

# WordCollage

## Lesson 2



### Description

Add a new Label and layout constraints to the collage.

### Learning Outcomes

- Recognize how adaptive layouts affect the appearance of an app running on different hardware and in different device orientations.
- Practice adding and customizing a user interface component.
- Discover how to add constraints to interface components.
- Experiment with size classes, and auto layout constraints to customize the appearance of a user interface.
- Test the runtime appearance of a user interface with Interface Builder previews and the iOS Simulator.



### Vocabulary

Interface Builder	storyboard	canvas
user interface	iOS Simulator	adaptive user interface
Object Library	Label	Attributes Inspector
Document Outline	Assistant Editor	auto layout
constraint	size class	orientation

## Materials

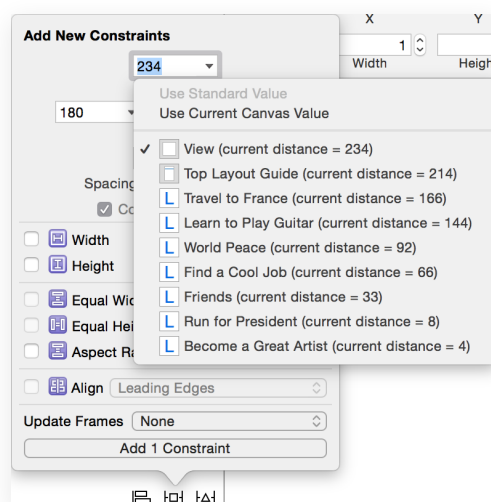
- **WordCollage Lesson 2** Xcode project
- **Adaptive User Interfaces** presentation

## Opening

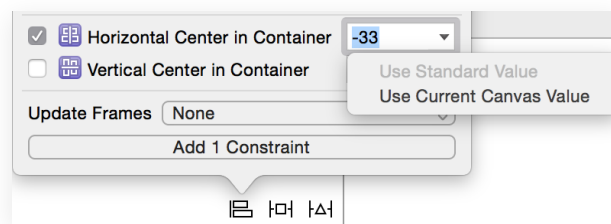
Why does the app look different in the iOS Simulator, compared to what we see in Interface Builder?

## Agenda

- Use the Project Navigator (⌘1) to select **Main.storyboard**.
- Run the app (⌘R), and observe how the visual layout of the collage appears different in the iOS Simulator.
- Present the concept of Adaptive User Interfaces.
- Using the Object Library (⇧⌘L), place a new Label on the interface. Change the Label contents (e.g. "Learn to Code") and use the Attributes Inspector (⇧⌘4) to change the font family, size and color (e.g. 51pt Avenir Next Ultra Light).
- Use the Label handles to expand its size, and adjust the Label position.
- Run the app (⌘R), and observe how the Label position appears differently in the iOS Simulator.
- Explain that position constraints must be added to the Label to influence its position.
- With the Label selected, use the Pin control to select a Vertical Space constraint relative to the View.



- Discuss how Interface Builder displays a vertical blue bar representing the Vertical Space constraint.
- Explain how missing constraints result in Interface Builder displaying Auto Layout issues in orange.
- With the Label selected, use the Align control to select a Center X Alignment constraint based on the current position of the Label.



- Discuss how Interface Builder displays another vertical blue bar representing the Center X Alignment constraint.
- Using the Show Document Outline control (☰) in the lower left corner of the canvas, ensure that the document outline is visible.
- Discuss how Interface Builder displays one remaining Auto Layout issue in orange, and use the Issue Navigator (⌘4) or the Document Outline disclosure arrow (🔍) to observe the details of the remaining Auto Layout issue.
- With the Label selected, use the menu item *Editor > Resolve Auto Layout Issues > Update Frames* (⌘⌘=) so the frame matches the constraint. Alternatively, use the menu item *Editor > Resolve Auto Layout Issues > Update Constraints* (⇧⌘=) so the constraints match the frame.
- Run the app (⌘R) and observe how the Label appears in a better position, but still appears somewhat different.
- Using Interface Builder, select the Compact Width | Regular Height size class.
- Explain how different size classes apply to different devices and orientations.
- While viewing the canvas in Interface Builder, open the Assistant Editor (⌘⇧↔), and use the Assistant Editor jump bar to select the Preview item.
- Delete the default iPhone 4-inch preview, and use the Add button in the lower left corner of the Preview to add an iPhone 4.7-inch preview.
- Discuss how the preview closely resembles the app in the iOS Simulator.
- Within the Interface Builder canvas, select the recently added Label, adjust its position, update the constraints (⇧⌘=), and observe how the preview automatically reflects the change.
- Run the app (⌘R) and observe how the Label appears as expected within the iOS Simulator.
- Rotate the app (⌘↩) within the iOS Simulator, and observe how the label appears in a different position when in a landscape orientation.

- Using Interface Builder, select the Any Width | Compact Height size class, and rotate the orientation of the preview.
- Select the recently added Label, adjust its position, update the constraints (⇧⌘=), and observe how the preview automatically reflects the change.
- Run the app (⌘R), rotate the app (⌘→) in the Simulator, and observe the Label appearing in the expected position.

## Closing

How do the physical screens on different iOS devices vary? How many different kinds of screens are there? Have you seen the principles of adaptive layouts elsewhere?

## Modifications And Extensions

- Use additional size classes and constraints, and simulate different devices, to create an interface that adapts to additional screen sizes and orientations.

## Resources

iOS Developer Program <https://developer.apple.com/programs/ios/>

Start Developing iOS Apps Today <https://developer.apple.com/library/ios/referencelibrary/GettingStarted/RoadMapiOS/>

iOS Technology Overview <https://developer.apple.com/library/ios/documentation/Miscellaneous/Conceptual/iPhoneOSTechOverview/>

iOS App Programming Guide: About iOS App Programming <https://developer.apple.com/library/ios/documentation/iPhone/Conceptual/iPhoneOSProgrammingGuide/Introduction/Introduction.html>

Xcode Overview: Build a User Interface [https://developer.apple.com/library/ios/documentation/ToolsLanguages/Conceptual/Xcode\\_Overview/edit\\_user\\_interface.html](https://developer.apple.com/library/ios/documentation/ToolsLanguages/Conceptual/Xcode_Overview/edit_user_interface.html)

Adding an Object to Your Interface [https://developer.apple.com/library/ios/recipes/xcode\\_help-IB\\_objects\\_media/Chapters/AddingObject.html](https://developer.apple.com/library/ios/recipes/xcode_help-IB_objects_media/Chapters/AddingObject.html)

Adaptive User Interfaces <https://developer.apple.com/design/adaptivity/>

Designing for Multiple Size Classes [https://developer.apple.com/library/ios/recipes/xcode\\_help-IB\\_adaptive\\_sizes/chapters/AboutAdaptiveSizeDesign.html](https://developer.apple.com/library/ios/recipes/xcode_help-IB_adaptive_sizes/chapters/AboutAdaptiveSizeDesign.html)

Auto Layout Guide: Resolving Auto Layout Issues <https://developer.apple.com/library/ios/documentation/UserExperience/Conceptual/AutolayoutPG/ResolvingIssues/ResolvingIssues.html>

Previewing Your Layout [https://developer.apple.com/library/ios/recipes/xcode\\_help-interface\\_builder/Chapters/PreviewingLayouts.html](https://developer.apple.com/library/ios/recipes/xcode_help-interface_builder/Chapters/PreviewingLayouts.html)