



Designing for iOS

iOS embodies the following themes:

- **Deference.** The UI helps people understand and interact with the content, but never competes with it.
- **Clarity.** Text is legible at every size, icons are precise and lucid, adornments are subtle and appropriate, and a sharpened focus on functionality motivates the design.
- **Depth.** Visual layers and realistic motion impart vitality and heighten people's delight and understanding.



Whether you're redesigning an older app or creating a new one, consider approaching the job in this way:

- First, look past the UI to the app's core

functionality and affirm its relevance.

- Next, use the themes of iOS to inform the design of the UI and the user experience. Add details and embellishments with care and never gratuitously.
- Finally, be sure to design your UI to adapt to various devices and modes so that users can enjoy your app in as many contexts as possible.

Throughout the process, be prepared to defy precedent, question assumptions, and let a focus on content and functionality motivate every design decision.

Defer to Content

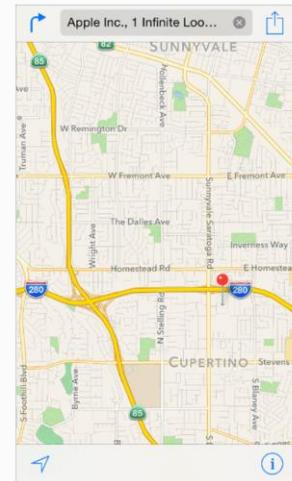
Although a crisp, beautiful UI and fluid motion are highlights of the iOS experience, the user's content is at its heart.

Here are some ways to make sure that your designs elevate functionality and defer to the user's content.



Take advantage of the whole screen. Weather is a great example of this approach: The beautiful, full-screen depiction of a location's current weather instantly conveys the most important information, with room to spare for hourly data.

Reconsider visual indicators of physicality and realism. Bezels, gradients, and drop shadows sometimes lead to heavier UI elements that can overpower or compete with the content. Instead, focus on the content and let the UI play a supporting role.



Let translucent UI elements hint at the content behind them. Translucent elements—such as Control Center—provide context, help users see that more content is available, and can signal transience. In iOS, a translucent element blurs only the content directly behind it—giving the impression of looking through rice paper—it doesn’t blur the rest of the screen.

Provide Clarity

Providing clarity is another way to ensure that content is





paramount in your app. Here are some ways to make the most important content and functionality clear and easy to interact with.

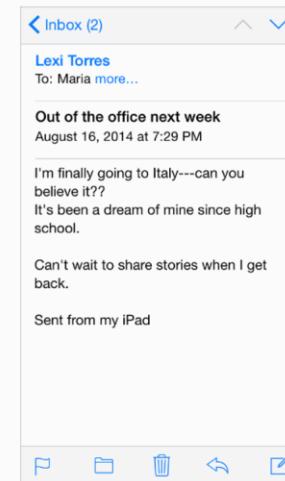
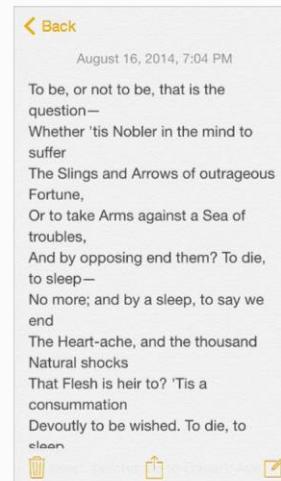


Use plenty of negative space. Negative space makes important content and functionality more noticeable and easier to understand. Negative space can also impart a sense of calm and tranquility, and it can make an app look more focused and efficient.

Let color simplify the UI. A key color—such as yellow in Notes—highlights important state information and subtly indicates interactivity. It also gives an app a



consistent visual theme. The built-in apps use a family of pure, clean system colors that look good at every tint and on both dark and light backgrounds.

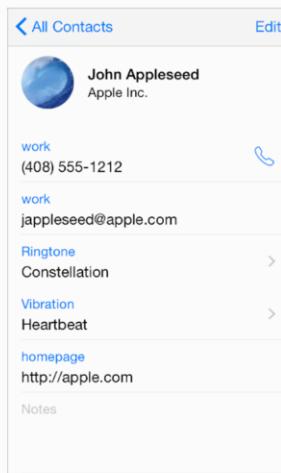


Ensure legibility by using the system font. San Francisco (the iOS system font) works with Dynamic Type to automatically adjust letter spacing and line height so that text is easy to read and looks great at every size. Whether you use San Francisco or a custom font, be sure to adopt Dynamic Type so your app can respond when the user chooses a different text size.

Embrace borderless buttons. By default, all bar buttons are borderless. In content areas, a borderless button uses context, color, and a call-to-action title to indicate interactivity. And when it makes sense, a content-area button can display a thin border or tinted background



that makes it distinctive.



Use Depth to Communicate

iOS often displays content in distinct layers that convey hierarchy and position, and that help users understand the relationships among onscreen objects.

On a device that supports 3D Touch, peek, pop, and quick actions give users access to important functionality without losing their context.

By using a translucent background and appearing to float above the Home screen, folders separate their content from the rest of the screen.

Reminders displays lists in layers, as shown here. When users work with one list, the other lists are collected together at the bottom of the screen.

iOS Human Interface Guidelines

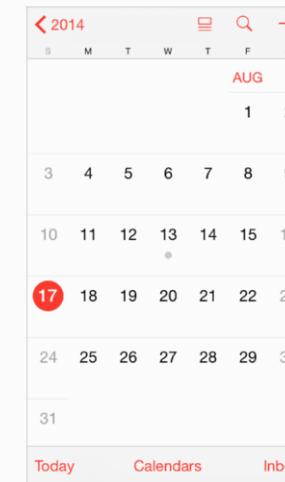
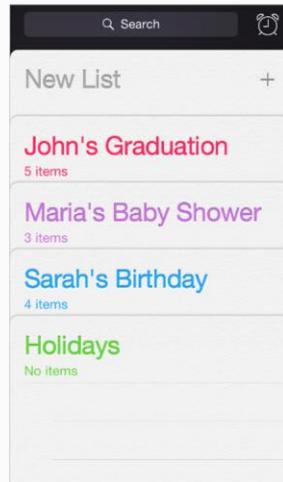
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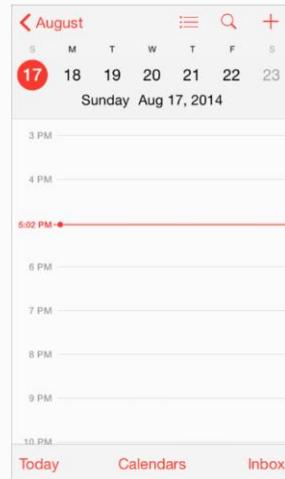


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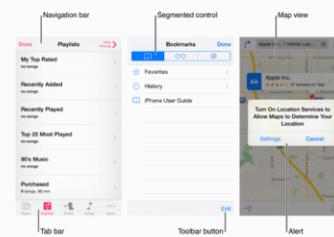
Calendar uses enhanced transitions to give users a sense of hierarchy and depth as they move between viewing years, months, and days. In the scrolling year view shown here, users can instantly see today's date and perform other calendar tasks.

When users select a month, the year view zooms in and reveals the month view. Today's date remains highlighted and the year appears in the back button, so users know exactly where they are, where they came from, and how to get back.



iOS App Anatomy

Almost all iOS apps use at least some of the UI components defined by the UIKit framework. Knowing the names, roles, and capabilities of these basic components helps you make informed decisions as you design the UI of your app.



A similar transition happens when users select a day: The month view appears to split apart, pushing the current week to the top of the screen and revealing the hourly view of the selected day. With each transition, Calendar reinforces the hierarchical relationship between years, months, and days.

The UI elements provided by UIKit fall into four broad categories:

- **Bars.** Bars contain contextual information that tells users where they are and controls that help users navigate or initiate actions.



- **Content views.** Content views contain app-specific content and can enable behaviors such as scrolling, insertion, deletion, and rearrangement of items.
- **Controls.** Controls perform actions or display information.
- **Temporary views.** Temporary views appear briefly to give users important information or additional choices and functionality.

In addition to defining UI elements, UIKit defines objects that implement functionality, such as gesture recognition, drawing, accessibility, and printing support.

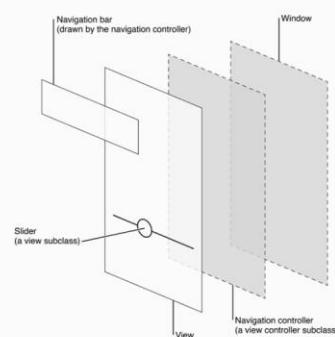
Programmatically, a UI element is a type of view because it inherits from `UIView`. A view knows how to draw itself onscreen, and it knows when a user touches within its bounds. Controls (such as buttons and sliders), content views (such as collection views and table views), and temporary views (such as alerts and action sheets) are all types of views.

To manage a set or hierarchy of views in your app, you typically use a *view controller*. A view controller coordinates the display of views, implements the functionality behind user interactions, and can manage transitions from one screen to another. For example, Settings uses a navigation controller to display its



hierarchy of views.

Here's an example of how views and view controllers can combine to present the UI of an iOS app.



Although developers think in terms of views and view controllers, users tend to experience an iOS app as a collection of screens. From this perspective, a *screen*



generally corresponds to a distinct visual state or mode in an app.

NOTE

An iOS app includes a window. But—unlike a window in a computer app—an iOS window has no visible parts and it can't be moved to another location on the display. Most iOS apps contain only one window; apps that support an external display can have more than one.

In *iOS Human Interface Guidelines*, the word *screen* is used as it's understood by most users. As a developer, you might also read about screens in other contexts, where the term refers to the `UIScreen` object you can use to access an external display screen.

Adaptivity and Layout

Build In Adaptivity

People generally want to use their favorite apps on all their devices and in multiple contexts, such as different device orientations and in Split View on iPad. Size classes and Auto Layout help you meet this expectation by defining how the layout of screens, view controllers, and views should adapt when the display environment changes. (The concept of *display environment* can refer to the entire device screen or only a portion of it, such as the area in a popover or the area in one side of Split View on iPad.)

iOS includes the concept of display environment in the definition of a *trait collection*, which includes size class, display scale, and user interface idiom. You can use a trait collection to make your views and view controllers responsive to changes in the display environment. (To learn more about trait collections, see *UITraitCollection Class Reference*.)

iOS defines two size classes: regular and compact. The *regular* size class is associated with expansive space and the *compact* size class is associated with constrained space. To characterize a display environment, you specify

a horizontal size class and a vertical size class. As you might guess, an iOS device can use one set of size classes for portrait orientation and a different set of size classes for landscape.

iOS automatically makes various layout changes when the size classes of a display environment change. For example, when the vertical size class changes from compact to regular, navigation bars and toolbars automatically become taller.

When you rely on size classes to drive changes in the layout, your app can look great in any display environment. To learn how to work with size classes in Interface Builder, see *Size Classes Design Help*.

NOTE

Within a size class, continue to use Auto Layout to make small layout adjustments, such as stretching or condensing content. To learn more about using Auto Layout, see *Auto Layout Guide*.

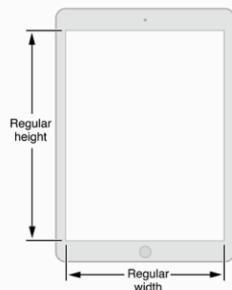
The following concrete examples can help you visualize how size classes characterize the display environments of various devices. For example, iPad (including iPad Pro) uses the regular size class in both dimensions and in both orientations. In other words, the iPad display



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environment is always horizontally and vertically regular.

The size classes of iPad
in portrait



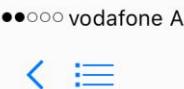
The size classes of iPad in
landscape



NOTE

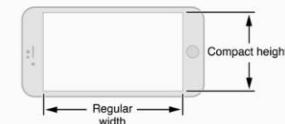
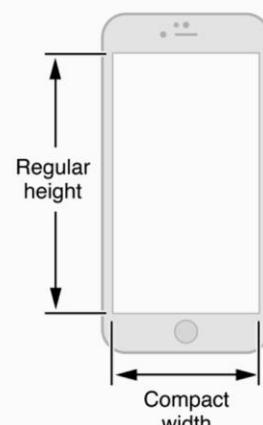
With multitasking support on eligible iPad models, your app may have to share the screen with another app. Be sure to use Auto Layout so that you can respond when the user decides to use multitasking features, such as Split View and Slide Over.

In addition to using Auto Layout, it's important to rely on the `UIView readableContentGuide` property when you lay out readable content on iPad Pro so that the margins are comfortable for readers.

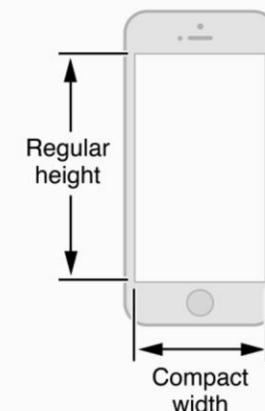


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The display environment of iPhone can vary depending on the device and its orientation.



All other iPhone models, including iPhone 6, use the same sets of size classes.



In portrait, iPhone 6 Plus uses the compact horizontal and regular vertical size classes.

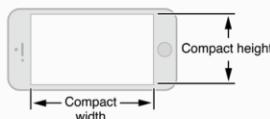
In landscape, iPhone 6 Plus uses the regular horizontal and compact vertical size classes.

In portrait, iPhone 6, iPhone 5, and iPhone 4s use the compact horizontal and regular vertical size classes.

In landscape, these devices use the compact size class in



both the horizontal and vertical dimensions.



Provide a Great Experience in Each Environment

When you take advantage of adaptivity, you can ensure that your UI responds appropriately to changes in the display environment. Follow these guidelines to give people a great experience on all devices and environments.

Maintain focus on the primary content in all environments. This is your highest priority. People use your app to view and interact with the content they care about. Changing the focus when the environment changes can disorient people and make them feel they've lost control over the app.

Avoid gratuitous changes in layout. A comparable experience in all environments lets people maintain their usage patterns when they rotate a device or run your app

on a different device. For example, if you use a grid to display images in a horizontally regular environment, you don't have to display the same information in a list in a horizontally compact environment, although you might adjust the dimensions of the grid.

Be straightforward if your app runs in only one orientation. People expect to use your app in different orientations, and it's best when you can fulfill that expectation. But if it's essential that your app run in only one orientation, you should:

- **Avoid displaying a UI element that tells people to rotate the device.** Running in the supported orientation clearly tells people to rotate the device, if required, without adding unnecessary clutter to the UI.
- **Support both variants of an orientation.** For example, if an app runs only in landscape, people should be able to use it whether they're holding the device with the Home button on the right or on the left. And if people rotate the device 180 degrees while using the app, it's best if the app responds by rotating its content 180 degrees.

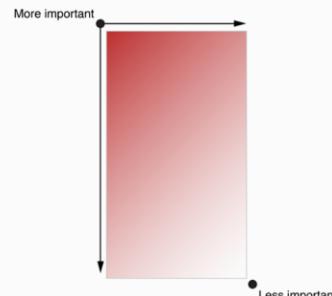
If your app interprets changes in device orientation as user input, handle rotation in app-specific ways. For example, a game that lets people move game pieces

by rotating the device can't respond to device rotation by rotating the screen. In a case like this, you should launch in both variants of the required orientation and allow people to switch between the variants until they start the main task of the app. As soon as people begin the main task, begin responding to device movement in app-specific ways.

Use Layout to Communicate

Layout encompasses more than just how UI elements look on an app screen. With your layout, you show users what's most important, what their choices are, and how things are related.

Make it easy to focus on the main task by elevating important content or functionality. Some good ways to do this are to place principal items in the upper half of the screen and—in left-to-right cultures—near the left side of the screen:



Use visual weight and balance to show users the relative importance of onscreen elements. Large items catch the eye and tend to appear more important than smaller ones. Larger items are also easier for users to tap, which makes them especially useful in apps—such as Phone and Clock—that users often use in distracting surroundings.

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Use alignment to ease scanning and communicate groupings or hierarchy. Alignment tends to make an app look neat and organized and it gives users places to focus while they scroll through screenfuls of information.

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Indentation and alignment of different information groups indicate how the groups are related and make it easier for users to find specific items.

Make sure that users can understand primary content at its default size. For example, users shouldn't have to scroll horizontally to read important text, or zoom to see primary images.

Be prepared for changes in text size. Users expect most apps to respond appropriately when they choose a different text size in Settings. To accommodate some text-size changes, you might need to adjust the layout; for more information about displaying text in your app, see [Text Should Always Be Legible](#).

As much as possible, avoid inconsistent appearances in your UI. In general, elements that have similar functions should also look similar. People often assume that there must be a reason for the inconsistencies they notice, and they're apt to spend time trying to figure it out.

Make it easy for people to interact with content and controls by giving each interactive element ample spacing. Give tappable controls a hit target of about 44 x 44 points.

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还剩 1 页



Recommended

Not Recommended



Starting and Stopping

Start Instantly

It's often said that people spend no more than a minute or two evaluating a new app. When you make the most of this brief period by presenting useful content immediately, you pique the interest of new users and give all users a superior experience.

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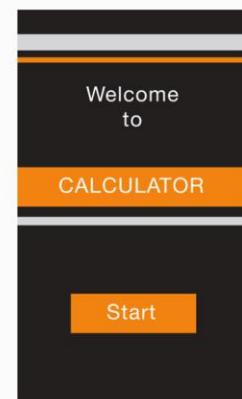
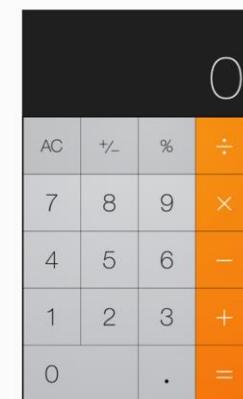
Don't tell people to reboot or restart their devices after installing your app. Restarting takes time and can make your app seem unreliable and hard to use.

If your app has memory-usage or other issues that make it difficult to run unless the system has just booted, you need to address those issues. For some guidance on developing a well-tuned app, see [Use Memory Efficiently](#).

As much as possible, avoid displaying a splash screen or other startup experience. It's best when users can begin using your app immediately.

