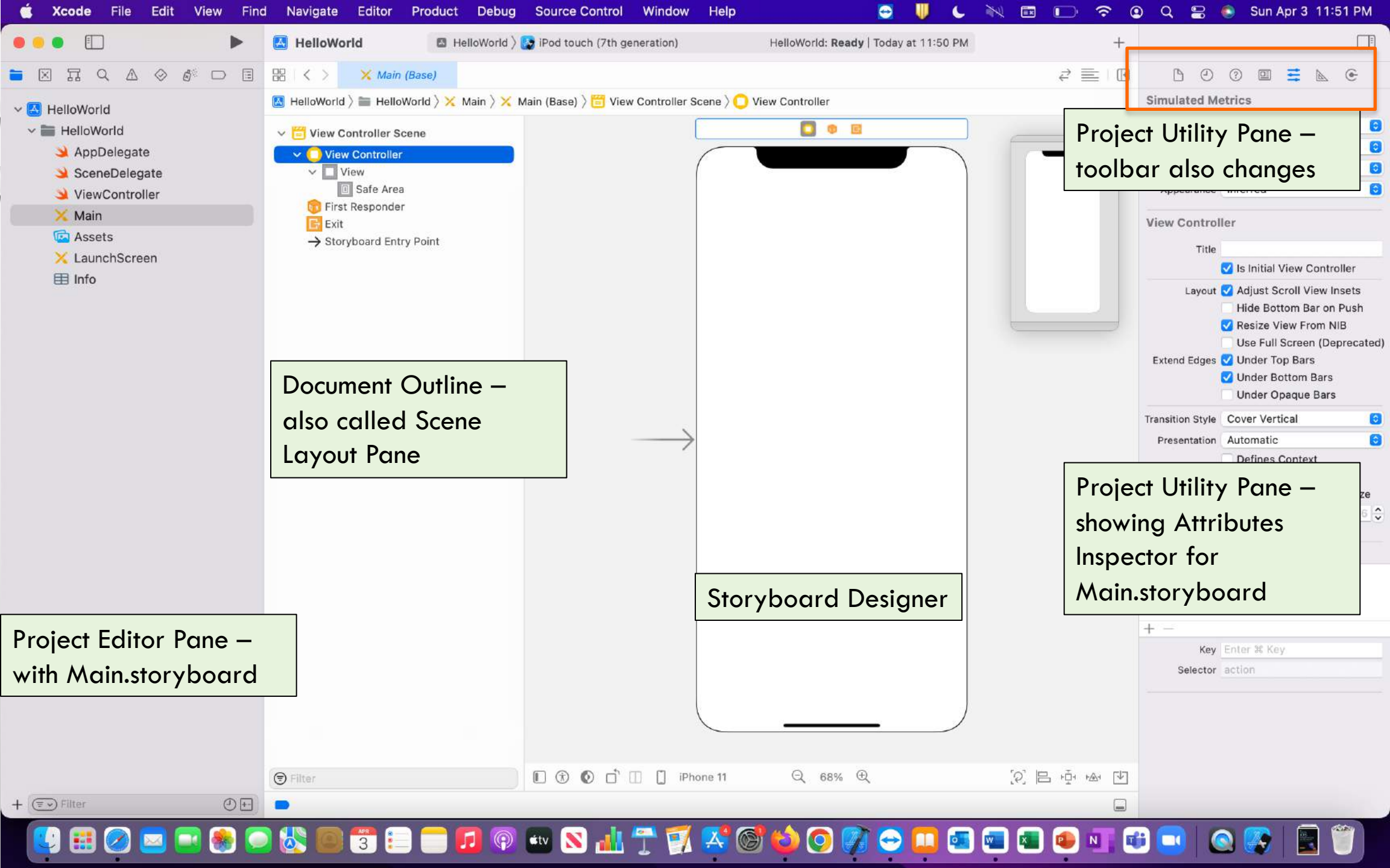


Project Editor
Pane showing
Targets to be
built

Project Editor Pane –
information changes
according to item
selected in navigator

Project Utility Pane –
information changes
according to item
selected in navigator

