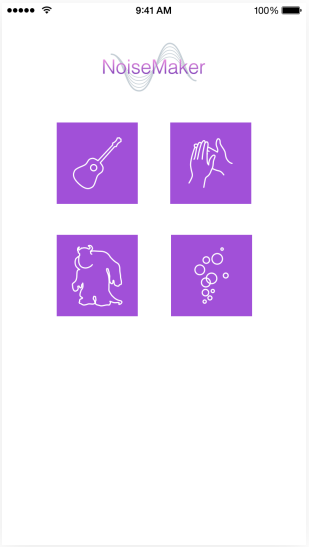
NoiseMaker
Lesson 10

Description

Add a custom title image to the interface and customize each button's appearance and accessibility attributes.



Learning Outcomes

- Discover how Xcode and iOS manage image asset to accommodate different size classes.
- Practice creating image sets and adding image files to an image set.
- Practice customizing the appearance of buttons with images.
- Assess the usability of an interface, and apply accessibility features to accommodate a wide audience of users.

Vocabulary

asset catalog	size class	image set
Project Navigator	resolution	launch screen
Auto Layout constraint	Attributes Inspector	accessibility
Identity Inspector		

Materials

- **NoiseMaker Lesson 10** Xcode project
- **NoiseMaker Images** archive
- **Apple Accessibility** web resources

Opening

How can we add our own images to the app and customize how the buttons look?

Agenda

- Explain how Xcode provides asset catalogs to group and manage assets such as images, that can adapt to different size classes.
- Using the Project Navigator (⌘1), select the **Images.xcassets** asset catalog.
- Use the Add control (+) to add a new image set to the catalog.
- Rename the image set to **ApplauseIcon**.
- With the ApplauseIcon image set selected, observe how Xcode displays three different wells for three different sizes of a single image.
- Discuss how the different resolutions of devices and size classes might use the different images within an image set.
- Drag the supplied **Applause.png** image file from within the OS X Finder to the **1x** well in the ApplauseIcon image set.
- Drag the supplied **Applause@2x.png** image file from within the OS X Finder to the **2x** well in the ApplauseIcon image set.
- Drag the supplied **Applause@3x.png** image file from within the OS X Finder to the **3x** well in the ApplauseIcon image set.
- Create four more image sets called **BubblesIcon**, **GuitarIcon**, **MonsterIcon**, and **Title**, and drag each image file into their respective 1x and 2x image wells.
- Using the Project Navigator (⌘1), select **LaunchScreen.xib**, and observe the default app launch screen appear in Interface Builder.
- Delete the NoiseMaker label, and use the Object Library (⌥⌘L) to add an Image View to the center of the launch screen.
- Select the Image View on the canvas, use the Attributes Inspector (⌥⌘4) to set the **Image** attribute to **Title**, and observe that the Title image appears on the canvas.
- Use the Align control (⫿) to center the image view horizontally and vertically, and use the menu item *Editor* > *Resolve Auto Layout Issues* > *Update Frames* (⌥⌘=) to establish appropriate constraints.
- Run the app (⌘R), and observe that the Title image appears on the launch screen in the Simulator.
- Using the Project Navigator (⌘1), select **Main.storyboard**, and use the Object Library (⌥⌘L) to add an Image View to the middle of the top of the interface.
- Select the Image View on the canvas, use the Attributes Inspector (⌥⌘4) to set the **Image** attribute to **Title**, and observe that the Title image appears on the canvas.

- Use the Align control (⫤) to add a horizontal alignment constraint, Control-drag upwards from the image view to the main view to create a vertical spacing constraint, and use the menu item *Editor* > *Resolve Auto Layout Issues* > *Update Frames* (⌥⌘=) to correct the size.
- Run the app (⌘R), and observe the image appear in the interface.
- Using Interface Builder, select a button and open the Attributes Inspector (⌥⌘4). Set the **Image** attribute to the corresponding image (e.g., GuitarIcon). Within the **View** panel of the Attributes Inspector (⌥⌘4), change the **Background Color** attribute to a desired color. Delete the word in the **Title** field (e.g., Guitar), and adjust the position and size of the button to a square large enough to accommodate the image (e.g., 100 x 100).
- Use the menu item *Editor* > *Resolve Auto Layout Issues* > *Update Constraints* (⇧⌘=) to accommodate the new size and position. Use the Pin control (⊢⊣) to add height and width constraints (e.g. 100), and use the menu item *Editor* > *Resolve Auto Layout Issues* > *Update Frames* (⌥⌘=) to resolve any remaining Auto Layout issues.
- Repeat the above actions to update each button's appearance, adjust each button position as necessary, and use the menu item *Editor* > *Resolve Auto Layout Issues* > *Update Constraints* (⇧⌘=) to match the constraints to the visible layout on the canvas.
- Run the app (⌘R), observe the customized buttons, and tap each button to play a sound.
- Discuss how the buttons now lack text, and how this might affect accessibility.
- Present the concept of user experience and accessibility, via the Apple Accessibility web resources.
- Using Interface Builder, select each button and open the Identity Inspector (⌥⌘3). In the Accessibility Pane, provide each button a **Label** (e.g. Guitar), Hint (e.g. Plays guitar sound), and ensure that the **Plays Sound** Trait is checked.
- Explain how iOS accessibility features can use the button Accessibility attributes to describe each button for visually-impaired users.

Closing

What other button attributes can we customize, and how do they affect the button appearance? How might you add your own sounds and button images to the app?

Modifications And Extensions

- Investigate the purpose of the **@2x** and **@3x** image files and how iOS uses them.
- Use the different button State Configurations within the Attributes Inspector to change the way the buttons appear when tapped.
- Change the device orientation within the iOS Simulator and modify the app so that the interface appears correctly in different orientations.

- Explore the Apple Human Interface Guidelines (HIG) and critique the user NoiseMaker interface.
- Add your own custom sounds and buttons to create a musical instrument, such as a digital drum machine. Ensure that the app is accessible as possible to all users.

Resources

Asset Catalogs https://developer.apple.com/library/ios/recipes/xcode_help-image_catalog-1.0/Recipe.html

Interface Builder Help: Configuring Object Attributes https://developer.apple.com/library/ios/recipes/xcode_help-IB_objects_media/Chapters/ObjectAttributes.html

iOS Human Interface Guidelines https://developer.apple.com/library/ios/documentation/UserExperience/Conceptual/MobileHIG/index.html

iOS Human Interface Guidelines: Icon and Image Sizes https://developer.apple.com/library/ios/documentation/UserExperience/Conceptual/MobileHIG/IconMatrix.html

UIKit User Interface Catalog: Buttons https://developer.apple.com/library/ios/documentation/UserExperience/Conceptual/UIKitUICatalog/UIButton.html

UIButton Class Reference https://developer.apple.com/library/ios/documentation/UIKit/Reference/UIButton_Class/index.html

Accessibility for Developers: Accessibility on iOS https://developer.apple.com/accessibility/ios/