Recommended

Not Recommended



Avoid asking people to supply setup information. Instead:

- **Focus on the needs of 80 percent of your users.** When you do this, most people won't have to supply any settings, because the app is already set up to behave the way they expect. If there is functionality that only a few users might want—or that most users might want only once—leave it out.
- **Get as much information as possible from other sources.** If you can use any of the information people supply in built-in app or



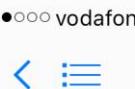
device settings, query the system for these values; don't ask people to enter them again.

- **If you must ask for setup information, prompt people to enter it within your app.** Then, store this information as soon as possible (potentially, in your app's settings). This way, people aren't forced to switch to Settings before they get the chance to enjoy your app. If people need to make changes to this information later, they can go to the app's settings at any time.

Delay a login requirement for as long as possible. It's best when users can navigate through much of your app and use some of its functionality without logging in. For example, App Store doesn't ask users to log in until they decide to buy something. Users often abandon apps that force them to log in before they can do anything useful.

If users must log in, display in the login view a brief, friendly explanation that describes the reasons for the requirement and how it benefits users.

Think carefully before providing an onboarding experience. (Onboarding introduces an app's features and explains how to perform common tasks.) Before you consider onboarding, make every effort to design your app so that all its features and tasks are intuitive and easily discoverable. *Onboarding is not a substitute for good*



app design. If you still feel that onboarding is necessary, follow these guidelines to create a brief, targeted experience that doesn't get in the user's way.

- **Give users only the information they need to get started.** A good onboarding experience shows users what to do first or briefly demonstrates a few of the features that most users are interested in. If you give too much information to users before they have a chance to explore your app, you make users responsible for remembering details they don't need right away and you may send the message that your app is hard to use. If additional help is needed for specific tasks, provide that help only when the user is performing those tasks.
- **Use animation and interactivity to engage users and help them learn by doing.** Add text sparingly and only if it enriches the experience; don't expect users to read long passages. For example, don't describe how to perform a simple task when you can use animation to show users what to do. To lead users through a more complex task, you might add transient overlay views that briefly describe each step as the user is about to do it. As much as possible, avoid displaying screenshots of your app because they're not interactive and users can confuse them with

app UI.

- **Make it easy to dismiss or skip the onboarding experience.** After users have viewed the onboarding experience, they probably don't want to view it again; other users may not want to view it at all. Be sure to remember the choice users make and don't force them to make it every time they open your app.

Avoid asking users to rate your app too soon. Asking for a rating too soon tends to annoy users and may decrease the amount of useful feedback you receive. To encourage well-considered feedback, be sure to give users a chance to form an opinion about your app before you ask them to rate it. For example, you might wait until users have visited a minimum number of different screens or performed a minimum number of tasks.

In general, launch in the device's current orientation. However, if your app runs in *only* one orientation, you should always launch in that orientation and let users rotate the device if necessary. For example, if a game or media-viewing app runs in landscape only, it's appropriate to launch the app in landscape, even when the device is currently in portrait. This way, if people start the app while the device is in portrait, they know to rotate the device to landscape to view the content.



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NOTE

It's best when a landscape-only app supports both variants of landscape orientation—that is, with the Home button on the right or on the left. If the device is already in landscape, a landscape-only app should launch in that variant, unless there's a very good reason not to. Otherwise, launch a landscape-only app in the variant with the Home button on the right. (To learn more about supporting different device orientations, see [Adaptivity and Layout](#).)

Provide a launch file. iOS displays an image the moment your app starts—giving users the impression that your app is fast and giving your app enough time to load content. Learn how to create a launch file in [Launch Files](#).

If possible, avoid requiring users to read a disclaimer or agree to an end-user license agreement before they can do anything else. Instead, you can let the App Store display your disclaimer or end-user license agreement (EULA) so that people can access it before they get your app. If you must provide these items within your app, be sure to integrate them in a way that harmonizes with your UI and balances business requirements with user experience needs.

When your app restarts, restore its state so users can

continue where they left off. People shouldn't have to remember the steps they took to reach their previous location in your app. To learn more about efficient ways to preserve and restore your app's state, see [Preserving Your App's Visual Appearance Across Launches](#).

Always Be Prepared to Stop

An iOS app never displays a Close or Quit option.

People stop using an app when they switch to another app, return to the Home screen, or put their devices in sleep mode.

When people switch away from your app, iOS multitasking transitions it to the background and replaces its UI with the UI of the new app. To prepare for this situation, your app should:

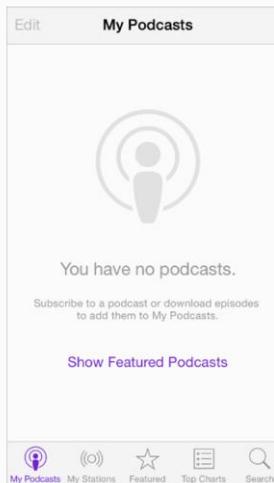
- **Save user data as soon as possible and as often as reasonable.** Do this because an app in the background can be told to exit or terminate at any time.
- **Save the current state when stopping at the finest level of detail possible.** In this way, people don't lose their context when they switch back to your app. For example, if your app displays scrolling data, save the current scroll position. You can learn more about



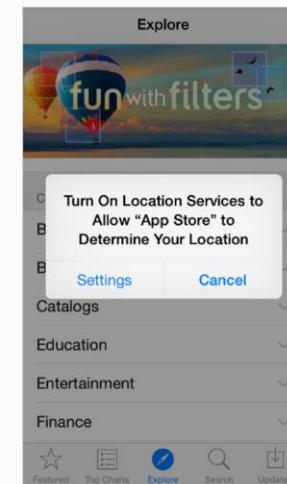
efficient ways to preserve and restore your app's state in Preserving Your App's Visual Appearance Across Launches.

Some apps may need to keep running in the background while users run another app in the foreground. For example, users might want to keep listening to the song that's playing in one app while they're using a different app to check their to-do list or play a game. Learn how to handle multitasking correctly and gracefully in [Multitasking](#).

Never quit an iOS app programmatically. People tend to interpret this as a crash. If something prevents your app from functioning as intended, you need to tell users about the situation and explain what they can do about it. Here are two good ways to do this:



functioning.



If all app features are unavailable, display a screen that describes the situation and suggests a correction. The information gives feedback to users and reassures them that there's nothing wrong with your app. It also puts users in control, letting them decide whether they want to take corrective action and continue using your app or switch to another app.

If only some app features are unavailable, display either a screen or an alert when people try to use the feature. Otherwise, people should be able to use the rest of the app. If you decide to use an alert, be sure to display it *only* when people try to access the feature that isn't



Navigation

People tend to be unaware of the navigation experience in an app unless it doesn't meet their expectations. Your job is to implement navigation in a way that supports the structure and purpose of your app without calling attention to itself.

Broadly speaking, there are three main styles of navigation, each of which is well suited to a specific app structure:

- Hierarchical
- Flat
- Content- or experience-driven

In a hierarchical app, users navigate by making one choice per screen until they reach their destination. To navigate to another destination, users must retrace some of their steps—or start over from the beginning—and make different choices. Settings and Mail are good examples of apps that use a hierarchical structure.



In an app with a flat information structure, users can navigate directly from one primary category to another because all primary categories are accessible from the main screen. Music and App Store are good examples of apps that use a flat structure.



It's no surprise that in an app that uses a content- or experience-driven information structure, navigation is also defined by the content or experience. For example, users navigate through a book by moving from one page

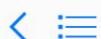
to the next or by choosing a page in the table of contents; in a game, navigation is often an important part of the experience.



In some cases, it works well to combine more than one navigation style in an app. For example, the items in one category of a flat information structure might best be displayed in a hierarchy.

Users should always know where they are in your app and how to get to their next destination.
Regardless of the navigation style that suits the structure of your app, the most important thing is that a user's path through the content is logical, predictable, and easy to follow.

UIKit defines some standard UI elements that make it easy to implement hierarchical and flat navigation styles, in addition to some elements that help you enable content-centric navigation, such as in a book-style or



media-viewing app. A game or other app that provides an experience-driven navigation style typically relies on custom elements and behaviors.

Use a navigation bar to give users an easy way to traverse a hierarchy of data. The navigation bar's title can show users their current position in the hierarchy; the back button makes it easy to return to the previous level. To learn more, see [Navigation Bar](#).

Use a tab bar to display several peer categories of content or functionality. A tab bar is a good way to support a flat information architecture and its persistence lets people switch between categories regardless of their current location. To learn more, see [Tab Bar](#).

Use a page control when each app screen represents an individual instance of the same type of item or page. A page control is good for showing users how many items or pages are available and which one is currently displayed. For example, Weather uses a page control to show how many location-specific weather pages the user has opened. To learn more about the page control, see [Page Control](#).

In general, it's best to give users one path to each screen. If there's one screen that users need to see in more than one context, consider using a temporary view, such as a modal view, action sheet, or alert. To learn more, see [Modal View](#), [Action Sheet](#), and [Alert](#).

UIKit also provides the following related controls:

- [Segmented Control](#). A segmented control can give users a way to see different categories or aspects of the content on the screen; it doesn't enable navigation to a new screen.
- [Toolbar](#). Although a toolbar looks similar to a navigation bar or a tab bar, it doesn't enable navigation. Instead, a toolbar gives users controls that act on the contents of the current screen.

Modal Contexts

Modality—that is, a mode in which something exists or is experienced—has advantages and disadvantages. It can give users a way to complete a task or get information without distractions, but it does so by temporarily preventing them from interacting with the rest of the app.



Ideally, people can interact with iOS apps in nonlinear ways, so it's best when you can minimize the number of modal experiences in your app. In general, consider creating a modal context only when:

- It's critical to get the user's attention
- A self-contained task must be completed—or explicitly abandoned—to avoid leaving the

user's data in an ambiguous state

Keep modal tasks simple, short, and narrowly focused. You don't want your users to experience a modal view as a mini app within your app. If a subtask is too complex, people can lose sight of the main task they suspended when they entered the modal context. Be especially wary of creating a modal task that involves a hierarchy of views, because people can get lost and forget how to retrace their steps. If a modal task must contain subtasks in separate views, be sure to give users a single, clear path through the hierarchy, and avoid circularities. For guidelines on using modal views, see [Modal View](#).

Always provide an obvious and safe way to exit a modal task. People should always be able to predict the fate of their work when they dismiss a modal view.

If the task requires a hierarchy of modal views, make sure your users understand what happens if they tap a Done button in a view that's below the top level. Examine the task to decide whether a Done button in a lower-level view should complete only the part of the task in that view, or the entire task. Because of this potential for confusion, avoid adding a Done button to a subordinate view as much as possible.

Reserve alerts for delivering essential—and ideally actionable—information. An alert interrupts the user's

experience and requires a tap to dismiss, so it's important for users to feel that the alert's message warrants the intrusion. To learn more, see [Alert](#).

Respect users' preferences for receiving notifications. In Settings, users indicate how they want to receive notifications from your app. Be sure to abide by these preferences so that users aren't tempted to turn off all notifications from your app.



Interactivity and Feedback

Interactive Elements Invite Touch

To signal interactivity, the built-in apps use a variety of cues, including response to pressure, color, location, context, and meaningful icons and labels. Users rarely need additional decorations to show them that an onscreen element is interactive or to suggest what it does.

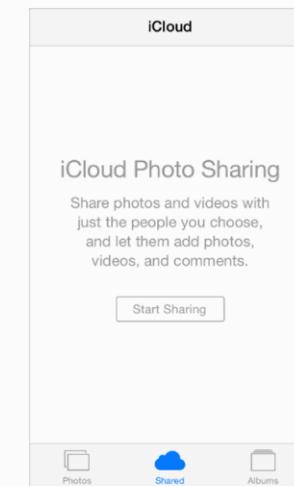
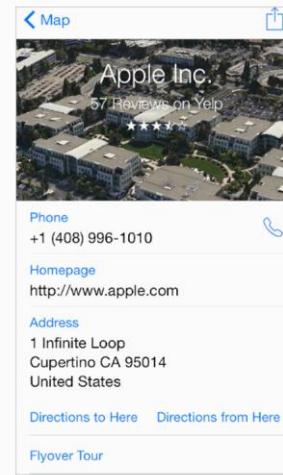
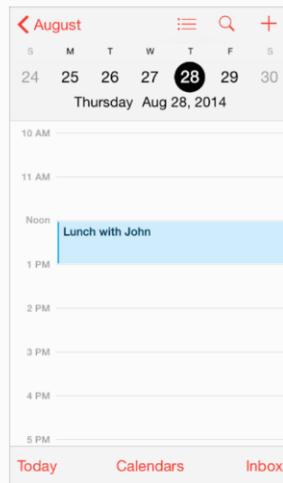
On a device that supports 3D Touch, the background blur that users see when they press on a Home screen icon signals that more functionality is available.



All Contacts	Edit
work	
(408) 555-1212	
work	
jappleseed@apple.com	
Ringtone	
Constellation	
Vibration	
Heartbeat	
homepage	
http://apple.com	
Notes	
Send Message	
Share Contact	
Add to Favorites	

A key color gives users a strong visual indicator of interactivity, especially in apps that don't use an abundance of other colors. In Contacts, blue marks the interactive elements and gives the app a unified and recognizable visual theme.

The back button uses several cues to indicate its interactivity and convey its function: It appears in response to navigation, it displays a back-pointing chevron, it typically uses a key color, and it can display a title that describes the previous screen.



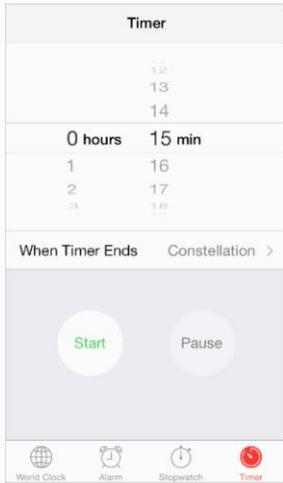
An icon or a title that provides a clear call to action invites users to tap it. For example, the titles in Maps, such as “Flyover Tour” and “Directions to Here,” clearly describe actions that users can take. Combined with a key color, actionable titles tend to make button borders or other embellishments superfluous.

In a content area, add a button border or background only if necessary. Buttons in bars, action sheets, and alerts don’t need borders because users know that most of the items in these areas are interactive. In a content area, on the other hand, a button might need a border or

a background to distinguish it from the rest of the content. For example, Music, Clock, Photos, and App Store use such buttons in a few specific contexts.

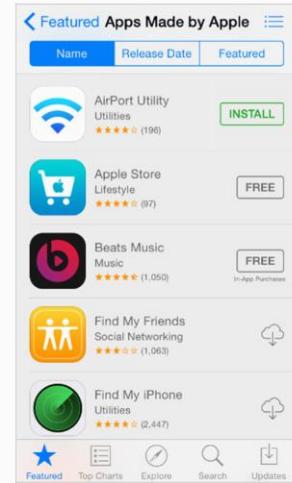
Photos uses a button border to differentiate the Start Sharing button from the explanatory text that appears above it.

Clock uses button backgrounds in the Stopwatch and Timer screens to draw attention to the Start and Pause buttons and to make them easy to tap even when the user’s surroundings are distracting.



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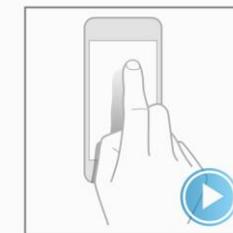
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iOS Human Interface Guidelines

onscreen objects. People generally expect gestures to work the same in all the apps they use.

People don't have to learn new gestures to interact with 3D Touch. People quickly discover the additional interactive dimension that 3D Touch enables when they press lightly on the screen and items respond.



Tap To press or select a control or item.



Drag To scroll or pan—that is, move side to side.

To drag an element.



Flick To scroll or pan quickly.



Swipe With one finger, to return to the previous screen, to reveal the hidden view in a split view controller, or the Delete button in a table-view row. In a peek, swiping up can reveal quick actions (for more information, see [3D Touch](#)).

With four fingers, to switch between apps on iPad.



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Double tap To zoom in and center a block of content or an image.

To zoom out (if already zoomed in).



Pinch Pinch open to zoom in; pinch close to zoom out.



Touch and hold In editable or selectable text, to display a magnified view for cursor positioning.



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还剩 4 页



Shake To initiate an undo or redo action.

In addition to the standard gestures users know, iOS defines a few gestures that invoke systemwide actions, such as revealing Control Center or Notification Center. Users rely on these gestures to work regardless of the app they're using.

Avoid associating different actions with the standard gestures. Unless your app is a game, redefining the meaning of a standard gesture may confuse people and make your app harder to use.

Avoid creating custom gestures that invoke the same actions as the standard gestures. People are used to the behavior of the standard gestures, and they don't appreciate being expected to learn different ways to do the same thing.

Use complex gestures as shortcuts to expedite a task, not as the only way to perform it. As much as possible, always give users a simple, straightforward way to perform an action, even if it means an extra tap or two. Simple gestures let users focus on the experience and the content, not the interaction.

In general, avoid defining new gestures unless your app is a game. In games and other immersive apps, custom gestures can be a fun part of the experience. But in apps that help people do things that are important to them, it's best to use standard gestures because people

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don't have to make an effort to discover them or remember them.

In a regular environment, consider using multifinger gestures. Although complex gestures aren't appropriate for every app, they can enrich the experience in apps that people spend a lot of time in, such as games or content-creation environments. Always bear in mind that nonstandard gestures aren't discoverable and should rarely, if ever, be the only way to perform an action.

Feedback Aids Understanding

Feedback helps users know what an app is doing, discover what they can do next, and understand the results of their actions. UIKit controls and views provide many kinds of feedback.

As much as possible, integrate status and other relevant feedback information into your UI. It's best when users can get this type of information without taking action or being distracted from their content. For example, Mail displays the current mailbox status in the toolbar where it doesn't compete with the user's content.