Project Editor Pane
showing Project
Properties for build



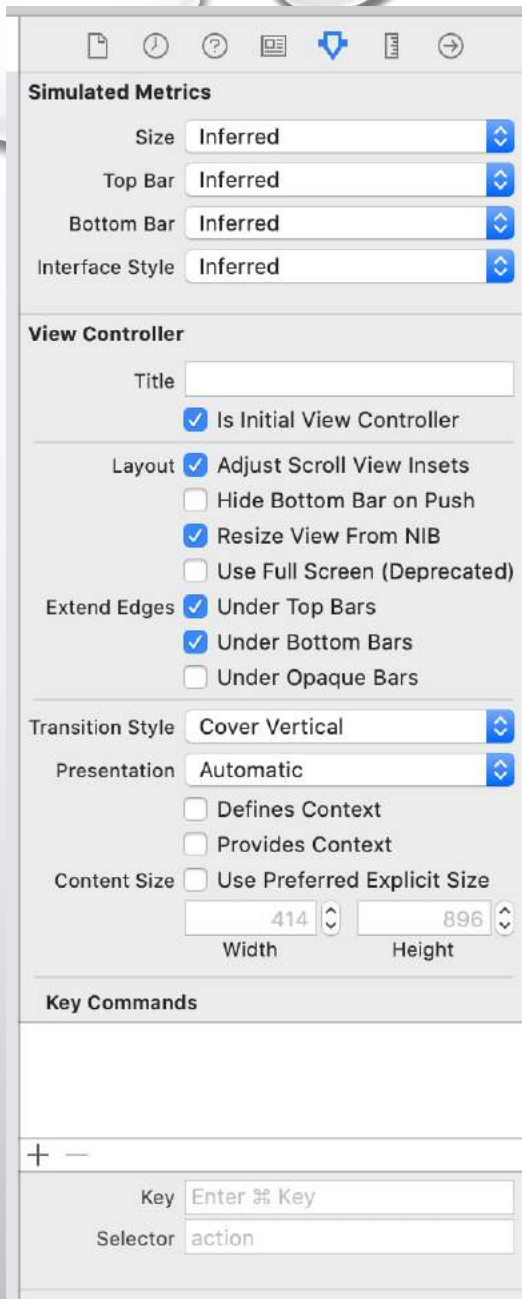
Project Utility Pane –
toolbar also changes

Document Outline –
also called Scene
Layout Pane

Storyboard Designer

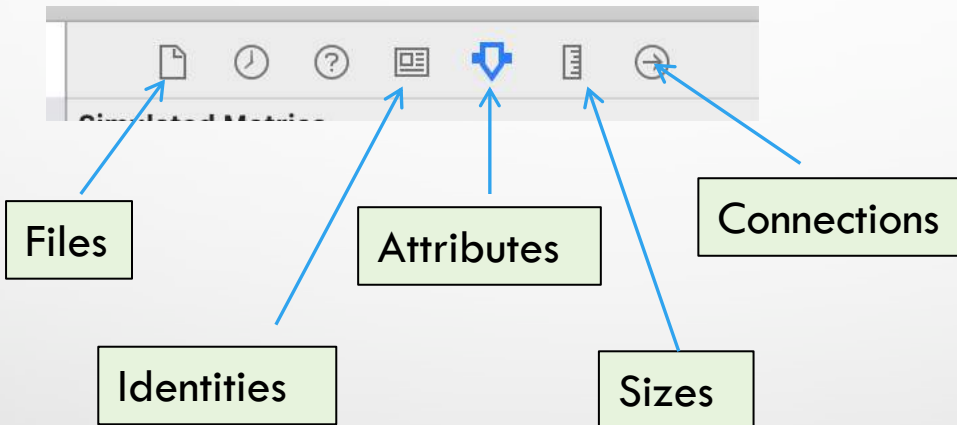
Project Utility Pane –
showing Attributes
Inspector for
Main.storyboard

Project Editor Pane –
with Main.storyboard

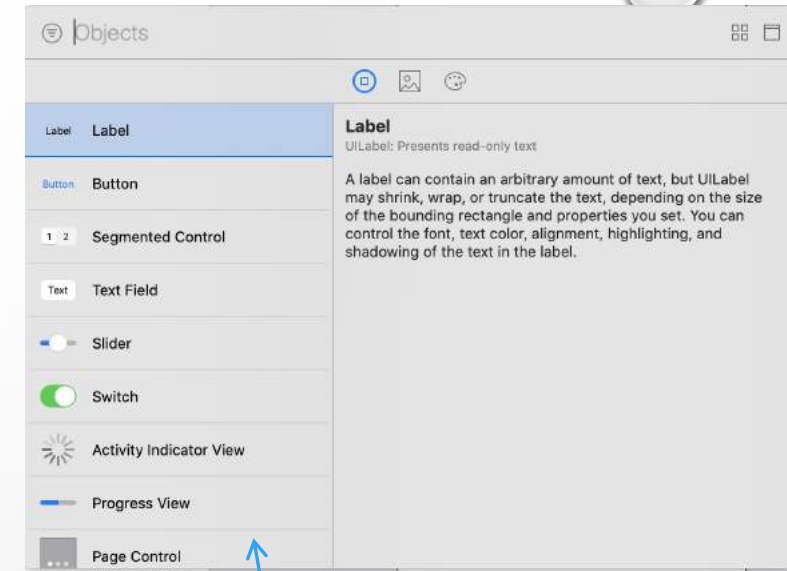


Inspectors Section and
Toolbar of Project Utility
Pane – toolbar changes
based on item selected
in navigator

Inspectors Toolbar



Objects Library - press Cmd+Shift+L



To build apps,
components are
dropped on the
storyboard

Project Editor showing AppDelegate code – it invokes the app from the iOS and passes messages back and forth between them

HelloWorld iPod touch (7th generation) HelloWorld: Ready | Today at 11:55 PM

AppDelegate

HelloWorld > HelloWorld > AppDelegate > No Selection

```
1 //
2 // AppDelegate.swift
3 // HelloWorld
4 //
5 // Created by Manish Goel on 4/3/22.
6 //
7
8 import UIKit
9
10 @main
11 class AppDelegate: UIResponder, UIApplicationDelegate {
12
13
14
15
16
17
18
19
20
21
22 func application(_ application: UIApplication,
23     didFinishLaunchingWithOptions launchOptions:
24     [UIApplication.LaunchOptionsKey: Any]?) -> Bool {
25     // Override point for customization after application
26     launch.
27     return true
28 }
29
30 // MARK: UISceneSession Lifecycle
31
32 func application(_ application: UIApplication,
33     configurationForConnecting connectingSceneSession:
34     UISceneSession, options: UIScene.ConnectionOptions)
35     -> UISceneConfiguration {
36     // Called when a new scene session is being created.
```

Identity and Type

Name AppDelegate.swift
Type Default - Swift Source
Location Relative to Group
AppDelegate.swift
Full Path /Users/mgoel/Documents/
Deanza Courses/2022_02/
Projects/HelloWorld/
HelloWorld/
AppDelegate.swift

On Demand Resource Tags

Only resources are taggable

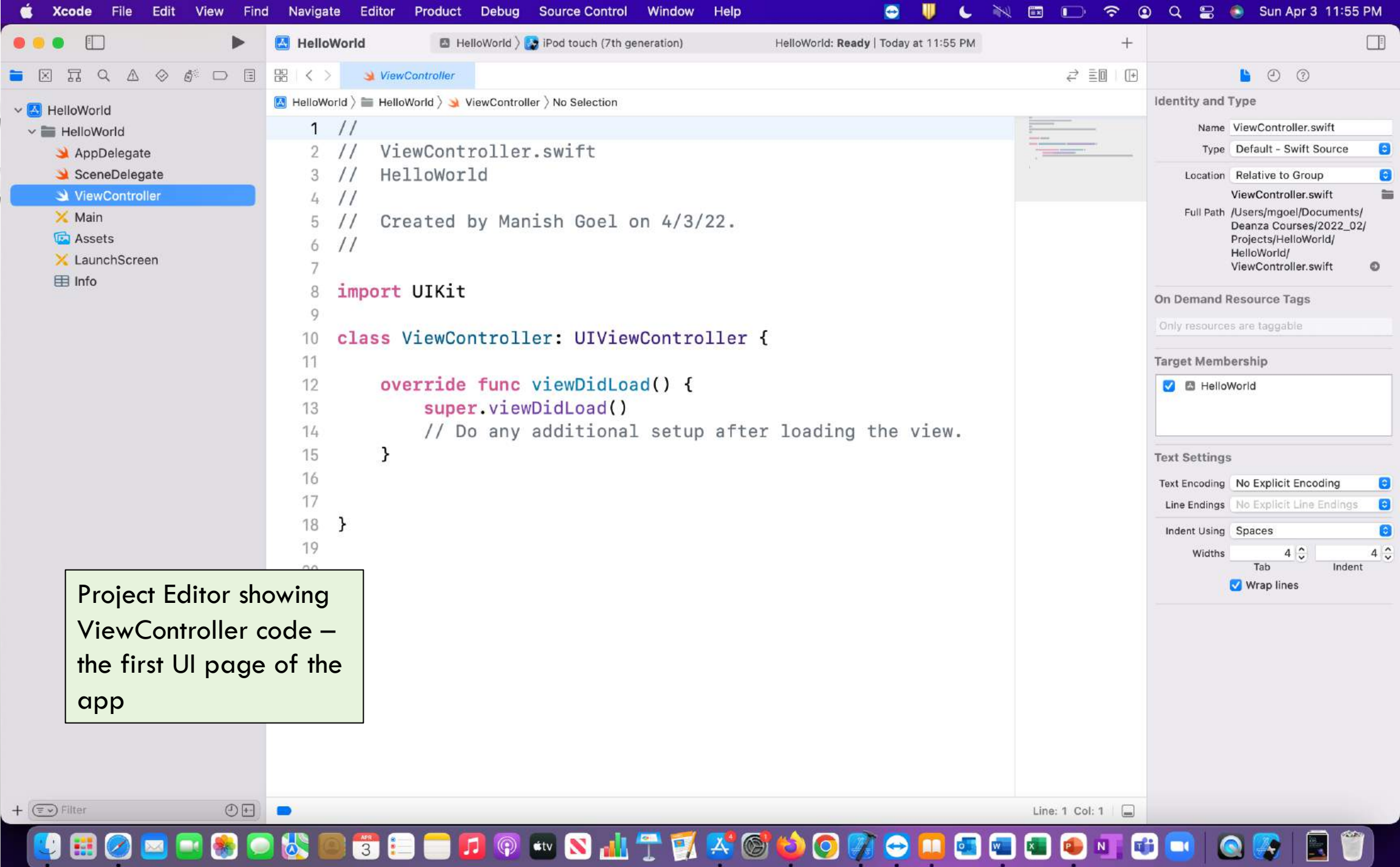
Target Membership

☒ HelloWorld

Text Settings

Text Encoding No Explicit Encoding
Line Endings No Explicit Line Endings
Indent Using Spaces
Widths 4 4
Tab Indent
☒ Wrap lines