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还剩 2 页



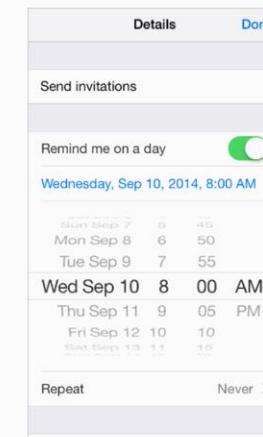
Avoid unnecessary alerts. An alert is a powerful feedback mechanism, but it should be used only to deliver important—and ideally actionable—information. If users see too many alerts that don't contain essential information, they quickly learn to ignore all alerts. To learn more about using an alert, see [Alert](#).

Inputting Information Should Be Easy

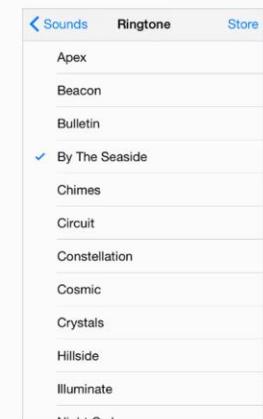
Inputting information takes time and attention, whether people tap controls or use the keyboard. When an app slows people down by asking for a lot of user input before anything useful happens, people can feel discouraged from using it.

Make it easy for users to make choices. For example, you can use a picker or a table view instead of a text field, because most people find it easier to select an item from a list than to type words.

A date picker in Reminders



A list of options in Settings



Get information from iOS, when appropriate. People store lots of information on their devices. When it makes sense, don't force people to give you information that you can easily find for yourself, such as their contacts or calendar information.

Balance a request for input by giving users something useful in return. A sense of give and take helps people feel they're making progress as they move through your app.



AA Q B



AA Q B



AA Q B

Animation

Beautiful, subtle animation pervades the iOS UI and makes the app experience more engaging and dynamic.

Appropriate animation can:

- Communicate status and provide feedback
- Enhance the sense of direct manipulation
- Help people visualize the results of their actions



Add animation cautiously, especially in apps that don't provide an immersive experience. Animation that seems excessive or gratuitous can obstruct app flow, decrease performance, and distract users from their task.

In particular, use motion effects and UIKit dynamic

behaviors with purpose and restraint, and be sure to test the results. Used appropriately, these effects can increase users' understanding and enjoyment; overusing them can make an app seem disorienting and difficult to control.

When appropriate, make custom animation

consistent with built-in animation. People are accustomed to the subtle animation used in the built-in iOS apps. In fact, people tend to regard the smooth transitions between views, the fluid response to changes in device orientation, and the physics-based scrolling as an expected part of the iOS experience. Unless you're creating an app that enables an immersive experience—such as a game—custom animation should be comparable to the built-in animations.

Use animation consistently throughout your app. As with other types of customization, it's important to use custom animation consistently so that users can build on the experience they gain as they use your app.

In general, strive for realism and credibility in custom animation. People tend to be willing to accept artistic license in appearance, but they can feel disoriented when they experience movement that doesn't make sense or appears to defy physical laws. For example, if you reveal a view by sliding it down from the top of the screen, you should dismiss it by sliding it back up because doing so helps users remember where the view comes from. If you dismiss the same view by sliding

it down beyond the bottom of the screen, you break the user's mental model of a view that's available above the top of the screen.



Branding

Successful branding involves more than adding brand assets to an app. The best apps integrate existing assets with a unique look and feel to give users a delightful, memorable experience.

iOS makes it easy to use custom icons, colors, and fonts to create a distinctive UI that sets your app apart from the rest. As you design these elements, keep two things in mind:

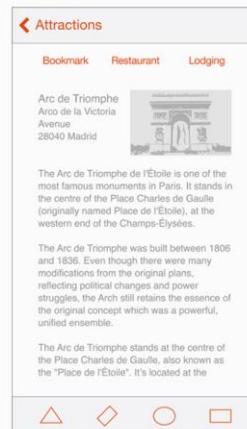
- Each custom element should look good and function well by itself, but it should also look like it belongs with the other elements in the app, whether they're custom or standard.
- To feel at home in iOS, an app doesn't have to look like the built-in apps but it does need to integrate deference, clarity, and depth (to learn more about these themes, see [Designing for iOS](#)). Take the time to figure out what deference, clarity, and depth mean in your app and then express this meaning in your custom elements.

When you need to remind users of an existing brand within your app, follow these guidelines.



Incorporate a brand's assets in a refined, unobtrusive way. People use your app to get things done or be entertained; they don't want to feel as if they're being forced to watch an advertisement. For the best user experience, you want to quietly remind users of the brand identity through your choice of font, color, and imagery.

Recommended



Not Recommended



Don't take space away from the content people care about. For example, displaying a second, persistent bar at the top of the screen that does nothing but display brand assets means that there's less room for content. Instead, defer to the user's content and consider less intrusive



ways to display pervasive branding, such as using a custom tint or font, or subtly customizing the background of a screen.

Resist the temptation to display your logo

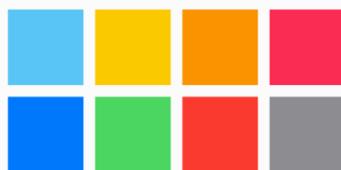
throughout the app. Mobile device screens are relatively small, and every occurrence of a logo takes space away from the content that users want to see. What's more, displaying a logo in an app doesn't serve the same purpose as displaying it in a webpage: It's common for users to arrive on a webpage without knowing its owner, but it's much less likely that users will open an iOS app without seeing its app icon.



Color and Typography

Color Enhances Communication

In iOS, color helps indicate interactivity, impart vitality, and provide visual continuity. The built-in apps use a family of pure, clean colors that look great individually and in combination, and on both light and dark backgrounds.



If you create multiple custom colors, make sure they work well together. For example, if pastels are essential to your app's style, you should create a family of coordinating pastels that can be used throughout the app.

Pay attention to color contrast in different contexts. For example, if there's not enough contrast between the

navigation bar background and the bar-button titles, the buttons will be hard for users to see. A quick but unscientific way to find out if your colors have sufficient contrast is to view your app on a device in different lighting conditions, including outdoors on a sunny day.

Although viewing your app on a device can help you find some of the areas you need to work on, it's no substitute for a more objective approach that yields reliable results. This approach involves determining the ratio between the luminance values of the foreground and background colors. To get this ratio, use an online contrast ratio calculator or you can perform the calculation yourself using the formula established in the WCAG 2.0 standard. Ideally the color contrast ratio in your app is 4.5:1 or higher.

Take bar translucency and app content into account when you use a custom bar tint. If you need to create a bar tint that matches a specific color, such as a color in an existing brand, you may have to experiment with various colors before you get the results you want. A bar's appearance is affected by both the translucency that iOS provides and the appearance of the app content that can be behind the bar.



API NOTE

To tint bar button items, use the `tintColor` property; to tint the bar itself, use the `barTintColor` property. To learn more about these bar properties, see [UINavigationBar Class Reference](#), [UITabBar Class Reference](#), [UIToolbar Class Reference](#), and [UISearchBar Class Reference](#).

Be aware of color blindness. Most color blind people have difficulty distinguishing red from green. Test your app to make sure that there are no places where you use red and green as the only way to distinguish between two states or values (some image-editing software includes tools that can help you proof for color-blindness). In general, it's a good idea to use more than one way to indicate an element's interactivity (to learn more about indicating interactivity in iOS, see [Interactive Elements](#) [Invite Touch](#)).

Consider choosing a key color to indicate interactivity and state. Key colors in the built-in apps include yellow in Notes and red in Calendar. If you define a key color to indicate interactivity and state, make sure that the other colors in your app don't compete with it.

Avoid using the same color in both interactive and noninteractive elements. Color is one of the ways that a UI element indicates its interactivity. If interactive and



noninteractive elements have the same color, it's harder for users to know where to tap.

Color communicates, but not always in the way you intend. Everyone sees color differently, and many cultures differ in how they assign meanings to colors. Spend time to research how your use of color might be perceived in other countries and cultures. As much as possible, you want to be sure that the colors in your app send the appropriate message.

In most cases, don't let color distract users. Unless color is essential to your app's purpose, it usually works well to use color as a subtle enhancement.

Great Typography Enables Clear Communication

Apple designed the San Francisco family of typefaces to provide a beautiful, consistent typographic voice and reading experience across all platforms. In iOS 9 and later, San Francisco is the system font.

San Francisco works hand in hand with Dynamic Type to give you:

- A range of font sizes that automatically provide superlative legibility and a great reading

experience at all user settings, including accessibility settings

- Automatic adjustments to letter spacing (tracking) and line height (leading) for every font size
- The ability to specify different text styles for semantically distinct blocks of text, such as Body, Footnote, or Headline
- Text that responds appropriately to changes the user makes to text-size settings (including accessibility text sizes)

Download San Francisco by visiting <https://developer.apple.com/fonts/>. (Note that the San Francisco font for iOS 9 is called SF-U.) When you adopt San Francisco in your app, you can adjust values in Simulator > Settings to test the appearance of your app's text at different sizes.

NOTE

If you use a custom font, you can still adopt Dynamic Type and scale type according to the system setting for text size. Your app is responsible for responding appropriately when the user changes the setting. To learn how to use text styles and ensure that your app gets notified when the user changes the text size setting, see Text Styles.

San Francisco consists of two optical sizes: Text and Display. Text is used for sizes that are below 20 points and Display is used for sizes that are 20 points or larger. When you use San Francisco in your app, iOS automatically switches between Text and Display when appropriate.

NOTE

If you're using an application such as Sketch or Photoshop to create your designs, you need to switch to Display when you set type that is 20 points or larger. iOS automatically adjusts tracking values for San Francisco based on font size (a tracking value is used to modify the native spacing of letters at a certain point size). The tracking values for each type size in Text and Display are shown in Table 10-1 and Table 10-2, respectively.


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B

A
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B

A
Q
B

Table 10-1 The tracking value used per type size in SF-UI Text

Type size in points @2x (144 PPI)	Tracking value
6	41
8	26
9	19
10	12
11	6
12	0
13	-6
14	-11
15	-16
16	-20
17	-24
18	-25

Table 10-2 The tracking value used per type size in SF-UI Display

Type size in points @2x (144 PPI)	Tracking value
20	19
22	16
28	13
32	12
36	11
50	7
64	3
80 and greater	0

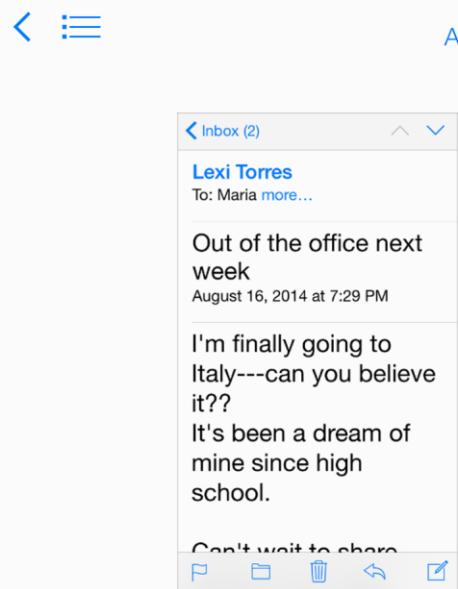
To emphasize some text or to create visual relationships among parts of content, you can rely on the semantically defined styles supported by Dynamic Type, such as heading and body, or you can specify font weights, such as thin or semibold. Adopting the Dynamic Type styles makes it easy to communicate meaning in your content, but if you want more control over your design, you can set a particular weight for a particular piece of text. (To learn more about adjusting font weight, see *UIFont Class Reference*.)

For example, you might want to increase the weight of

some text to help users visualize the hierarchy of the content or to draw their attention to a particular word or phrase. Or you might want to create visual cohesion among multiple, nearby labels of different sizes by increasing the weight of small type and decreasing the weight of large type. Font weight also has a significant impact on the overall style and voice of your content, so you might choose a particular weight to achieve a particular design goal.

Prioritize content when responding to text-size changes. Not all content is equally important to users. When users choose a larger text size, they want to make the content they care about easier to read; they don't always want every word on the screen to be larger.

For example, when users choose a large accessibility text size, Mail displays the subject and body of the message in the large size but leaves the less important text—such as the date and the recipient—in a smaller size.



Make sure all styles of a custom font are legible at different sizes. One way to do this is to emulate some of the ways iOS displays font styles at different text sizes. For example:

- Text should never be smaller than 11 points, even when the user chooses the extra-small text size. For comparison, the body style uses a font size of 17 points at the large size, which is the default text-size setting.
- In general, font size and leading values differ



by one point per text-size setting. Exceptions to this are the two caption styles, which use the same font size, leading, and tracking at the extra-small, small, and medium settings.

- At the smallest three text sizes, tracking values are relatively large; at the largest three text sizes, tracking values are relatively tight.
- The headline and body styles use the same font size. To distinguish it from the body style, the headline style uses a heavier weight.
- Text in a navigation bar always uses 17 points, which is the same as the body text style at the large setting.
- Text always uses either regular or medium weight; it doesn't use light or bold, because light and bold weights don't read well at small sizes.

Recommended



Not Recommended



In general, use a single font throughout your app. Mixing several different fonts can make your app seem fragmented and sloppy. Instead, use one font and just a few styles and sizes.



Icons and Graphics

The App Icon

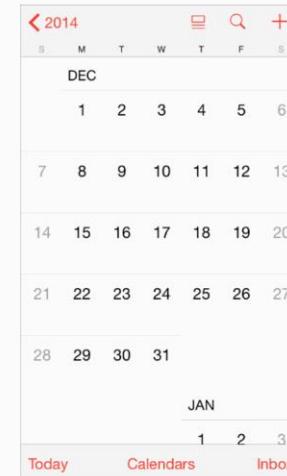
Every app needs a beautiful app icon. It's not unusual for people to base their initial opinions about your app's quality, purpose, and reliability solely on the look of your app icon.



Here are a few of the things you should keep in mind as you think about your app icon. When you're ready to start creating it, see [App Icon](#) for detailed guidance and specifications.

- The app icon is an important part of your app's brand. Approach the design as an opportunity to tell your app's story and build an emotional connection with users.
- The best app icons are unique, uncluttered, engaging, and memorable.

- An app icon needs to look good at many different sizes and on different backgrounds. Details that might enrich an icon at large sizes can make it look muddy at small sizes.



Small Icons

iOS provides a lot of small icons—representing common tasks and types of content—for use in tab bars, toolbars, navigation bars, and Home screen quick actions. It's a good idea to use the built-in icons as much as possible because users already know what they mean.



If you need to represent custom actions or content types you can create custom bar icons. Designing these small, streamlined icons is very different from designing an app icon. If you need to create custom bar icons, see [Template Icons](#) to learn how.

Note that you can use text instead of icons to represent items in a navigation bar or toolbar. For example, Calendar uses "Today," "Calendars," and "Inbox" instead of icons in the toolbar.

To help you decide whether to use text or icons in the navigation bar or toolbar in your app, consider how many icons are visible onscreen at one time. Too many icons on a screen can make an app seem difficult to decode. Also, note that this decision might be different depending on the horizontal environment, because a horizontally regular environment tends to have more room for text in bars.


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A Q 书

A Q 书

Graphics

iOS apps tend to be graphically rich. Whether you're displaying users' photos or creating custom artwork, here are a few guidelines you should follow.

Support the Retina display. Make sure that you supply high resolution assets for all artwork and graphics in your app. In particular, supply @3x assets for iPhone 6 Plus and @2x assets for all other high-resolution iOS devices.

Display photos and graphics in their original aspect ratio, and don't scale them greater than 100%. You don't want the artwork or graphics in your app to look skewed or too large. Let users choose whether they want to zoom images in or out.

Don't use images that replicate Apple products in your designs. These symbols are copyrighted, and product designs can change frequently.

Don't use Apple app icons, images, or screenshots in your designs. Apple designs are copyrighted and can't appear in your UI unless they are provided by the system.

Terminology and Wording

Every word you display in an app is part of a conversation you have with users. Use this conversation as an opportunity to provide clarity and to help people feel comfortable in your app.



Settings is an essential app for all users, so it uses simple, direct language to describe what users can do. For example, Settings > Do Not Disturb explains the effects of various options without using technical jargon that

might be difficult for unsophisticated users to understand.

Use terminology that you're sure your users understand. Use what you know about your users to determine whether the words and phrases you plan to use are appropriate. For example, technical jargon is rarely helpful in an app aimed at unsophisticated users, but in an app designed for technically savvy users, it might be appreciated.

Use a tone that's informal and friendly, but not too familiar. You want to avoid being stilted or too formal, but you don't want to risk sounding falsely jovial or patronizing. Remember that users are likely to read the text in your UI many times, and what might seem clever at first can become irritating when repeated.

Think like a newspaper editor, and watch out for redundant or unnecessary words. When your UI text is short and direct, users can absorb it quickly and easily. Identify the most important information, express it concisely, and display it prominently so that people don't have to read too many words to find what they're looking for or to figure out what to do next.

Give controls short labels or use well-understood icons. People should be able to tell at a glance what a control does.



Take care to be accurate when describing dates. It's often appropriate to use friendly terms such as *today* and *tomorrow* when you display date information in your UI. But it can be confusing if you don't account for the user's current locale. For example, consider an event that starts just before midnight. To users in the same time zone, the event starts today, but to users in an earlier time zone, the same event may have started yesterday.

Make the most of the opportunity to communicate with potential users by writing a great App Store description. In addition to describing your app accurately and highlighting the qualities you think people are most likely to appreciate, be sure to:

- **Correct all spelling, grammatical, and punctuation errors.** Although such errors don't bother everyone, in some people they can create a negative impression of your app's quality.
- **Keep all-capital words to a minimum.** Occasional all-capital words help draw people's attention, but when an entire passage is capitalized, it's difficult to read and it can be interpreted as shouting.
- **Consider describing specific bug fixes.** If a new version of your app contains bug fixes that customers have been waiting for, it can be a good idea to mention this in your description.



Integrating with iOS

Integrating with iOS means giving users a compelling, delightful experience that feels at home on the platform; it doesn't mean creating an app that looks like a copy of a built-in app.

The best way to integrate your unique app with the platform is to understand the themes that motivate iOS—these are described in [Designing for iOS](#)—and figure out how your app should express them. As you do this, follow the guidelines in this section to help you give users the experience they expect.