Line: 1 Col: 1



Project Editor showing
ViewController code –
the first UI page of the
app

Project Editor showing the Scene delegate code – works in conjunction with the View Controller to manage the “Scene” – new in Xcode 11

HelloWorld

HelloWorld > iPod touch (7th generation)

HelloWorld: Ready | Today at 11:56 PM

SceneDelegate

HelloWorld > HelloWorld > SceneDelegate > No Selection

```
1 //
2 // SceneDelegate.swift
3 // HelloWorld
4 //
5 // Created by Manish Goel on 4/3/22.
6 //
7
8 import UIKit
9
10 class SceneDelegate: UIResponder, UIWindowSceneDelegate {
11
12     var window: UIWindow?
13
14
15     func scene(_ scene: UIScene, willConnectTo session:
        UISceneSession, options connectionOptions:
        UIScene.ConnectionOptions) {
        // Use this method to optionally configure and attach
        the UIWindow `window` to the provided
        UIWindowScene `scene`.
        // If using a storyboard, the `window` property will
        automatically be initialized and attached to the
        scene.
        // This delegate does not imply the connecting scene
        or session are new (see
        `application:configurationForConnectingSceneSessio
        n` instead).
        guard let _ = (scene as? UIWindowScene) else { return
        }
```

Identity and Type

Name SceneDelegate.swift

Type Default - Swift Source

Location Relative to Group

SceneDelegate.swift

Full Path /Users/mgoel/Documents/
Deanza Courses/2022_02/
Projects/HelloWorld/
HelloWorld/
SceneDelegate.swift