Use Standard UI Elements Correctly

As much as possible, it's a good idea to use the standard UI elements that UIKit provides. When you use standard elements instead of creating custom ones, both you and your users benefit:

- Standard UI elements automatically receive updates if iOS introduces a redesigned appearance—custom elements don't get updated.
- Standard UI elements tend to offer various



ways to customize their appearance or behavior. For example, all views (that is, objects that inherit from `UIView`) can be tinted using the `tintColor` property, which makes it easy to add color to your app.

- People are comfortable with the standard UI elements, so they instantly understand how to use them in your app.

To take advantage of the benefits of using standard UI elements, it's crucial that you:

Follow the guidelines for every UI element. When a UI element looks and works the way people expect it to, they can depend on their prior experience to help them use it in your app. You can find UI element guidelines in [Bars](#), [Content Views](#), [Controls](#), and [Temporary Views](#).

Don't mix UI element styles from different versions of iOS. You don't want to confuse users by displaying UI elements that look like they belong in a different version of iOS than the version that's currently running on the device.

In general, avoid creating a custom UI element that performs a standard action. First, ask yourself why you're creating a custom UI element that behaves exactly like a standard one. If you just want a custom look, consider changing the look of a standard element by



using the UIKit appearance customization APIs or tint color. If you want a slightly different behavior, be sure to find out whether a standard element might do what you want when you adjust its properties and attributes. If you need completely custom behavior, it's best to design a custom element that doesn't look too similar to the standard ones.

TIP

Interface Builder makes it easy to get the standard UI elements, use the appearance customization APIs, access properties and attributes, and apply custom and system provided icons to your controls. To learn more about Interface Builder, see [Xcode Overview](#).

Don't use system-defined buttons and icons to mean something else. iOS provides many buttons and icons that you can use in your app. Be sure you understand the documented, semantic meaning of these buttons and icons; don't rely on your interpretation of their appearance. (You can find the meaning of each icon in [Toolbar and Navigation Bar Buttons](#) and [Tab Bar Icons](#).)

If you can't find a system-provided button or icon that has the appropriate meaning for a function in your app, you can create your own. For some guidelines to help you design custom icons, see [Bar Button Icons](#).

If your app enables an immersive task or experience, it may be reasonable to create completely custom controls. This is because you're creating a unique environment, and discovering how to control that environment is an experience users expect in such apps.

Downplay File and Document Handling

iOS apps can help people create and manipulate files, but this doesn't mean that people should have to think about the file system on an iOS device.

If your app helps people create and edit documents, it works well to provide some sort of app-specific document library view that lets them open an existing document or create a new one. Ideally, such a library view:

- **Is highly graphical.** People should be able to easily identify the document they want by looking at visual representations of the documents onscreen.
- **Lets people make the fewest possible gestures to do what they want.** For example, people might scroll horizontally through a carousel or grid of existing documents and open the desired one with a tap.
- **Includes a new document function.** Instead of making people go somewhere else to create


A Q B

a new document, a document library might let them tap a placeholder image to create a new document.

For example, Pages displays the user’s documents, along with an easy way to create new documents, in a graphical library view.


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TIP

You can use the Quick Look Preview feature to let people preview documents within your app, even if your app can’t open them. To learn how to provide this feature in your app, see [Quick Look](#).

If your app lets people use documents that they created in other apps, you can display a modal document picker view controller to help them access these documents. The document picker view controller can display documents in the user’s iCloud Drive in addition to Document Provider extensions, which are associated with other document-creation or document-storage apps. To learn more about Document Provider extensions, see [Document Provider Extensions](#); to learn more about the document picker view controller, see [Document Picker Programming Guide](#).

Give people confidence that their work is always preserved unless they explicitly cancel or delete it. If your app helps people create and edit documents, don’t require them to take an explicit save action. iOS apps should take responsibility for saving people’s input, both periodically and when they open a different document or switch away from the app.

If the main function of your app isn’t content creation—


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but you allow people to switch between viewing information and editing it—it can make sense to ask them to save their changes. In this scenario, it often works well to provide an Edit button in the view that displays the information. When people tap the Edit button, replace it with a Save button and add a Cancel button. The transformation of the Edit button helps remind people that they’re in an editing mode and might need to save changes, and the Cancel button gives them the opportunity to exit without saving their changes.

Be Configurable If Necessary

Some apps might need to give users a way to make setup or configuration choices, but most apps can avoid or delay doing this. Successful apps work well for most people right away, while also offering some convenient ways to adjust the user experience.

When you design your app to function the way most of your users expect, you decrease the need for settings. If you need information about the user, query the system for it instead of asking users to provide it. If you decide you must provide app settings that users rarely need to change, see [The Settings Bundle](#) to learn how to support them in your code.

As much as possible, offer configuration options in



the main UI. Putting options in the main UI can make sense if the options represent a primary task and if people might want to change them frequently. If people are likely to change an app's configuration only occasionally, it can make sense to put them in a separate view.

If necessary, help users go directly to your app's settings in **Settings**. In particular, if you display a message that describes where to find your settings, such as "Go to Settings > MyApp > Privacy > Location Services," replace the description with a button that opens that location in Settings. To learn how to enable this behavior, see **Settings Launch URL**.

displaying in-app advertising ([iAd Rich Media Ads](#)), integrating with [Game Center](#), and supporting [iCloud](#).

Design Strategies

Take Advantage of iOS Technologies

iOS provides a wealth of technologies that support common tasks and scenarios in ways that users expect. This expectation means that it's almost always better to integrate system-supported technologies into your app than it is to design a custom approach.

Some iOS technologies—such as [Multitasking](#) and [VoiceOver](#)—are system features that all apps should incorporate. Others enable specific app functionality, such as handling tickets and gift cards ([Wallet](#)), enabling user purchases within an app ([In-App Purchase](#)),

Design Principles

Aesthetic Integrity

Aesthetic integrity doesn't measure the beauty of an app's artwork or characterize its style; rather, it represents how well an app's appearance and behavior integrates with its function to send a coherent message.



People care about whether an app delivers the functionality it promises, but they're also affected by the app's appearance and behavior in strong—sometimes subliminal—ways. For example, an app that helps people perform a serious task can put the focus on the task by keeping decorative elements subtle and unobtrusive and by using standard controls and predictable behaviors. This app sends a clear, unified message about its purpose and its identity that helps people trust it. But if the app sends mixed signals by presenting the task in a UI that's

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intrusive, frivolous, or arbitrary, people might question the app's reliability or trustworthiness.

On the other hand, in an app that encourages an immersive task—such as a game—users expect a captivating appearance that promises fun and excitement and encourages discovery. People don't expect to accomplish a serious or productive task in a game, but they expect the game's appearance and behavior to integrate with its purpose.

Consistency

Consistency lets people transfer their knowledge and skills from one part of an app's UI to another and from one app to another app. A consistent app isn't a slavish copy of other apps and it isn't stylistically stagnant; rather, it pays attention to the standards and paradigms people are comfortable with and it provides an internally consistent experience.

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To determine whether an iOS app follows the principle of consistency, think about these questions:

- Is the app consistent with iOS standards? Does it use system-provided controls, views, and icons correctly? Does it incorporate device features in ways that users expect?
- Is the app consistent within itself? Does text use uniform terminology and style? Do the same icons always mean the same thing? Can people predict what will happen when they perform the same action in different places? Do custom UI elements look and behave the same throughout the app?
- Within reason, is the app consistent with its earlier versions? Have the terms and meanings

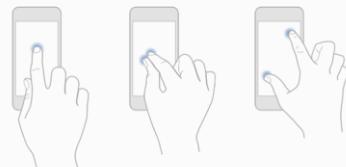
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remained the same? Are the fundamental concepts and primary functionality essentially unchanged?

Direct Manipulation

When people directly manipulate onscreen objects instead of using separate controls to manipulate them, they're more engaged with their task and it's easier for them to understand the results of their actions.



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Using the Multi-Touch interface, people can pinch to directly expand or contract an image or content area. And in a game, players move and interact directly with onscreen objects—for example, a game might display a combination lock that users can spin to open.

In an iOS app, people experience direct manipulation when they:

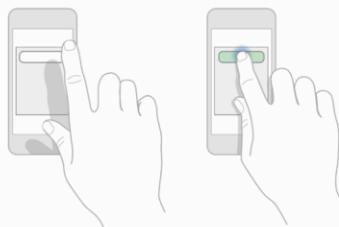
- Rotate or otherwise move the device to affect onscreen objects
- Use gestures to manipulate onscreen objects
- Can see that their actions have immediate, visible results

Feedback

Feedback acknowledges people's actions, shows them the results, and updates them on the progress of their task.

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The built-in iOS apps provide perceptible feedback in response to every user action. List items and controls highlight briefly when people tap them and—during operations that last more than a few seconds—a control shows elapsing progress.

Subtle animation can give people meaningful feedback that helps clarify the results of their actions. For example, lists can animate the addition of a new row to help people track the change visually.

Sound can also give people useful feedback, but it

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shouldn't be the only feedback mechanism because people can't always hear their devices.

Metaphors

When virtual objects and actions in an app are metaphors for familiar experiences—whether these experiences are rooted in the real world or the digital world—users quickly grasp how to use the app.

It's best when an app uses a metaphor to suggest a usage or experience without letting the metaphor enforce the limitations of the object or action on which it's based.

iOS apps have great scope for metaphors because people physically interact with the screen. Metaphors in iOS include:

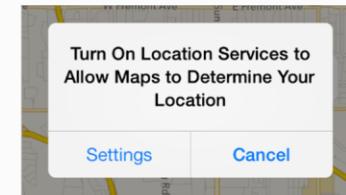
- Moving layered views to expose content beneath them
- Dragging, flicking, or swiping objects in a game
- Tapping switches, sliding sliders, and spinning pickers
- Flicking through pages of a book or magazine

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User Control

People—not apps—should initiate and control actions. An app can suggest a course of action or warn about dangerous consequences, but it's usually a mistake for the app to take decision-making away from the user. The best apps find the correct balance between giving people the capabilities they need while helping them avoid unwanted outcomes.



Users feel more in control of an app when behaviors and controls are familiar and predictable. And when actions are simple and straightforward, users can easily understand and remember them.

People expect to have ample opportunity to cancel an operation before it begins, and they expect to get a chance to confirm their intention to perform a potentially destructive action. Finally, people expect to be able to gracefully stop an operation that's underway.

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From Concept to Product

Define Your App

An *app definition statement* is a concise, concrete declaration of an app's main purpose and its intended audience.

Create an app definition statement early in your development effort to help you turn an idea and a list of features into a coherent product that people want to own. Throughout development, use the definition statement to decide if potential features and behaviors make sense. Take the following steps to create a robust app definition statement.

1. List All the Features You Think Users Might Like

Go ahead and brainstorm here. At this point, you're trying to capture all the tasks related to your main product idea. Don't worry if your list is long; you'll narrow it down later.

Imagine that your initial idea is to develop an app that helps people shop for groceries. As you think about this

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activity, you come up with a list of related tasks—that is, potential features—that users might be interested in. For example:

- Creating lists
- Getting recipes
- Comparing prices
- Locating stores
- Annotating recipes
- Getting and using coupons
- Viewing cooking demos
- Exploring different cuisines
- Finding ingredient substitutions

2. Determine Who Your Users Are

Now you need to figure out what distinguishes your app's users from all other iOS users. In the context of your main idea, what's most important to them? Using the grocery-shopping example, you might ask whether your users:

- Usually cook at home or prefer ready-made meals
- Are committed coupon-users or think that

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- coupons aren't worth the effort
- Enjoy hunting for specialty ingredients or seldom venture beyond the basics
- Follow recipes strictly or use recipes as inspiration
- Buy small amounts frequently or buy in bulk infrequently
- Want to keep several in-progress lists for different purposes or just want to remember a few things to buy on the way home
- Insist on specific brands or make do with the most convenient alternatives
- Tend to buy a similar set of items on each shopping trip or buy items listed in a recipe

After musing on these questions, imagine that you decide on three characteristics that best describe your target audience: Love to experiment with recipes, are often in a hurry, and are thrifty if it doesn't take too much effort.

3. Filter the Feature List Through the Audience Definition

If, after deciding on some audience characteristics, you end up with just a few app features, you're on the right track: Great iOS apps have a laser focus on the task they

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help users accomplish.

For example, consider the long list of possible features you came up with in Step 1. Even though these are all useful features, not all of them are likely to be appreciated by the audience you defined in Step 2.

When you examine your feature list in the context of your target audience, you conclude that your app should focus on three main features: Creating lists, getting and using coupons, and getting recipes.

Now you can craft your app definition statement, concretely summarizing what the app does and for whom. A good app definition statement for this grocery-shopping app might be:

“A shopping list creation tool for thrifty people who love to cook.”

4. Don’t Stop There

Use your app definition statement throughout the development process to determine the suitability of features, controls, and terminology. For example:

As you consider adding a new feature, ask yourself whether it’s essential to the main purpose of your app and to your target audience. If it isn’t, set it aside; it

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might form the basis of a different app. For example, you’ve decided that your users are interested in adventurous cooking, so emphasizing boxed cake mixes and ready-made meals would probably not be appreciated.

As you consider the look and behavior of the UI, ask yourself whether your users appreciate a simple, streamlined style or a more overtly thematic style. Be guided by what people might expect to accomplish with your app, such as the ability to accomplish a serious task, to get a quick answer, to delve into comprehensive content, or to be entertained. For example, although your grocery list app needs to be easy to understand and quick to use, your audience would probably appreciate a themed UI that displays plenty of beautiful pictures of ingredients and meals.

As you consider the terminology to use, strive to match your audience’s expertise with the subject. For example, even though your audience might not be made up of expert chefs, you’re fairly confident that they want to see the proper terms for ingredients and techniques.

Tailor Customization to the Task

The best iOS apps balance UI customization with clarity of purpose and ease of use. To achieve this balance in

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your app, be sure to consider customization early in the design process. Because concerns about branding, originality, and marketability often influence customization decisions, it can be challenging to stay focused on how customization impacts the user experience.

Start by considering the tasks in your app: How often do users perform them and under what circumstances?

For example, imagine a calculator app that uses an elaborate, artistic style and imaginative layout to display familiar calculator elements. The meticulously rendered artwork and the imaginative layout don’t prevent people from understanding how to tap the buttons and read the results. But for people who simply need to get their jobs done, the novelty of the experience wears off quickly and the beautiful custom UI becomes a hindrance.

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In contrast, consider GarageBand. GarageBand could have helped people make music without displaying beautiful, realistic instruments, but this would have made the app less intuitive and less enjoyable to use. In GarageBand,

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the custom UI not only shows people how to use the app, it also makes the main task—that is, making music—easier to accomplish.



As you think about how customization might enhance or detract from the task your app enables, keep these guidelines in mind.

Always have a reason for customization. Ideally, UI customization facilitates the task people want to perform and enhances their experience. As much as possible, you need to let your app's task drive your customization decisions.

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As much as possible, avoid increasing the user's cognitive burden. Users are familiar with the appearance and behavior of the standard UI elements, so they don't have to stop and think about how to use them. When faced with elements that don't look or behave at all like standard ones, users lose the advantage of their prior experience. Unless your unique elements make performing the task easier, users might dislike being forced to learn new procedures that don't transfer to any other apps.

Be internally consistent. The more custom your UI is, the more important it is for the appearance and behavior of your custom elements to be consistent within your app. If users take the time to learn how to use the unfamiliar controls you create, they expect to be able to rely on that knowledge throughout your app.

Always defer to the content. Because the standard elements are so familiar, they don't compete with the content for people's attention. As you customize your UI, take care to ensure that it doesn't overshadow the content people care about. For example, if your app allows people to watch videos, you might choose to design custom playback controls. But whether you use custom or standard playback controls is less important than whether the controls fade out after the user begins watching the video and reappear with a tap.

Think twice before you redesign a standard control. If

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you plan on doing more than customizing a standard control, make sure your redesigned control provides as much information as the standard one. For example, if you create a switch control that doesn't indicate the presence of the opposite value, people might not realize that it's a two-state control.

Be sure to thoroughly user-test custom UI elements. During testing, closely observe users to see if they can predict what your elements do and if they can interact with them easily. If, for example, you create a control that has a hit target smaller than 44 x 44 points, people will have trouble activating it. Or if you create a view that responds differently to a tap than it does to a swipe, be sure the functionality the view provides is worth the extra care people have to take when interacting with it.

Prototype & Iterate

Before you invest significant engineering resources into the implementation of your design, it's a really good idea to create prototypes for user testing. Even if you can get only a few colleagues to test the prototypes, you'll benefit from their fresh perspectives on your app's functionality and user experience.

In the very early stages of your design you can use paper prototypes or wireframes to lay out the main views and

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controls, and to map the flow among screens. You can get some useful feedback from testing wireframes, but their sparseness may mislead testers. This is because it's difficult for people to imagine how the experience of an app will change when wireframes are filled in with real content.

You'll get more valuable feedback if you can put together a fleshed-out prototype that runs on a device. When people can interact with your prototype on a device, they're more likely to uncover places where the app doesn't function as they expect, or where the user experience is too complex.

The easiest way to create a credible prototype is to use a storyboard-based Xcode template to build a basic app, and populate it with some appropriate placeholder content. (A *storyboard* file captures the entire UI of your app, including the transitions among different screens.) Then, install the prototype on a device so that your testers can have as realistic an experience as possible.

You don't need to supply a large amount of content or enable every control in your prototype app, but you do need to provide enough context to suggest a realistic experience. Aim for a balance between the typical user experience and the more unusual edge cases. For example, if it's likely that your app will handle long lists of items, you should avoid creating a prototype that displays only one or two list items. And for testing user

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interactions, as long as testers can tap an area of the screen to advance to the next logical view or to perform the main task, they'll be able to provide constructive feedback.

When you base your prototype on an Xcode app template, you get lots of functionality for free and it's relatively easy to make design adjustments in response to feedback. With a short turnaround time, you should be able to test several iterations of your prototype before you solidify your design and commit resources to its implementation. To get started learning about Xcode, see *Xcode Overview*.

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Case Study: From Desktop to iOS

Keynote on iPad

Keynote on the desktop is a powerful, flexible app for creating world-class slide presentations. People love how Keynote combines ease of use with fine-grained control over myriad precise details, such as animations and text attributes.