On Demand Resource Tags

Only resources are taggable

Target Membership

☒ HelloWorld

Text Settings

Text Encoding No Explicit Encoding

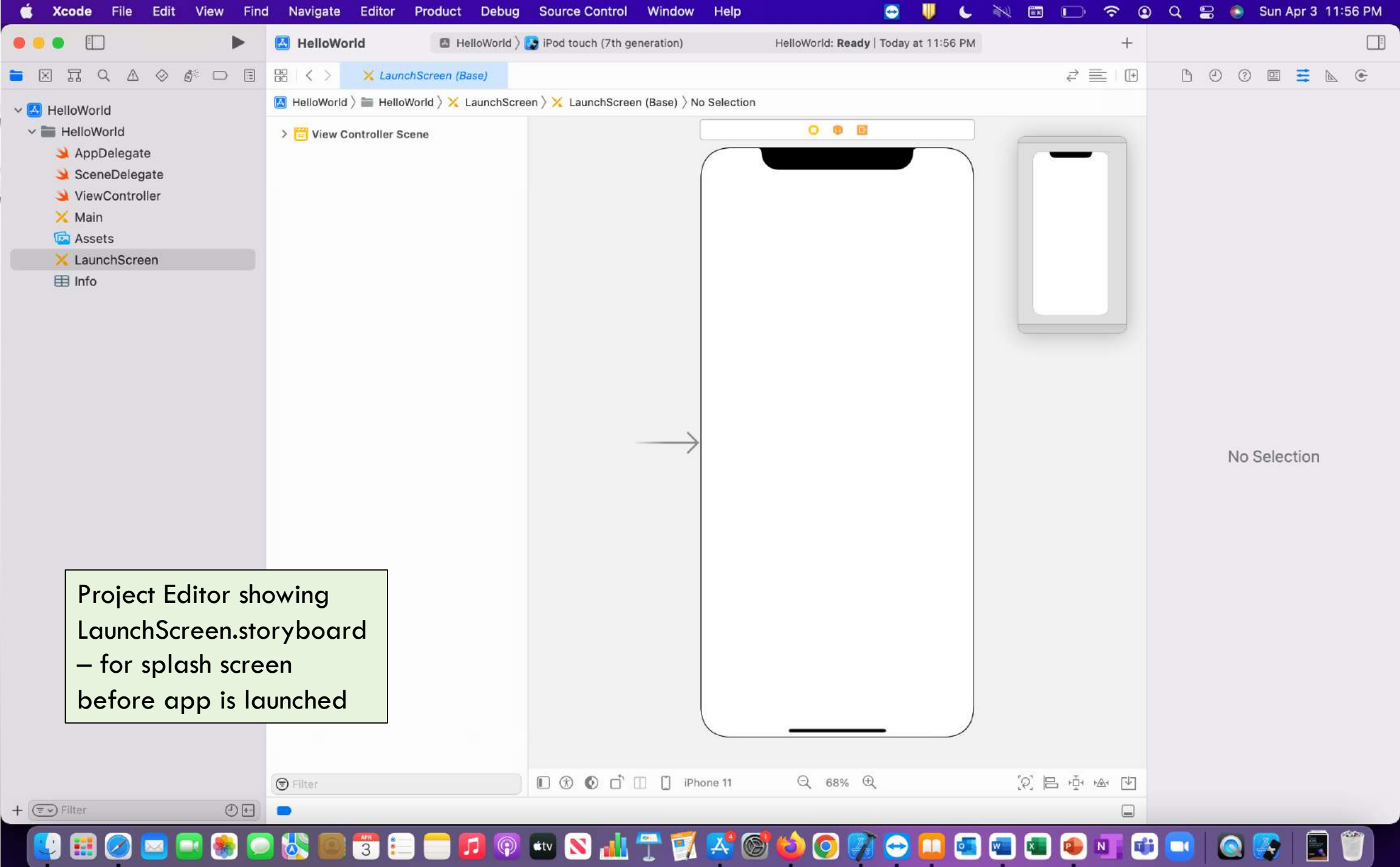
Line Endings No Explicit Line Endings

Indent Using Spaces

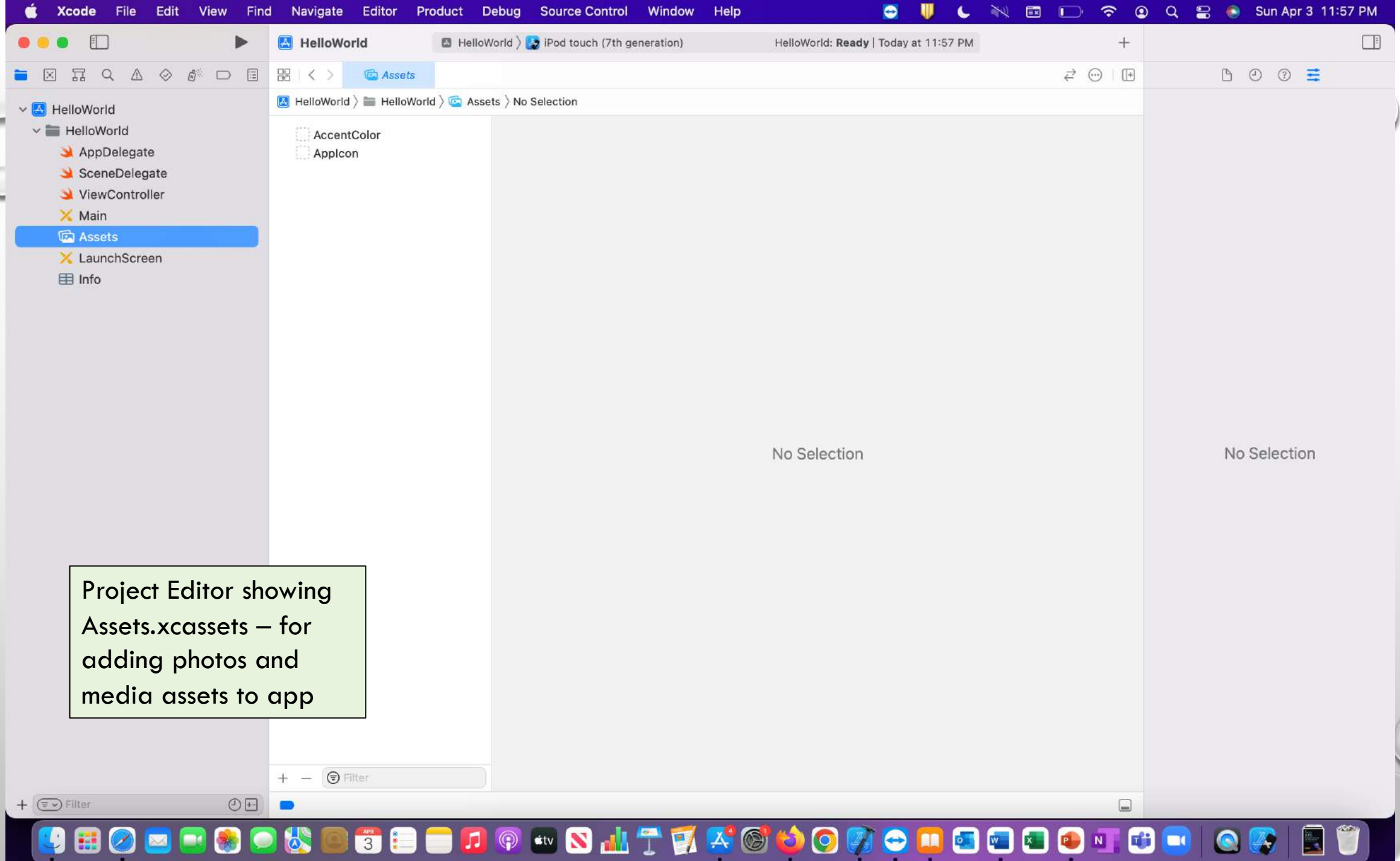
Widths 4 4
Tab Indent

☒ Wrap lines