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Keynote on iPad captures the essence of Keynote on the desktop, and makes it feel at home on iPad by creating a user experience that:

- Focuses on the user's content
- Reduces complexity without diluting capability
- Provides shortcuts that empower and delight
- Adapts familiar hallmarks of the desktop experience
- Provides feedback and communication via eloquent animation

Keynote users instantly understand how to use the app on iPad because it delivers expected functionality using native iPad paradigms. New users easily learn how to use Keynote on iPad because they can directly manipulate their content in simple, natural ways.

The transformation of Keynote from the desktop to iPad is based on myriad modifications and redesigns that range from subtle to profound. These are some of the most visible adaptations:

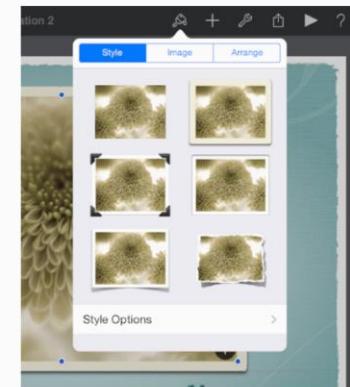
A streamlined toolbar. Only a handful of items are in the toolbar, but they give users consistent access to all the functions and tools they need to create their content.

Presentations Units Presentation 1 A + P C ?

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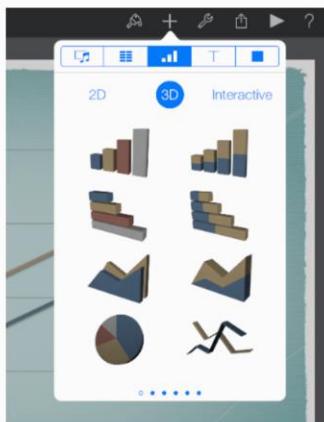
A simplified, prioritized inspector that responds to the user's focus. The Keynote on iPad inspector automatically contains the tools and attributes people need to modify the selected object. Often, people can make all the modifications they need in the first inspector view. If they need to modify less frequently changed attributes, they can drill down to other inspector views.



Lots of prebuilt style collections. People can easily change the look and feel of objects such as charts and tables by taking advantage of the prebuilt styles. In addition to color scheme, each collection includes prestyled attributes, such as table headings and axis-division marks, that are designed to coordinate with the overall theme.

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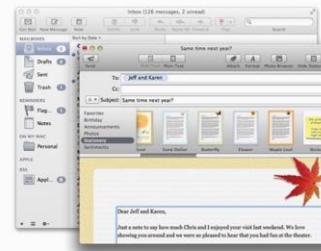
Direct manipulation of content, enriched with meaningful animation. In Keynote on iPad, a user drags a slide to a new position, twists an object to rotate it, and taps an image to select it. The impression of direct manipulation is enhanced by the responsive animations Keynote on iPad performs. For example, a slide pulses gently as users move it and, when they place it in a new location, the surrounding slides ripple outward to make room for it.

Mail on iPhone

Mail is one of the most highly visible, well-used, and appreciated apps in OS X. It is also a very powerful

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program that allows users to create, receive, prioritize, and store email, track action items and events, and create notes and invitations. Mail on the desktop offers this powerful functionality in a couple of windows.



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Mail on iPhone focuses on the core functionality of Mail on the desktop, helping people to receive, create, send, and organize their messages. Mail on iPhone delivers this condensed functionality in a UI tailored for the mobile experience that includes:

- A streamlined appearance that puts people's content front and center
- Different views designed to facilitate different tasks
- An intuitive information structure that scales effortlessly
- Powerful editing and organizing tools that are available when they're needed
- Subtle but expressive animation that communicates actions and provides feedback

It's important to realize that Mail on iPhone isn't a better app than Mail on the desktop; rather, it's Mail, redesigned for mobile users. By concentrating on a subset of desktop features and presenting them in an attractively lean UI, Mail on iPhone gives people the core of the Mail experience while they're mobile.

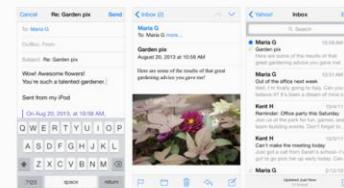
To adapt the Mail experience to the mobile context, Mail on iPhone innovates the UI in several key ways.

Distinct, highly focused screens. Each screen displays

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one aspect of the Mail experience: account list, mailbox list, message list, message view, and composition view. Within a screen, people scroll to see the entire contents.



Easy, predictable navigation. Making one tap per screen, people drill down from the general (the list of accounts) to the specific (a message). Each screen displays a title that shows people where they are, and a back button that makes it easy for them to retrace their steps.

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Simple, tappable controls, available when needed. Because composing a message and checking for new email are primary actions people might want to take in any context, Mail on iPhone makes them accessible in multiple screens. When people are viewing a message, functions such as reply, move, and trash are available because they act upon a message.

Different types of feedback for different tasks. When people delete a message, it animates into the trash icon. When people send a message, they can see its progress; when the send finishes, they can hear a distinctive sound. By looking at the subtle text in the message list toolbar, people can see at a glance when their mailbox was last updated.

Web Content in iOS

Safari on iOS provides a preeminent mobile web-viewing experience on iOS devices. People appreciate the crisp text and sharp images and the ability to adjust their view by rotating the device or pinching and tapping the screen.

Standards-based websites display well on iOS devices. In particular, websites that detect the device and do not use plug-ins look great on both iPhone and iPad with little, if any, modification.

In addition, the most successful websites typically:

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Set the viewport appropriately for the device, if the page width needs to match the device width

Avoid CSS fixed positioning, so that content does not move offscreen when users zoom or pan the page

Enable a touch-based UI that does not rely on pointer-based interactions

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- Set the viewport appropriately for the device, if the page width needs to match the device width
- Avoid CSS fixed positioning, so that content does not move offscreen when users zoom or pan the page
- Enable a touch-based UI that does not rely on pointer-based interactions

Sometimes, other modifications can be appropriate. For example, web apps always set the viewport width appropriately and often hide the UI of Safari on iOS. To learn more about how to make these modifications, see Configuring the Viewport and Configuring Web Applications in *Safari Web Content Guide*.

Websites can adapt the desktop web experience to Safari on iOS in other ways, too:

Accommodate the keyboard in Safari on iOS. When a keyboard and the form assistant are visible, Safari on iPhone displays your webpage in the area below the URL text field and above the keyboard and form assistant.

Accommodate the pop-up menu control in Safari on iOS. In Safari on the desktop, a pop-up menu that contains a large number of items displays as it does in an OS X app; that is, the menu opens to display all items, extending past the window boundaries, if necessary. In

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Safari on iOS, a pop-up menu is displayed using native elements, which provides a much better user experience. For example, on iPhone, the pop-up menu appears in a *picker*, a list of choices from which the user can pick. (To learn more about the picker control, see [Picker](#).)

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3D Touch

3D Touch gives iOS 9 users an additional interaction dimension. On supported devices, people can quickly choose app-specific actions from the Home screen by pressing on the app icon. Within an app, people can use various pressures to get a preview of an item, open the item in a separate view, and access related actions. (To learn more about adding support for 3D Touch in your code, see [Adopting 3D Touch on iPhone](#).)

iOS Technologies

Peek and Pop

A *peek* lets users preview an item and perform related actions without leaving their current context. An item indicates that it supports peek by displaying a small rectangular view (sometimes called a *hint*) in response to a light press.

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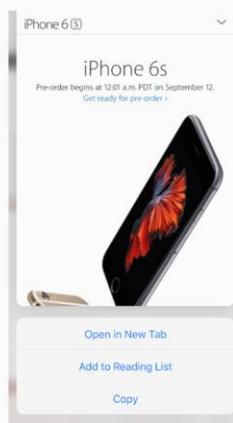
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A peek preview in Safari



Quick actions in a Safari peek



A peek:

- Appears while a user presses on an item that supports peek and disappears when the user's finger lifts
- Opens a detailed view of the item—called a *pop*—when users press a little deeper on the peek view
- Can provide quick actions related to the item when users swipe up within the peek view

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When users press lightly on the screen, an item that supports peek hints that further interaction is available by displaying a rectangular view that you provide. The view should be large enough so that the user's finger doesn't obscure the content and detailed enough so that the user can decide whether to press a little deeper to view the peek.

IMPORTANT

It's essential that you adopt peek and pop consistently throughout your app. If you support peek and pop in some places but not in others, users are likely to think that there's a problem with your app or their device.

Use a peek to provide a live, content-rich preview of an item. It's best when a peek gives users enough information about an item to augment their current task. For example, users can use peek to preview the webpage of a URL in a message before they decide to open the webpage in Safari or share the link with their friends. In a table view, peek shows users the detail view for a row item.

Provide a pop for every peek. Even though a peek should give users most of the information they need, you should always let users transition to the pop if they decide to switch away from their current task and focus

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on the item. The pop should be the same view that users get when they tap the item.

Don't enable both peek and the Edit menu for the same item. It can be confusing when both features are enabled for one item. (To learn more about the Edit menu, see [Edit Menu](#).)

Within a peek, avoid displaying elements that look like buttons. If users lift their finger to tap an element that looks like a button, the peek disappears.

Provide peek quick actions, if appropriate. Within a peek, users can swipe up to reveal actions that are related to the item. For example, peek quick actions in Mail include Reply All, Forward, and Move Message. Not every peek needs quick actions, but if you already provide custom touch-and-hold actions for an item, it's good practice to provide the same actions within the peek that replaces touch and hold for that item. (Note that peek quick actions in a peek for a web view are supplied automatically.)

Don't use peek as the only way to enable item-specific actions. Not every device supports peek and pop and some users may choose to turn off 3D Touch, so it's essential to find other ways to make peek functionality available in your app. When your app runs on older devices, it can make sense to mirror a peek's quick actions in a view that users get when they touch and hold

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an item.

Home Screen Quick Actions

Home screen quick actions give users a convenient way to perform useful, app-specific actions from the Home screen.

Camera Home screen quick actions



Mail Home screen quick actions



A Home screen quick action:

- Appears when users press a little more deeply

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than for touch and hold on an app icon on the Home screen

- Displays a short title, an icon, and optional subtitle that you supply
- Does not support other custom content
- Can display updated information when your app updates

Use a Home screen quick action to enable a compelling, high-value task. For example, Maps lets users search near their current location or get directions home without first opening the Maps app. Every app should enable at least one useful task in a Home screen quick action; you can provide a total of four quick actions.

Avoid using Home screen quick actions to ease navigation through your app. If it's difficult or time-consuming for users to visit important areas in your app, first fix the navigation in your app so that all users benefit. Next, focus on providing Home screen quick actions that deep-link into your app and enable useful, creative tasks.

Avoid changing a Home screen quick action in ways that are difficult for users to predict. It's best to update a quick action based on events or context changes that the user understands. For example, it makes sense to

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update an item based on the user's current location or recent activities in your app, time of day, or changes in the user's settings.

Don't use a Home screen quick action as a way to notify users. iOS users expect to receive notifications from apps in other ways (to learn about these ways, see [Notifications](#)).

Provide a succinct title (and optional subtitle) and a template icon for each Home screen quick action. The title should instantly communicate the results of the action; for example, "Directions Home," "Create New Contact," and "New Message." You can also provide an optional subtitle to give users more context. For example, Mail uses a subtitle to tell users if there are any unread messages in the VIP Home screen quick action. Don't include your app name or any extraneous information in the title and subtitle, and be sure to take localization into account as you write the text.

It's important to keep the title as short as possible to avoid truncation and to help users quickly understand the action. If you supply a subtitle, the system truncates a title that's too long to fit on one line; if you don't include a subtitle, the system wraps a long title onto the second line.

You can choose from among the many system-provided template icons or you can create a custom template icon.

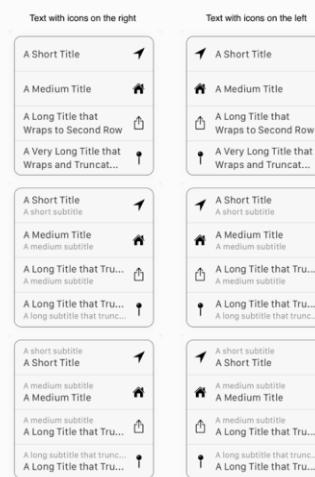
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For detailed guidance on icon sizes, padding, and positioning, download Home Screen Quick Action Icon Template from <https://developer.apple.com/design/downloads/Quick-Action-Guides.zip>. To learn more about designing a template icon, see [Template Icons](#).

The system automatically displays the icons on the left or right side of the list of quick actions, depending on the location of your app icon on the user's Home screen. (Regardless of the position of icons in the list, the text is always left-aligned in left-to-right languages.) Here are several examples of Home screen quick actions that illustrate the various ways they can look.

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Live Photos

Live Photos lets users capture and relive their favorite memories in a sound- and motion-rich experience. Starting in iOS 9, the Camera app captures additional content—including audio and extra frames before and after the photo—that add life to traditional still photos.



In apps that run in iOS 9.1 and later, you can let users enjoy and share Live Photos within your app. The

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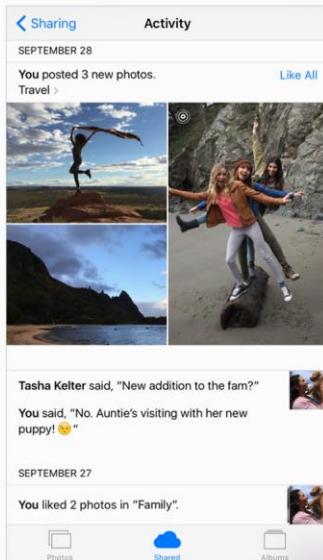
guidelines here can help you give users a great experience.

Display a Live Photo as a traditional photo in an environment that doesn't support Live Photos. Don't use a custom implementation to approximate the experience that's provided by a Live Photo in a supported environment.

Don't display the additional frames and audio of a Live Photo separately. It's important for users to experience Live Photos in a consistent way that uses the same visual treatment and interaction model across all apps. Disassembling a Live Photo and presenting the components separately gives users a bad experience.

Make sure that users can distinguish a Live Photo from a traditional still photo. It's especially important to help users make this distinction when they can share the photo. The best way to show users that they're viewing a Live Photo is to display a little movement that gives a hint of the experience. In cases where a hint isn't possible, you can display the system-provided badge on the Live Photo. A Live Photo never displays a playback button that looks like a video playback button.

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NOTE

There is no support for providing the visual motion effect that users experience as they swipe through photos in the full-screen browser of Photos app.

Apply the user's adjustments to all frames of a Live Photo. If your app lets users apply effects or adjustments to a photo, be sure to update the entire Live Photo. If you don't support adjusting the entire contents of a Live Photo that users want to share, let them know that they can share it as a traditional photo.

Let users preview the entire contents of a Live Photo before they decide to share it. If your app contains UI that helps users select photos to share, include a way for them to share a Live Photo as a traditional photo.

If you use the system-provided badge, put it in the same location on every Live Photo. Typically, the badge looks good in a corner of the photo, where it doesn't distract the user from the photo. Be sure to apply the badge consistently throughout your app so that users can rely on it to help them recognize a Live Photo. iOS provides the badge image in two styles:

- Overlay. The overlay style includes a shadow that makes it look good on top of the photo

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content.

- Solid-color. The solid-color style (which does not include a shadow) can be used to create a template image that you can tint.

iOS also provides a variant of the badge in the solid-color style that includes a strikethrough over the image to indicate that a Live Photo is currently being treated as a traditional photo.

Give users a good experience when they download a Live Photo. In particular, users need to know that the item they're downloading is a Live Photo and they need to know when they can play it. If you show a progress indicator for a Live Photo that isn't playable yet, be sure to use the indicator in a way that's consistent with the other download experiences within your app.

Wallet

Wallet helps people view and manage passes, which are digital representations of physical items such as boarding passes, coupons, membership and rewards cards, and tickets. Wallet also lets people add their credit, debit, and store cards to use with Apple Pay. In your app, you can create a pass, distribute it to users, and update it when things change.

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The PassKit framework makes it easy to use custom content to assemble a pass and to access a pass when it's in the user's pass library. (To learn about the key concepts of Wallet technology and how to use the PassKit APIs in your app, see *Wallet Developer Guide*.) The following guidelines can help you create a pass that people appreciate having in Wallet and enjoy using.

Design a pass that looks good on all devices. When you choose a pass style—such as boarding pass, coupon, ticket, rewards card, or generic pass—you get a particular layout and set of fields to work with (for details about different pass styles, see *Pass Style Sets the Overall Visual Appearance*). The system displays your pass appropriately on each device, so it's important to use the pass fields correctly. On Apple Watch, for example, the strip and thumbnail images are not displayed, so you don't want to put essential information in these elements. To learn more about the layout of passes on Apple Watch, see *Designing Passes for Apple Watch*.

Use appropriate pass fields to display text. Using the fields allows VoiceOver users to get all the information in your pass and gives your pass a consistent appearance. It's also a good idea to avoid embedding text in images and using custom fonts because not all images are displayed on all devices and it can be hard for users to read such text.

Avoid using language that identifies a device. You can't predict the device on which users will view your pass, so you don't want to include language that might not make sense on a particular device. For example, text that tells users to "slide to view" content doesn't make sense when it appears on Apple Watch.

As much as possible, avoid simply reproducing an existing physical pass. Wallet has an established design

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aesthetic and passes that coordinate with this aesthetic tend to look best. Instead of replicating the appearance of a physical item, take this opportunity to design a clean, simple pass that follows the form and function of Wallet.

Be selective about the information you put on the front of a pass. People expect to be able to glance at a pass and quickly get the information they need, so the front of a pass should be uncluttered and easy to read. If there's additional information that you think people might need, it's better to put it on the back of the pass than to squeeze it onto the front. Note that passes on Apple Watch do not include a back view.

Avoid using a plain white background. A pass looks best when its background is a vivid, solid color or displays an image that uses strong, vibrant colors. As you design the background, always make sure that it doesn't interfere with the readability of the content.

Use the logo text field for your company name. Text in the logo text field is rendered in a consistent font on all passes. To avoid clashing with other passes in Wallet, it's recommended that you enter text into the logo text field instead of using a custom font.

Use a white company logo. The logo image is placed in the upper-left corner of the pass, next to your company name. For best results, supply a white, monochrome version of your logo that doesn't include text. If you want

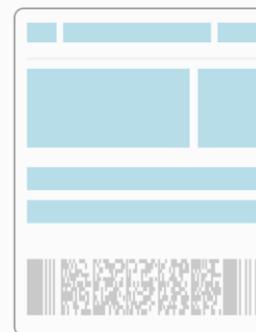
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to engrave the logo so that it matches the rendered logo text, add a black drop shadow with a 1 pixel y offset, a 1 pixel blur, and 35% opacity.

Use a rectangular barcode when possible. Because of the layout of a pass, a rectangular barcode—such as PDF417—can look better than a square barcode. As shown below on the right, a square barcode creates empty gutters on both sides and can vertically crowd the fields above and below it.

A rectangular barcode fits well in the layout



A square barcode can crowd other fields



Optimize images for performance. Because users often receive passes via email or Safari, it's important to make downloads as fast as possible. To improve the user experience, use the smallest image files that achieve the

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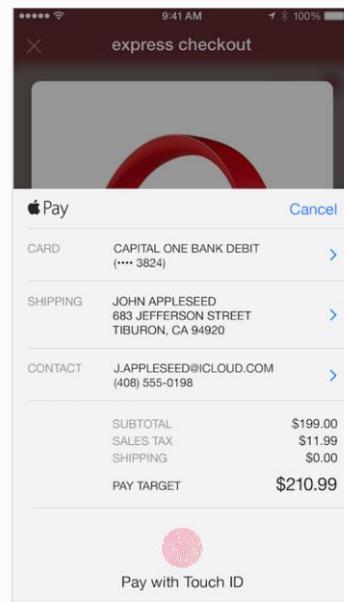
desired visual appearance.

Enhance the utility of a pass by updating it when appropriate. Even though a pass represents a physical item that doesn't typically change, your digital pass can provide a better experience by reflecting real-world events. For example, you can update an airline boarding pass when a flight is delayed so that people always get current information when they check the pass.

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Apple Pay

Apple Pay is an easy, secure, and private way to make payments on iOS devices. When purchasing physical goods and services within apps, people can use Apple Pay to quickly and securely provide their contact, shipping, and payment information.



Using Apple Pay, people can make purchases without having to create an account or type their information. Apple Pay significantly expedites the checkout process,

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helping to eliminate up-front registration and providing users with a better experience for browsing your products and making hassle-free purchases. For more information, see [Apple Pay Programming Guide](#).

The Apple Pay UI is clear, streamlined, and unobtrusive. It consists of three pieces that appear in different contexts:

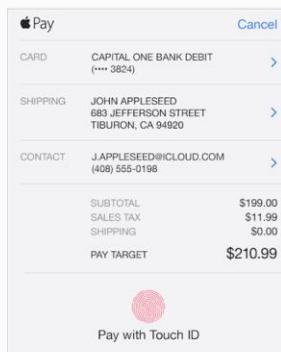


Buttons. The Apple Pay button tells users that they can make a purchase from the current context, such as a product page. When users tap the Apple Pay button, immediately display the payment sheet (described below) and help them begin the checkout process. The Set Up Apple Pay button gives users the opportunity to set up Apple Pay. You get both buttons by using the `PKPaymentButton` API (to learn more, see [PKPaymentButton Class Reference](#)). For more information about using the Apple Pay buttons, see [Apple Pay Identity Guidelines](#).

Apple Pay mark. Users expect to see the Apple Pay mark when they need to select a payment option and finalize additional information before authorizing a payment. The

iOS Human Interface Guidelines

Apple Pay mark should appear only when other payment options are also displayed in the same or similar format.



Payment sheet. Before a user submits an order and the associated payment, Apple Pay displays a payment sheet with the contact, shipping, and payment information relevant to their checkout. Although people can make some changes in the payment sheet—such as selecting a different shipping method—they shouldn't have to make changes or enter additional information. When users see the payment sheet, they should be able to immediately complete their transaction and authorize a payment.

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Always display Apple Pay UI to people who can use it. When users are on a supported device and they've activated a card that you support, it's likely that they'll want to use Apple Pay in your app. Meet users's expectations by making Apple Pay the default payment option.

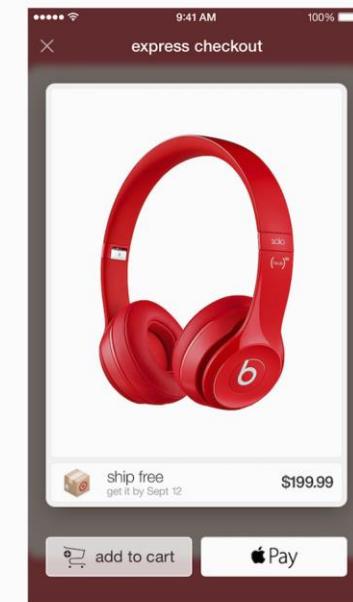
Don't display any Apple Pay UI if a user can't use Apple Pay. If the user is using a device that doesn't support Apple Pay, advertising it as a payment option can be confusing. However, if the user is using a device that supports Apple Pay, but doesn't have a credit or debit card set up, you can display the Set Up Apple Pay button.

Display the payment sheet immediately after a user taps the Apple Pay button. Forcing people to take additional steps after they've decided to begin their checkout with Apple Pay adds friction to the process and can frustrate your users. Don't display additional alerts or modal views after a user taps the Apple Pay button. If users can supply things like discount or promotional codes, find a way to accept this information before they tap the Apple Pay button.

Display the Apple Pay button at the same size or larger than other visible payment buttons. Show the Apple Pay button prominently to help users find it with ease.

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Use Handoff to help users complete a purchase they initiate on Apple Watch. Apple Watch wearers can make purchases in stores, but they can't complete a

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purchase within your Apple Watch app. When wearers initiate a purchase in your Apple Watch app, display a message that tells them to complete the payment on their iPhone. For the best experience, use Handoff to deep-link into your iOS app and immediately display a payment sheet that's prepopulated with the appropriate information.

For additional guidelines on how to use Apple Pay buttons and the Apple Pay mark, see [Apple Pay Identity Guidelines](#).

Customizing the Payment Sheet

You can customize what the Apple Pay payment sheet displays depending on the information you need to know to complete the transaction and the information you need to convey to the user about the purchase.

Display only the information that's necessary to complete the transaction on the payment sheet. Users may get confused or concerned if the Apple Pay payment sheet displays extraneous information. For example, if the merchandise will be delivered or fulfilled electronically, it makes sense to request a contact email address, but not a shipping address. Requesting a shipping address in this case may give users the impression that something will be shipped to their home

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or work by accident, or cause them concern about their information being accessed needlessly.

Let users choose a delivery method or pickup option within the payment sheet. Users can select a delivery method from any number of methods that you specify within the Apple Pay payment sheet. To specify a shipping method, use a label, a cost, and an optional second line for providing an estimated date of delivery. Alternatively, you can change the section label from “Shipping” to “Pickup” to let users specify a location for things like a courier delivery or a pickup from a transportation service.

Use line items for recurring payments and for charges that are added to the subtotal for the purchase. A line item consists of a label and a cost. Use line items to:

- Indicate that a user is authorizing a recurring payment with a line item like “Monthly Subscription \$19.99”
- Notify the user of extra charges, for example, “Gift Wrap \$5.00” or “Tax \$4.53”
- Show a coupon or discount that has a negative cost, such as “Friday Discount -\$2.00”
- Indicate that an amount is pending, such as “Time & Distance ...” for a transportation

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service

Don't use line items to show an itemized list of products that make up the purchase.

As much as possible, create line item labels that can display on a single line. Line item labels should be specific and easily understood by users. Creating lengthy labels makes it difficult for your users to understand line items at a glance.

Provide a business name after the word “PAY” on the same line as the total. Be sure to use the same business name that users will see associated with the charge when they check their credit card or bank statement. This is important, because it helps reassure users that their payment is going where they think it's going. If your app acts as an intermediary and is not the end merchant for a payment, clearly indicate this to the user by specifying “PAY END_MERCHANT_NAME (VIA YOUR_APP_NAME).”

Communicate that there might be additional costs if the total cost is unknown at the time the payment is authorized. For example, a car ride based on distance or time might change in value from the time when a payment is authorized to the time when it's posted. Or a customer might want to add a tip after a product has been delivered. In cases like these, it's essential to

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provide a very clear explanation within the payment sheet. When you use a line item configured to get updated with a final cost, the amount is automatically displayed as “AMOUNT PENDING.” Also, if you are preauthorizing a payment for a specific amount, make sure the payment sheet accurately reflects this information.

Streamlining the Checkout Process

People appreciate using Apple Pay to make their purchases quickly and easily. The fewer steps in the checkout process and the less information that users have to enter manually, the better.

Always use the latest information from Apple Pay. Assume that users keep their Apple Pay information complete and up to date, and don’t rely on any previously collected information. Even if you previously collected contact, shipping, or payment information from users, fetch the latest information from Apple Pay during checkout. Don’t make people enter any information during checkout that you could have retrieved from Apple Pay.

Use Apple Pay to accelerate purchases. To enable a single-item purchase, let users tap the Apple Pay button on a product page to display the payment sheet and

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proceed with an immediate checkout. Users love the convenience of buying a single item in your app without having to take extra steps to add the item to a shopping cart. For situations in which multiple items in a shopping cart will be shipped by the same method to the same address, support an express checkout flow that displays the payment sheet as soon as users are ready to pay.

Collect redemption or promo codes before displaying the payment sheet. Because there’s no way to input codes within the Apple Pay payment sheet, be sure to collect any codes before displaying the sheet.

If people can ship individual items in a cart to different places or at different speeds, get this information before you display the payment sheet. In this rare case, you need to get the shipping information before you display the payment sheet because there is no way to specify multiple shipping methods or addresses in the payment sheet. In the general case, be sure to collect shipping method and address information within the payment sheet.

Display an order confirmation or thank you page. To provide a straightforward user experience, after the payment is complete, use an order confirmation page to display details about when the merchandise will ship and how users can check the status of their order.

If appropriate, note Apple Pay on your confirmation

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page. Although it’s not necessary to mention Apple Pay on your confirmation screen, if you choose to, use one of these formats:

- “Visa •••• 1234 (Apple Pay)”
- “Paid with Apple Pay”

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Research Apps

A research app lets iOS users participate in research studies from the convenience of their iOS devices. The predesigned screens and transitions available in Apple's open source ResearchKit project make it easy to create a beautiful research app that's customized for your study and enjoyable for people to use. To learn how to use ResearchKit to develop a research app for your study, see researchkit.org.

IMPORTANT

These guidelines are for informational purposes only and do not constitute legal advice. You should contact an attorney to obtain advice with respect to the development of a research app and any applicable laws.

Typically, a research app groups customized ResearchKit screens and app-specific screens into sections that fit into three primary experiences:

- [Onboarding](#)
- [Study-specific investigation](#)
- [Management items](#)

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Follow the guidelines for the sections that comprise each of these experiences so that you can design a research app that helps participants feel comfortable and stay engaged.

Onboarding

The onboarding experience consists of a series of sections that introduce the study to potential participants and allow you to get their consent. Participants don't typically revisit the onboarding sections after completing them. The onboarding experience includes the following sections:

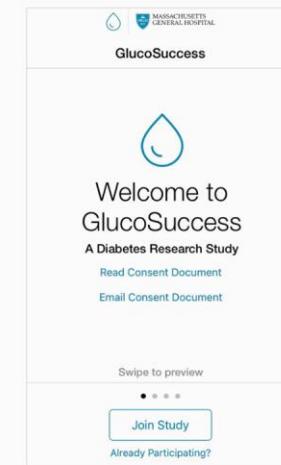


You should present the sections in the onboarding experience in the order shown here—that is, introduction, eligibility, consent, and (if appropriate) permission to access data.

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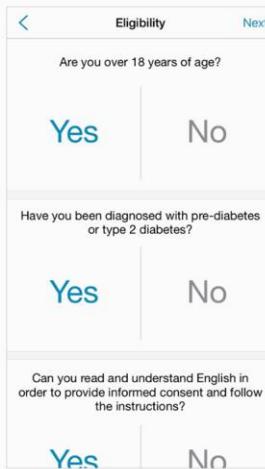
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Create an introduction that informs and provides a call to action. The introduction section should help people learn more about your study and tell them how to become a participant. It's best when the introduction section also gives existing participants a quick way to log in and continue an in-progress study.



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Determine eligibility as soon as possible. Present the eligibility section after the introduction and before the consent section (participants don't need to view the consent section if they're not eligible for the study). Be sure to present only the eligibility requirements that are necessary for your study. Use simple, straightforward language to describe the requirements and make it easy for people to enter information.

Make sure participants understand your study before you get their consent. ResearchKit helps you make the consent process concise and friendly, while still allowing you to incorporate into the consent any legal

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requirements or requirements set by an institutional review board or ethics review board. (If your app involves conducting human subjects research, you must make sure that your app complies with the applicable App Store Guidelines, including the consent requirements.) Typically, the consent section:

- Explains how the study works
- Ensures that participants understand the study and their responsibilities
- Gets the participant's consent

Break a long consent document into easily digestible subsections. Each subsection can cover one aspect of the study, such as data gathering, data use, potential benefits, possible risks, time commitment, how to withdraw, and so on. For each subsection, use simple, straightforward language to provide a high-level overview. If necessary, provide a more detailed explanation of the subsection that participants can read by tapping a Learn More button. Participants should be able to view the full consent content before they agree to participate.

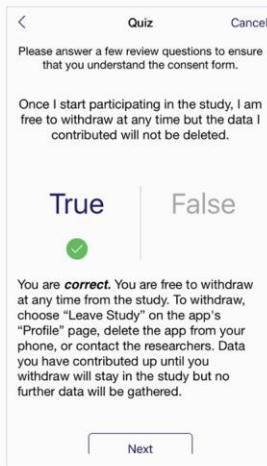
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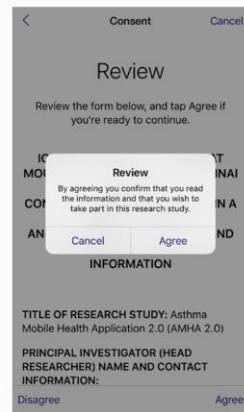
If it makes sense, provide a quiz that tests the participant's understanding. You might choose to do this if you would be asking the participant to answer the same questions if you obtained the participant's consent in person.

Get the participant's consent and, if appropriate, some contact information. After agreeing to join the study, participants receive a confirmation dialog, which should be followed by screens in which they provide their signature and contact details. Most research apps email participants a PDF version of the consent form for their records.

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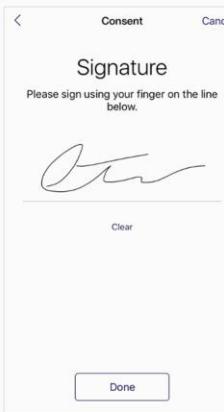
Participants respond to an alert to confirm their intent to join a study



Get permission if you need to access the participant's device or data. Clearly explain why your research app needs access to location, Health app, or other data and be sure to avoid asking for access to data that isn't critical for your study. Also ask for permission to send notifications to the participant's device, if your app requires it.

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Participants can provide their signature in the consent process



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Prepare participants to grant access to data, such as Health app data



Let participants choose the data they want to share with you



Study-Specific Investigation

To get input from participants, your study might use surveys, active tasks, or a combination of both. Depending on the architecture of your study, participants may interact with each section multiple times or only once.

Create surveys that keep participants focused and engaged. ResearchKit makes it easy to present survey

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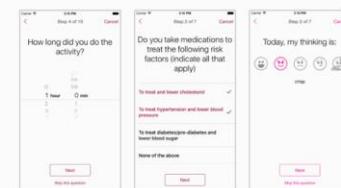
questions that require different types of answers, such as true or false, multiple choice, dates and times, sliding scales, and open ended text entry. As you use ResearchKit screens to create a survey, follow these guidelines to provide a great user experience:

- Tell participants how many questions there are and about how long it will take to complete the survey.
- Use one screen per question.
- Show participants their progress in the survey.
- Keep the survey as short as possible. Several short surveys tend to work better than one long survey.
- For questions that require some additional explanation, use the standard font for the question and a slightly smaller font for the explanatory text.
- Tell participants when the survey is complete.

ResearchKit provides many customizable screens you can use in your surveys. Here are a few examples of survey screens.

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Make active tasks easy to understand. An active task requires participants to engage in an activity, such as speaking into the microphone, tapping their fingers on the screen, walking, or performing a memory test. Follow these guidelines to encourage participants to perform an active task and give them the best chance of success:

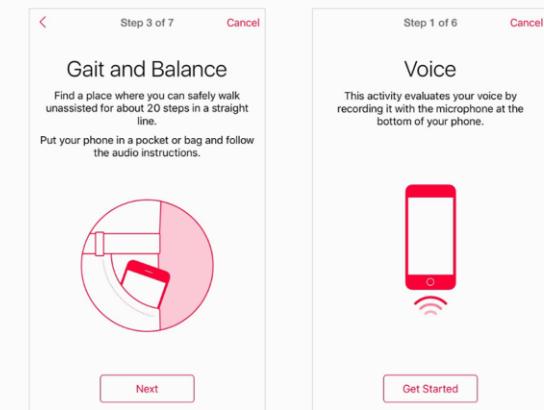
- Describe how to perform the task using clear, simple language that everyone can understand.

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- Mention if the task must be performed at a particular time or under specific circumstances.
- Make sure that participants can tell when the task is complete.

Here are two examples of active tasks that ResearchKit supports.



Management Items

ResearchKit provides a profile screen that gives users a way to manage their personal information while they're in your research app. In addition, it's a good idea to

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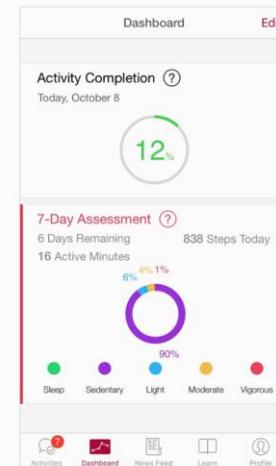
create a screen that motivates users and gives them a way to track their progress in the study. For the most part, participants should be able to access both of these areas at any time.