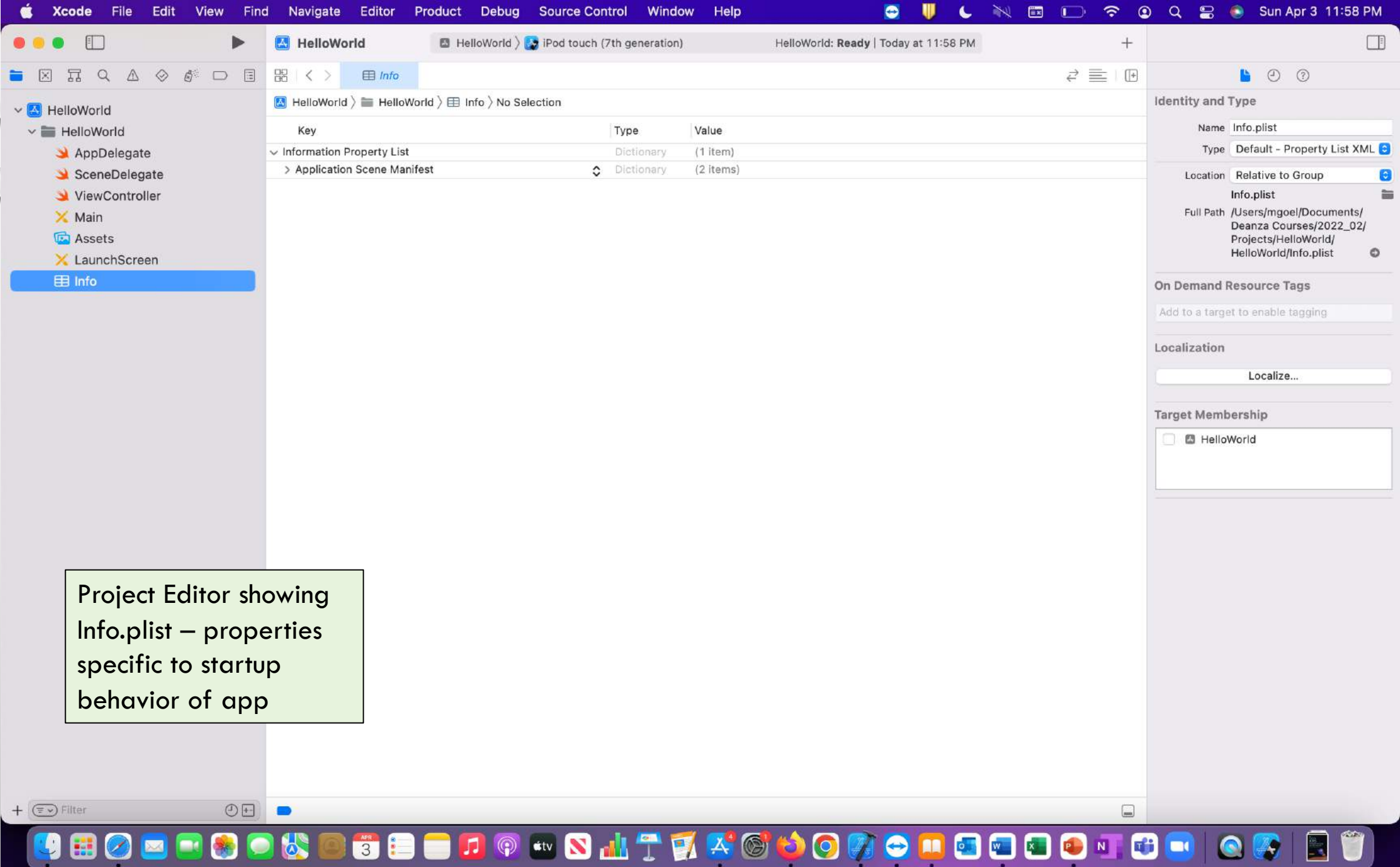
Line: 1 Col: 1



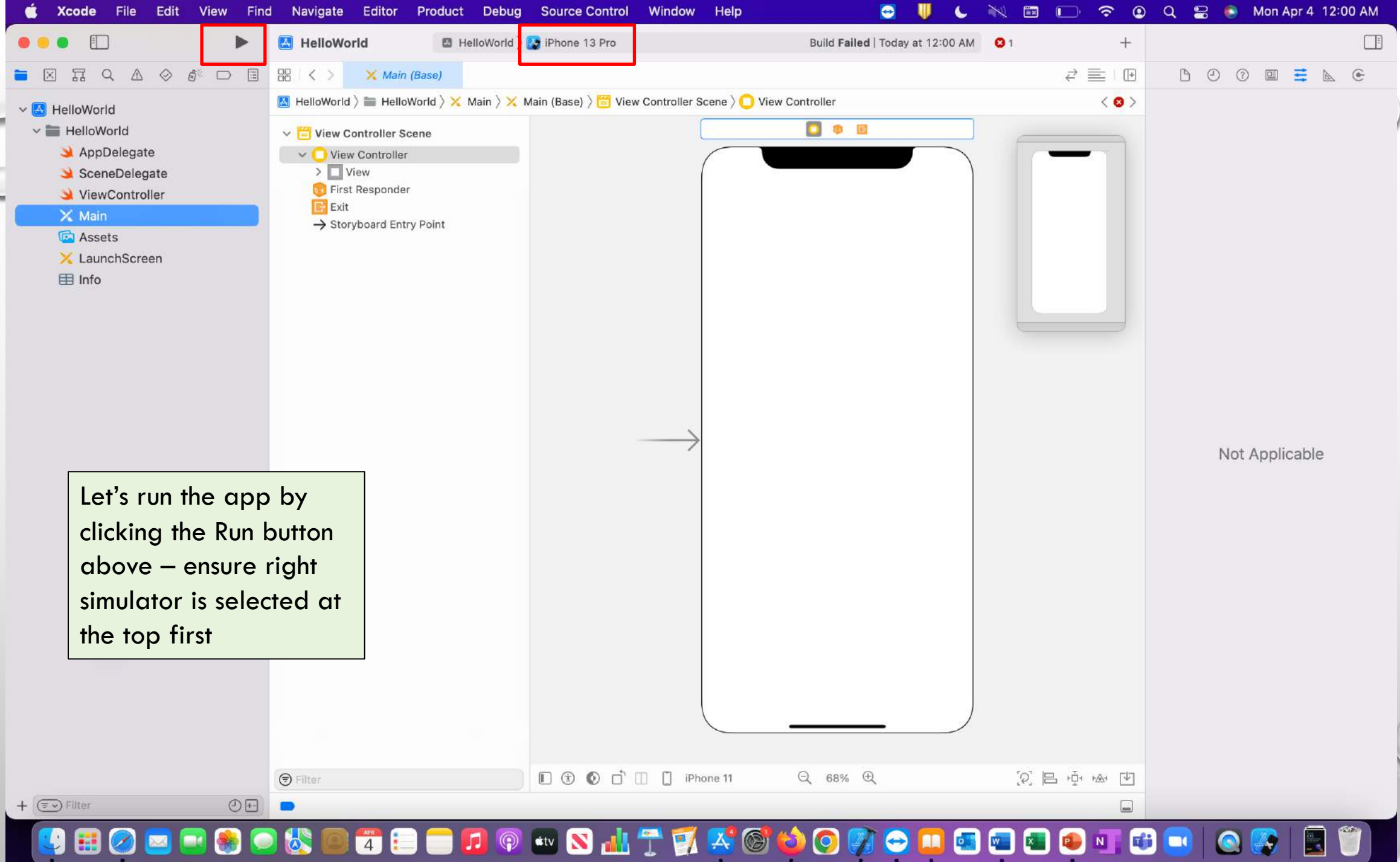
Project Editor showing
LaunchScreen.storyboard
– for splash screen
before app is launched



Project Editor showing
Assets.xcassets – for
adding photos and
media assets to app



Project Editor showing
Info.plist – properties
specific to startup
behavior of app



Let's run the app by clicking the Run button above – ensure right simulator is selected at the top first

If you are running an app for the very first time, you MAY get the following prompt – Click 'Enable' to ensure all debugging features are available, otherwise Xcode might ask you for password when those features are used.