Use a profile to help participants manage personal data that relates to your study. A profile screen can let participants edit data that can change during the course of the study—such as weight or sleep habits—and remind them of upcoming activities. You can also use a profile to give participants an easy way to leave the study and to view the consent document and the app's privacy policy.



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App Extensions

App extensions increase the reach of your app, giving users access to focused parts of its functionality while they use other apps. For example, while viewing websites in Safari, people can use your Share extension to post an image or an article to your social website. Or while using Photos, people might use your Photo Editing extension to apply a filter to a photo. (In these scenarios, Safari and Photos are called *host apps* because they give users access to extensions.)

You deliver an app extension inside a fully functional iOS app that you submit to the App Store (an app that contains extensions is called a *containing app*). After enabling the extension in your containing app, people can use it to perform a quick task while they're using other apps. For example, while reading about a product in an email message, people might use your Action extension to add the product to a shopping list without having to leave Mail.

Table 22-1 lists many of the types of iOS app extensions you can create.

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Table 22-1 Types of app extensions

App extension type	People use the extension to...
Today widget	Get a quick update or perform a quick task in the Today view of Notification Center
Share	Post to a website or share content with others
Action	Manipulate or view content within the context of another app
Photo Editing	Edit a photo or video within the Photos app
Document Provider	Access and manage a repository of files
Custom keyboard	Replace the iOS system keyboard with a custom keyboard

The following guidelines apply to app extensions of all types; for guidance that's specific to a particular type of app extension, see the sections below. (To learn how to develop, debug, and distribute an extension, see *App Extension Programming Guide*.)

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Enable a single task. An app extension is not a mini version of your app. Instead, an extension performs a narrowly scoped task in the context of the user's larger goal. For example, an Action extension might give users a different way to view their current content.

Keep user interactions limited and streamlined. The best app extensions let people perform the task in just a few taps so that they can return to their earlier context as soon as possible. For example, a Share extension might let people post an image with a single tap.

Incorporate the name of your containing app into the name of each extension it provides. Although multiple extensions in one containing app should each have a unique name, you want to make sure that users understand the relationship between your extensions and your app. People encounter extensions in many different contexts, and they're unlikely to trust an extension if they don't recognize it.

In most cases, use the icon of the containing app. Displaying a familiar icon is another way an extension can gain users's trust. Note that in the case of an Action extension, you create a monochromatic version of the containing app's icon (for details, see [Share and Action Extensions](#)).

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IMPORTANT

As with all icons and graphics you design, don't replicate iOS icons or images and don't create images of Apple products and designs.

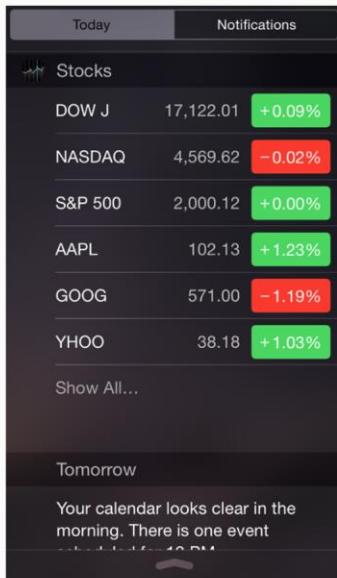
Avoid displaying a modal view on top of an extension. Many extensions are displayed within a modal view by default, and it's best to avoid layering modal views. Although there are cases where users might see an alert on top of an extension, avoid designing an extension workflow that requires a modal view.

Today Widgets

People view Today widgets in the Today area of Notification Center. Because people configure the Today area so that it displays the information they value most, design your widget with the goal of earning a place among the user's most important items.

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Design an appearance that looks at home in Notification Center. When you use the default margins and background appearance provided by Notification Center, your Today widget gives users a consistent

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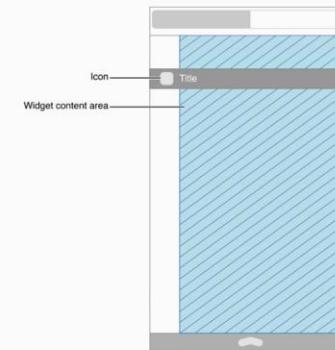
experience. For best results, focus on drawing your content and not on drawing backgrounds or other materials. In particular, avoid drawing a solid background.

NOTE

iOS automatically displays your app icon and title above your custom widget content (the icon appears in the leading margin).

Align content with the widget’s title. When your widget content aligns with your title, people can easily scan the Today view for the widget they want. Respect the margins in the Today view, and restrain your content to the widget content area shown here.

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In general, use the system font in white to display text. White text looks good on the default Notification Center background. For secondary text, use the system-provided vibrant appearance (to learn more about this

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appearance, see `notificationCenterVibrancyEffect`).

Provide a Notification Center experience. People visit Notification Center to get brief updates or to perform a very simple task, so it's best when your Today widget displays the right amount of information and limits interactivity. Specifically:

- Avoid making users scroll or vertically shift the view to see all the information in your Today widget. A widget can expand vertically to show more information, but it's not a good experience when a widget's height exceeds the height of Notification Center, because it interferes with scrolling to see other Today widgets.
- Avoid enabling horizontal swiping or dragging, because it interferes with navigation between Notification Center areas.
- As much as possible, let users perform a task or open your app with a single tap (note that the keyboard is not available within a Today widget).
- Optimize performance so that people get useful information immediately. It's a good idea to cache information locally so that you can display recent information while you get updates. People expect to spend very little time

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in the Today view, and iOS may terminate Today widgets that don't use memory wisely.

If appropriate, let people tap your Today widget to open your app. Because your Today widget provides a narrowly focused experience, it can work well to direct people to your app for more information or functionality. It's not a good idea to provide an "Open App" button, so one solution is to make your entire Today widget tappable. Or you might let users tap an appropriate UI object within the widget so that it opens your app to a view that's focused on that object. For example, the Calendar widget shows today's events; if users want to get more information about an event, they can tap the event in the widget to view it in the Calendar app.

NOTE

Giving users a way to open your app from your Today widget can work well, but it's essential that you also provide useful, timely information in the widget. Users don't appreciate Today widgets whose only function is to launch an app.

If necessary, let people know if they need to be logged in to get useful information in your Today widget. If your Today widget requires people to log in to

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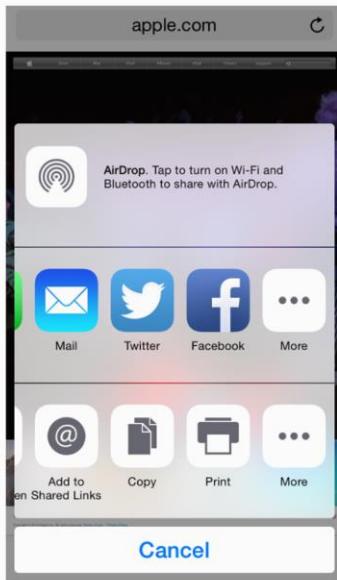
view information, show a message encouraging them to log in and explaining what content will be shown if they do. For example, if your Today widget shows upcoming reservations when users are signed in, you might ask people to "Sign in to MyApp to view upcoming reservations."

Don't create a Today widget that launches an app other than your own. A Today widget that mimics the behavior of the iOS Home screen doesn't provide useful functionality to your users.

Share and Action Extensions

People access Share and Action extensions by tapping the Action button in an app. In the activity view controller displayed by the Action button, Action extensions are listed in the bottom row and Share extensions are listed above them. People can use the More buttons to manage the Share and Action extensions that are displayed in the activity view controller shown here.

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A Share or Action extension typically takes as input the content in the user’s current context. While reading an article in Safari, for example, a user might tap the Action button and use a Share extension to post the article to a

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sharing website or use an Action extension to view a translation of the article.

NOTE

In the activity view controller, iOS lists only the Action extensions that support the current content type. For example, when the user’s current content is a video, iOS doesn’t list Action extensions that support only text.

As much as possible, use the system-provided UI in a Share extension. The system-provided compose view controller gives users a consistent experience and automatically supports common tasks, such as previewing and validating standard items, synchronizing content and view animation, and configuring a post. To learn more about using the system-provided compose view controller, see Share in *App Extension Programming Guide*.

Consider displaying the progress of a lengthy upload in a Share extension’s containing app. People expect to return to their previous context immediately after tapping an extension’s Post or Share button, even when the shared content is large. You need to make progress updates available, but people don’t want to get a notification every time an upload completes, and there’s no way to programmatically relaunch an extension. In

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this scenario, it can work well to display the progress of the upload in the containing app, which can handle the task in the background and send a notification if there’s a problem.

Use a monochromatic version of the app icon for an Action extension. (In contrast, a Share extension uses its containing app’s full-color app icon.) To create an icon for an Action extension, you might start by creating a stencil version of your app icon. If necessary, simplify the design by focusing on the elements that make your icon unique.

If you provide multiple Action extensions in your containing app, it can work well to create a family of icons for them. Be sure to make every icon in the family look related to the containing app’s icon.

Photo Editing Extensions

People can use Photo Editing extensions while they view photos or videos in the Photos app. Typically, a Photo Editing extension helps a user apply a filter or make some other edit to a photo or video. After the user confirms the change, the edited content is available in Photos.

Photos provides a modal view that displays the custom UI of your Photo Editing extension. Photos can also display a confirmation view when the user chooses

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Cancel after applying edits to a photo or video (you’re responsible for enabling this behavior in code).

Avoid using a navigation bar in your Photo Editing extension. As you can see here, the modal view that encloses your extension’s view already includes a navigation bar; adding another navigation bar would take space away from your UI and be confusing to users. (By default, Photos displays your view at full-screen height, so your content will appear underneath the built-in navigation bar.)

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If appropriate, let users preview their edits. As much as possible, you want to let users see the results of their work before they close your extension and return to

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Photos.

Document Provider Extensions

A Document Provider extension helps people access the documents that your app manages from a wide range of other apps. In a host app, a document picker view controller displays the UI that your extension provides (to learn more about the document picker view controller, see [UIDocumentPickerViewController Class Reference](#)).

NOTE

A Document Provider extension can consist of two separate parts: a Document Picker View Controller extension and a File Provider extension. The Document Picker View Controller extension contains your custom UI; the File Provider extension implements access to files. For simplicity, this section uses the term *Document Provider extension* to refer to the UI and experience provided by the Document Picker View Controller part of the extension.

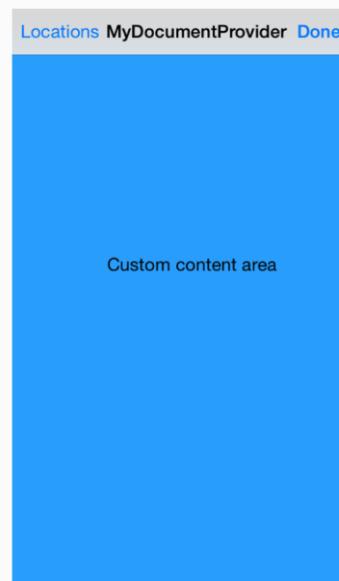
Avoid using a navigation bar in your Document Provider extension. iOS displays your extension’s custom UI within the navigation bar-based interface of

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the document picker view controller. Displaying a second navigation bar below the built-in bar is confusing to users and takes space away from your content. (By default, the document picker view controller displays your view at full-screen height, so your content appears underneath the built-in navigation bar.)

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keyboard with a custom keyboard throughout the system. After enabling a keyboard extension, people get the custom keyboard when they enter any text entry area except for secure text entry areas (such as a password field) and phone pad areas (such as a phone number field in Contacts).

Provide an obvious way for users to switch to the next keyboard. People are very familiar with the iOS globe key, and they expect a similar experience in your keyboard.

Custom Keyboards

People use a keyboard extension to replace the iOS

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If appropriate, include a tutorial in your containing app. If necessary, use your custom keyboard's containing app to give people instructions on how to enable or use your keyboard. Don't put this information directly into

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the keyboard itself, because it may confuse people when they try to use the keyboard.

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HomeKit

HomeKit makes it easy for people to use home automation apps on their iOS devices to control and configure the connected accessories in their homes, regardless of the accessory manufacturer. The best home automation apps integrate with HomeKit and iOS to help users:

- Set up homes, rooms, and zones
- Add, find, and remove accessories, such as light bulbs or thermostats
- Define behaviors that apply to a set of multiple accessories
- Manage users
- Use Siri to control their homes

To learn how to use HomeKit in your app, read *HomeKit Developer Guide*. The following guidelines can help you create a home automation app that's easy and enjoyable to use.

Don't assume that your accessory is the first accessory the user has set up. Your app should make it easy for users to create a home, room, or zone, but it should also make it easy for them to assign your

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accessory to a previously configured area.

Make it easy to add new accessories. Don't force users to create an account before they can add an accessory. It's best when your app automatically searches for new accessories and presents them prominently in the UI. Be sure to display enough information about each accessory so that users can easily identify them.

Help users identify the accessory they're adjusting. Offer a control that helps users physically identify the accessory; for example, you might let users flash a light bulb to confirm that they're adjusting the one they want.

Give users different ways to find accessories. Time of day, season, and the user's current location can influence which accessories are important at a given moment, so your app should provide ways to find accessories by type, name, or location in the home.

Suggest action sets based on the configured accessories in the home. An *action set* lets users define a situation in which multiple accessories should behave in specific ways. For example, an "away" action set might lower the temperature of the house, turn off the lights, and lock all the doors. Your app can suggest predefined action sets or let users create their own. If users can create their own action sets, it often works best to let users choose from accessories you suggest, based on selected rooms or zones.

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Use friendly, conversational language to make your app approachable and easy to use. Home automation can be intimidating to users. Avoid using acronyms and technical terminology that they might not understand. In particular, HomeKit is a technical term that refers to APIs, so it should not be used inside your app.

NOTE

If you're an MFi licensee, visit the MFi portal for guidance on naming and messaging for accessory packaging.

Integrate with Siri. Siri can make it easy to execute sophisticated operations with a single statement. Siri recognizes the names of action sets, homes, rooms, and zones and can understand statements like "Siri, lock the front door," "Siri, turn off the upstairs lights," and "Siri, make it warmer in the media room." The following guidelines can help you give users a great experience using Siri to control their accessories.

- **Use the service name—not the accessory name—so that Siri can recognize it.** An accessory can have multiple services, such as a ceiling fan that has a light service and a fan service, so it's important to help users

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distinguish them. For best results, let users choose from a limited list of names that don't include company names or model numbers and be sure to let users edit the name later. Names that you suggest should be standard, well-understood words or phrases that describe the service, and optionally include a location in the home, such as "living room lamp" or "garage door." You can also let users specify a service type for outlets and switches, so that generic commands like "Siri, turn off the lights" can control all lamps, light fixtures, and other light accessories.

- **Let users know how to use Siri to control an action set at the time they configure it.** For example, when confirming that the "movie" action set has been configured, also display suggested language the user can say to Siri, such as "You can use Siri to activate this action set by saying 'Siri, set the house to movie mode.'" Note that users can also tell Siri to activate an action set simply by speaking the action set's name. Siri recognizes predefined and user-defined action sets that are configured to have at least one action.

Help users set up triggers. In iOS 9, HomeKit supports *triggers*, which are ways to activate an action set based on

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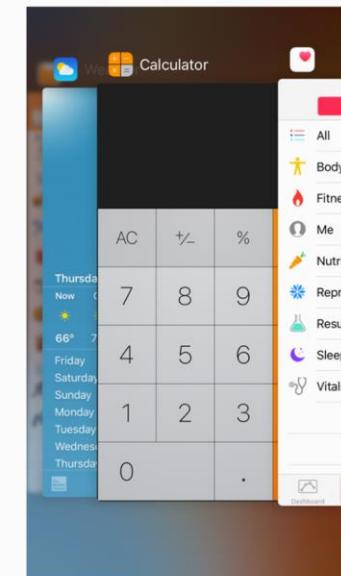
conditional relationships such as time, location, and the behavior of other accessories. For example, a user might set up a trigger to turn on the kitchen lights when the garage door opens and it's after sunset. Setting up a conditional relationship that involves several items can be confusing, so it's important to make the setup UI as simple as possible. For example, it can help users understand the conditions by displaying the items, attributes, and logical operators in an order that mirrors the way people speak.

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Multitasking

Multitasking lets people view more than one app onscreen (on eligible iPad models) and to switch quickly among recently used apps. In iOS 9, people can use the *multitasking UI* (shown below) to choose a recently used app.

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Thriving in a multitasking environment hinges on achieving a harmonious coexistence with other apps on the device. At a high level, this means that apps should:

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- Carefully tune resource usage to avoid using too much CPU, memory, screen space, and other resources
- Handle interruptions or audio from other apps gracefully
- Stop and restart—that is, transition to and from the background—quickly and smoothly
- Behave responsibly when not in the foreground

The following specific guidelines help your app succeed in the multitasking environment that's focused on app switching. For more information about running in the multitasking environment available on eligible iPad models, see *Adopting Multitasking Enhancements on iPad*.

Be prepared for interruptions, and be ready to resume. Multitasking increases the probability that a background app will interrupt your app. Other features, such as the presence of ads and faster app-switching, can also cause more frequent interruptions. The more quickly and precisely you can save the current state of your app, the faster people can relaunch it and continue from where they left off. To give users a seamless restart experience, take advantage of UIKit's state preservation and restoration functionality (for more information, see *Preserving Your App's Visual Appearance Across Launches*).

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Make sure your UI can handle the double-high status bar. The double-high status bar appears during events such as in-progress phone calls, audio recording, and tethering. In unprepared apps the extra height of this bar can cause layout problems. For example, the UI can become pushed down or covered. In a multitasking environment, it's especially important to be able to handle the double-high status bar properly because there are likely to be more apps that can cause it to appear.

Be ready to pause activities that require people's attention or active participation. For example, if your app is a game or a media-viewing app, make sure your users don't miss any content or events when they switch away from your app. When people switch back to a game or media viewer, they want to continue the experience as if they'd never left it.