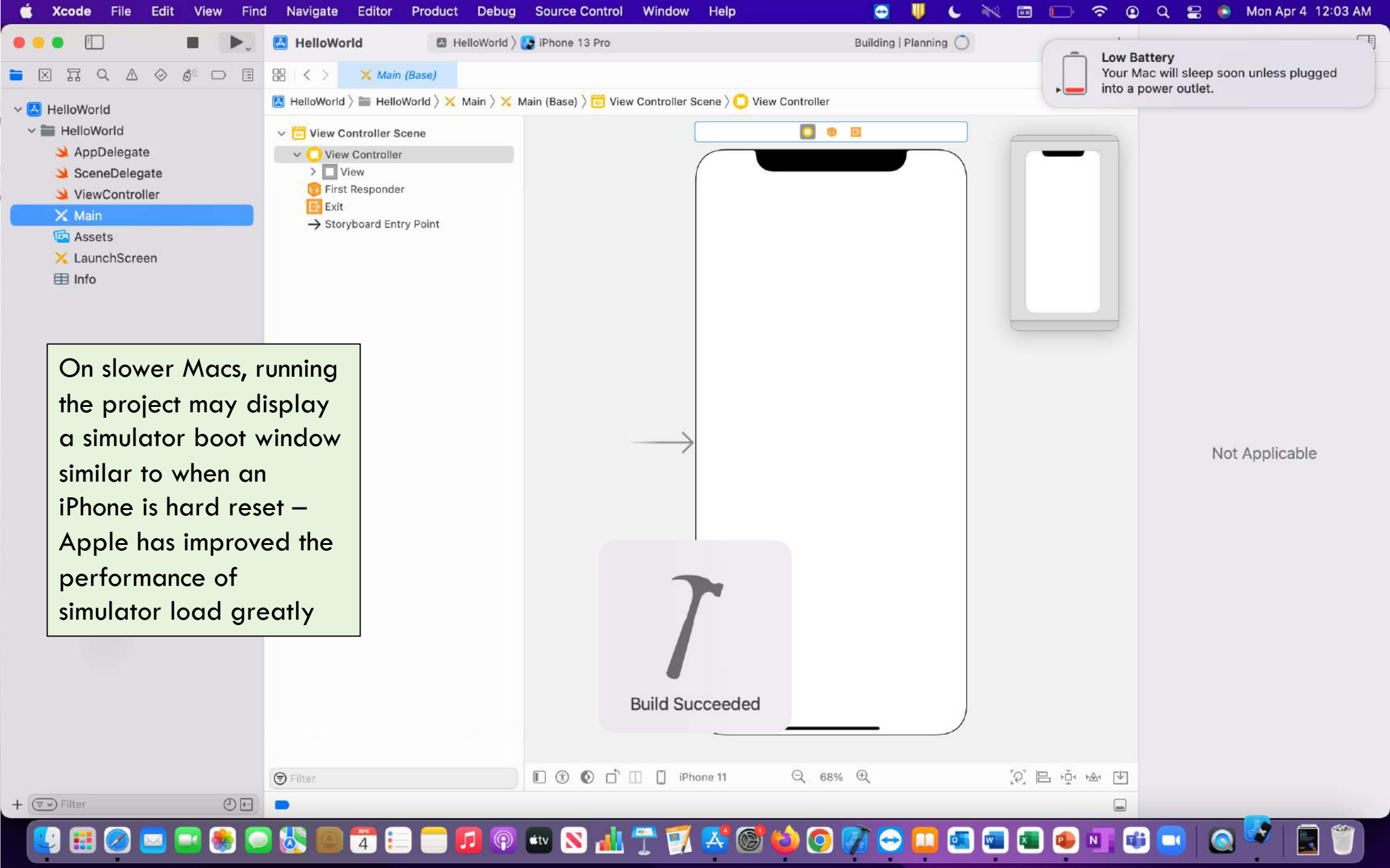


Enable Developer Mode on this Mac?

Some debugging and playground features require you to enter your password. Enabling Developer Mode authorizes Xcode to perform these functions without requiring your password for each session.

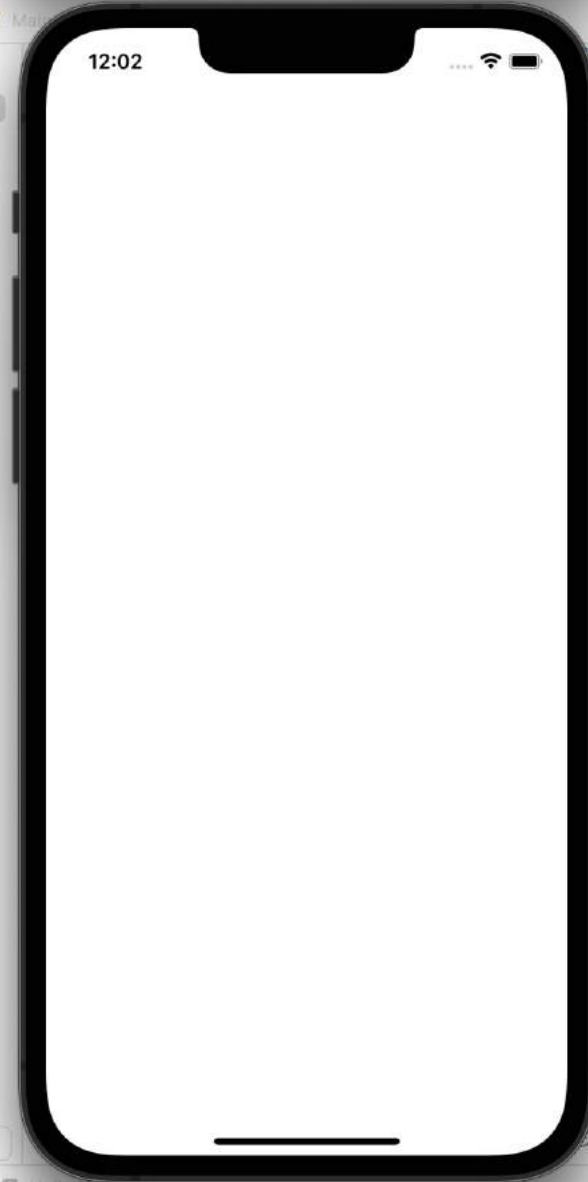
Don't Enable

Enable



On slower Macs, running the project may display a simulator boot window similar to when an iPhone is hard reset – Apple has improved the performance of simulator load greatly

Once iOS has loaded and launched our app, the LaunchScreen appears briefly and then the Main scene is displayed – it is currently empty since we did not add anything to the app



Not Applicable