Ensure that your audio behaves appropriately. Multitasking makes it more likely that other media activity is occurring while your app is running. It also makes it more likely that your audio will have to pause and resume to handle interruptions. For specific guidelines that help you make sure your audio meets people's expectations and coexists properly with other audio on the device, see [Sound](#).

Use local notifications sparingly. An app can arrange for local notifications to be sent at specific times, whether the app is suspended, running in the background, or not

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running at all. For the best user experience, avoid pestering people with too many notifications, and follow the guidelines for creating notification content described in [Notifications](#).

When appropriate, finish user-initiated tasks in the background. When people initiate a task, they usually expect it to finish even if they switch away from your app. If your app is in the middle of performing a user-initiated task that does not require additional user interaction, you should complete it in the background before suspending.

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Notifications

Notifications give people information and functionality that's important right now. People can get notifications in various contexts, such as on the lock screen, while they're using apps, and when they visit Notification Center.

Notification Center has two views: Today and Notifications.



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The Today view displays an editable list of widgets. A Today widget is an app extension that displays a small amount of timely, high-value information or functionality that's provided by an app the user cares about. For example, the Calendar widget displays only today's events. Tapping an event in the Calendar widget opens that event in the Calendar app, where users can edit the event and manage other events. To learn more about designing a Today widget, see [Today Widgets](#).

The Notifications view displays recent notification items from apps that users are interested in. Users can visit an app's area in Settings to specify whether they want notifications from the app to appear in Notification Center.

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iOS apps can use notifications to let people know when interesting things happen, such as:

- A message has arrived
- An event is about to occur
- New data is available for download
- The status of something has changed

In iOS 8 and later, apps can define actions that users can take within a notification. For example, a notification from a to-do app might let users mark an item as done

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without having to open the app.

iOS defines two types of notifications.

- A *local notification* is scheduled by an app and delivered by iOS on the same device, regardless of whether the app is currently running in the foreground. For example, a calendar or to-do app can schedule a local notification to alert people of an upcoming meeting or due date.
- A *remote notification* (also called a *push notification*) is sent by an app's remote server to the Apple Push Notification service, which pushes the notification to all devices that have the app installed. For example, a game that users can play against remote opponents can update all players with the latest move.

NOTE

An app extension may request that a remote notification be sent to its containing app. In this scenario, the containing app typically launches in the background to handle the notification. To learn more about app extensions, see [App Extensions](#).

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If you receive local or remote notifications while your app is running in the foreground, you're responsible for passing the information to your users in an app-specific way.

To ensure that users can customize their notification experience, you should support as many as possible of the following notification types:

- Banner
- Alert
- Badge
- Sound

NOTE

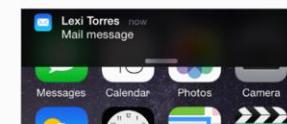
In iOS 8 and later, you must register the types of notifications you want to send to users. The first time you perform this registration action, users get an alert in which they can approve or deny all notifications from your app. Regardless of their choice, users can always visit your app's settings to change this preference or specify the types of notifications they want to receive.

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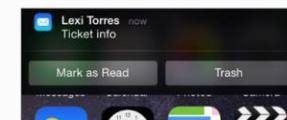
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A *banner* is a small translucent view that appears onscreen and then disappears after a few seconds. Users can also see a version of the banner on the lock screen and in the Notifications view of Notification Center. In the banner, iOS displays your notification message and the small version of your app icon (to learn more about the small app icon, see [App Icon](#)). Users tap the banner to dismiss it and switch to the app that sent the notification.

In addition to a default action that users can take by tapping a banner, you can also define two actions that are revealed when users swipe the banner. Tapping a notification action button dismisses the banner and launches your app (possibly in the background) to handle the action.

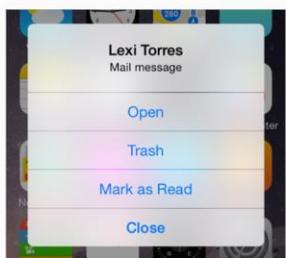


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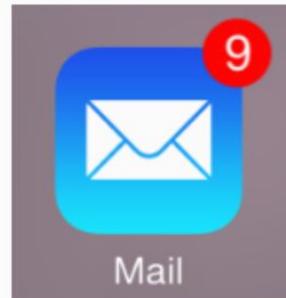
A notification *alert* is a standard alert view that appears onscreen and requires user interaction to dismiss. You supply the notification message and either a default action or up to four specific actions that are revealed when users tap the Options button. You have no control over the background appearance of the alert.

When users tap a default or custom action button in an alert, iOS simultaneously dismisses the alert and launches your app (possibly in the background). Tapping the Close or OK button dismisses the alert without opening your app.



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A *badge* is a small red oval that displays the number of pending notification items (a badge appears over the upper-right corner of an app's icon). You have no control over the size or color of the badge.

A custom or system-provided *sound* can accompany any of the other three notification types.

Think carefully before enabling a destructive action in a notification. You want to be sure that users have enough context to avoid unintended consequences. To help users distinguish an action that you specify as destructive, iOS displays it in red. In some cases, it's a good idea to require users to authenticate before your app performs a destructive action. For example, if you provide a destructive action in a banner that appears on the lock screen, you want to make sure that only the device's owner can take that action (you're responsible

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for implementing this requirement in code).

Provide a custom title for each action button. Create a very short title that clearly describes the action that occurs. For example, a game might use the title Play to indicate that tapping the button opens the app to a place where the user can take their turn. Make sure the title:

- Uses title-style capitalization
- Is short enough to fit in the button without truncation (be sure to test the length of localized titles, too)

Don't send multiple notifications for the same event. Users can attend to notification items when they choose; the items don't disappear until users handle them in some way. If you send multiple notifications for the same event, you fill up the Notification Center list and users are likely to turn off notifications from your app.

Don't include your app name in the notification message. Your custom message is displayed in alerts and banners, and in the Notifications view of Notification Center. You don't want to include your app's name in your custom message because iOS automatically displays the name with your message.

To be useful, a local or remote notification message should:

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- Focus on the information, not user actions. Avoid telling people which alert button to tap or how to open your app.
- Be short enough to display on one or two lines. Long messages are difficult for users to read quickly, and they can force alerts to scroll.
- Use sentence-style capitalization and appropriate ending punctuation. When possible, use a complete sentence.

NOTE

If necessary, iOS truncates your message so that it fits well in each notification delivery style; for best results, you shouldn't truncate your message.

Keep badge contents up to date. It's especially important to update the badge as soon as users have attended to the new information, so that they don't think additional notifications have arrived. Note that setting the badge contents to zero also removes the related notification items from Notification Center.

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IMPORTANT

Don't use a badge for purposes other than notifications. Remember that users can turn off badging for your app, so you can't be sure that they will see the content in a badge.

Provide a sound that users can choose to hear when a notification arrives. A sound can get people's attention when they're not looking at the device screen. For example, a calendar app might play a sound with an alert that reminds people about an imminent event. Or, a collaborative task management app might play a sound with a badge update to signal that a remote colleague has completed an assignment.

You can supply a custom sound, or you can use a built-in alert sound. If you create a custom sound, be sure it's short, distinctive, and professionally produced. (To learn about the technical requirements for this sound, see [Preparing Custom Alert Sounds](#).) Note that you can't programmatically cause the device to vibrate when a notification is delivered, because the user has control over whether alerts are accompanied by vibration.

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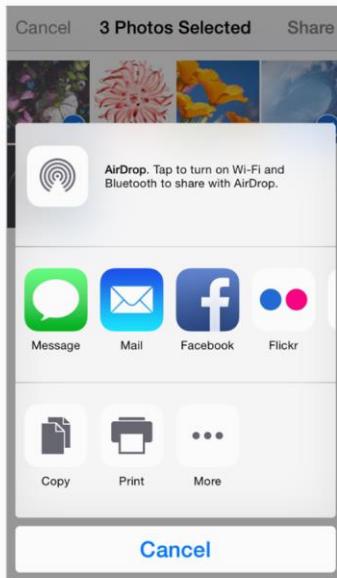
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Social Media

People expect to have access to their favorite social media accounts regardless of their current context. iOS makes it easy to integrate social media interactions into your app in ways that people appreciate.

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NOTE

When users tap the Action button, they get an activity view controller like the one shown here. To learn more about this view controller, see [Activity View Controller](#).

The middle row of the activity view controller lists the Share app extensions enabled by the user along with system-provided sharing services. To learn more about designing a Share extension, see [Share and Action Extensions](#).

Consider giving users a convenient way to compose a post within your app. Users are likely to enable Share extensions that make it easy to post content from anywhere, but you can also use the system-provided compose view controller to present users with a view in which they can edit a post. Optionally, you can prepopulate the compose view with custom content before you present it to users for editing (after you present the view to users, only they can edit the content). To learn about the programming interfaces of the Social framework—including the `SLComposeViewController` class—see [Social Framework Reference](#).

When possible, avoid asking users to sign into a social media account. The Social framework works with the Accounts framework to support a single sign-on model, so you can get authorization to access the user's

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account without asking them to reauthenticate. If the user hasn't already signed into an account, you can present UI that allows them to do so.

iCloud

iCloud lets people access the content they care about regardless of which device they're currently using. When you integrate iCloud into your app, users can use different instances of your app on different devices to view and edit their personal content without performing explicit synchronization.



To provide this user experience, it's likely that you'll need to reexamine the ways in which you store, access, and present information—especially user-created content—in your app. To learn how to enable iCloud in your app, see *iCloud Design Guide*.

A fundamental aspect of the iCloud user experience is transparency: Ideally, users don't need to know where their content is located and they should seldom have to

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think about which version of the content they're currently viewing. The following guidelines can help you give users the iCloud experience they're expecting.

If appropriate, make it easy for users to enable iCloud for your app. On their iOS devices, users log into their iCloud account in iCloud Settings, and for the most part, they expect their apps to work with iCloud automatically. But if you think users might want to choose whether to use iCloud with your app, you can provide a simple option that they can set when they open your app for the first time. In most cases, this option should provide a choice between using iCloud with all the content that users access in your app or not at all.

Respect the user's iCloud space. It's important to remember that iCloud is a finite resource for which users pay. You should use iCloud for storing information that users create and understand, and avoid using it to store app resources or content that you can regenerate. Also, note that when the user's iCloud account is active, iCloud automatically backs up the contents of your app's Documents folder. To avoid using up too much of the user's space, it's best to be picky about the content you place in the Documents folder.

Avoid asking users to choose which documents to store in iCloud. Typically, users expect all the content they care about to be available via iCloud. Most users don't need to manage the storage of individual

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documents, so you shouldn't assume that your app needs to support this experience. To provide a good user experience, you might want to rearchitect the way your app handles and exposes content so that you can perform more file-management tasks for the user.

Determine which types of information to store in iCloud. In addition to storing user-created documents and other content, you can also store small amounts of data such as the user's current state in your app or their preferences. To store this type of information you use iCloud key-value storage. For example, if people use your app to read a magazine, you might use iCloud key-value storage to store the last page they viewed so that when they reopen the issue on a different device, they can continue reading from where they left off.

If you use iCloud key-value storage to store preferences, be sure that the preferences are ones that users are likely to want to have applied to all their devices. For example, some preferences are more useful in a work environment than they are in a home environment. In some cases, it can make sense to store preferences on your app's server, instead of in the user's iCloud account, so that the preferences are available regardless of whether iCloud is enabled.

Make sure that your app behaves reasonably when iCloud is unavailable. For example, if users log out of their iCloud account, turn off iCloud usage for your app,

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or enter Airplane mode, iCloud becomes unavailable. In these cases, users performed an action that turned off access to iCloud, so your app does not need to tell them about it. However, it can be appropriate to show users that the changes they make will not be visible on their other devices until they restore access to iCloud.

Avoid giving users the option to create a "local" document. Regardless of whether you support iCloud in your app, you should not encourage users to think in terms of a device-specific file system. Instead, you want users to focus on the pervasive availability of their content through iCloud.

When appropriate, update content automatically. It's best when users don't have to take any action to ensure that they're accessing the most up-to-date content in your app. However, you need to balance this experience with respect for the user's device space and bandwidth constraints. If your users work with very large documents, it can be appropriate to give them control over whether to download an update from iCloud. If you need to do this, design a way to indicate that a more recent version of the document is available in iCloud. When the user chooses to update the document, be sure to provide subtle feedback if the download takes more than a few seconds.

Warn users about the consequences of deleting a document. When a user deletes a document in an

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iCloud-enabled app, the document is removed from the user's iCloud account and all other devices. It's appropriate to display an alert that describes this result and to get confirmation before you perform the deletion.

Tell users about conflicts as soon as possible, but only when necessary. Using the iCloud programming interfaces, you should be able to resolve most conflicts between different versions of a document without involving the user. In cases where this is not possible, make sure that you detect conflicts as soon as possible so that you can help users avoid wasting time on the wrong version of their content. You need to design an unobtrusive way to show users that a conflict exists; then, make it easy for users to differentiate between versions and make a decision.

Be sure to include the user's iCloud content in searches. Users with iCloud accounts tend to think of their content as being universally available, and they expect search results to reflect this perspective. If your app allows people to search their content, make sure you use the appropriate APIs to extend search to their iCloud accounts.

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HealthKit

In iOS 8 and later, apps built with HealthKit can use data from the Health app to provide health and fitness services that are more powerful and integrated. With the user's permission, apps can use HealthKit to both read and write data from the Health app, the central storage location for a user's health-related data.

For example, users can give a nutrition app access to the weight and activity data they store in the Health app so that the nutrition app can recommend the number of calories to consume each day to reach a certain goal. The nutrition app can also use HealthKit to update the Health app with the number of calories actually consumed, so that users can more easily track their progress. To learn how to integrate HealthKit into your app, see *HealthKit Framework Reference*.

The following guidelines can help you create a health and fitness app that people trust and enjoy using.

Request access to health data only if you have a compelling reason to do so. HealthKit is designed for use in apps focused on health and fitness services. If an app asks for access to unrelated health information, users are less likely to trust the app with their private data. So it's your job to make sure that users understand the

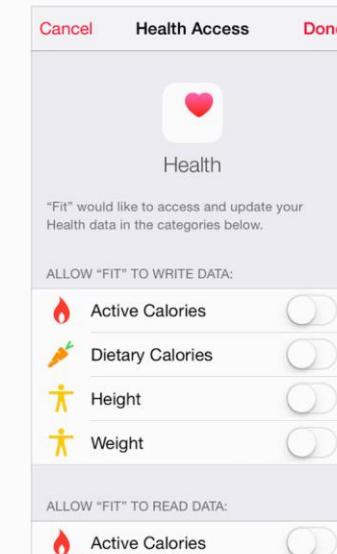
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reasons your app needs access to specific pieces of their private health data and the benefits of sharing that data.

Avoid asking for health data before users have a chance to understand what it will be used for. People are more inclined to give access to their health data if they see the connection between their current task and your request for the data. For example, when users are filling out a profile in a weight-loss app, it makes sense to ask for access to the weight data they store in the Health app. But if the weight-loss app asks for access to weight data immediately after the app launches, users may be less inclined to share their private information.

Use the system-provided UI to request permission to access the user's data. Users expect to see the system-provided permission sheet, as shown here, as soon as they need to grant permission to access their data. To provide a good user experience, avoid duplicating information from the permission sheet in your app's other screens. Instead, you can add customized messages to the permission sheet to explain why your app needs to access specific pieces of data (for more information, see *HKHealthStore Class Reference*). Keep these messages brief, but make sure that they clearly convey how your app uses the health data and the benefits of sharing it.

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NOTE

If users decide to stop sharing data with your app, they make this change in Settings. There is no need to enable this action within the UI of your app.

Don't use Health app icons, images, or screenshots in your UI. As with all Apple designs, these images are copyrighted and should not be displayed in your app.

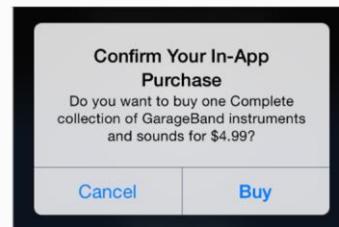
Don't use the term "HealthKit" in your UI. HealthKit is a developer term that names the technical framework you use to access data stored in the Health app. If you need to refer to the ways in which your app works with the data users store in the Health app, use the term "the Health app." For example, you might say that your app "saves information to the Health app" or "uses data from the Health app."

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In-App Purchase

In-App Purchase lets people buy digital products within your app, in a store that you design.



For example, users might:

- Upgrade a basic version of an app to a premium version
- Renew a subscription for new monthly content
- Purchase virtual items, such as a new level or weapon in a game
- Buy and download new books

You use the StoreKit framework to embed a store in your app and support In-App Purchase. When a user makes a purchase, StoreKit connects to the App Store to securely

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process the payment and then notifies your app so that it can provide the purchased item.

IMPORTANT

In-App Purchase only collects payment—you provide additional functionality, such as presenting your store to users, unlocking built-in features, and downloading content from your own servers. Also, all products you sell through In-App Purchase must be registered in the App Store.

To learn about the technical requirements of adding a store to your app, see *In-App Purchase Programming Guide*. For more information on the business requirements of using In-App Purchase, visit the [App Store Resource Center](#). You should also read your licensing agreement for definitive information about what you may sell and how you are required to provide those products in your app.

The following guidelines can help you design a purchasing experience that users appreciate.

Elegantly integrate the store experience into your app. When presenting products and handling user transactions, create an experience that feels at home in your app. You don't want users to think that they've entered a different app when they visit your store.

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Use simple, succinct titles and descriptions. It's best when people can scan a set of items and quickly find the ones they're interested in. When you use plain, direct language and titles that don't truncate or wrap, it's easier for people to understand the items you're offering.

Don't alter the default confirmation alert. When users buy a product, StoreKit presents a confirmation alert (shown above). You shouldn't modify this alert because it helps users avoid accidental purchases.

iOS Human Interface Guidelines

Game Center

Game Center lets people play games, organize online multiplayer games, and more. Players use the built-in Game Center app to sign in to an account, discover new games, add new friends, and browse leaderboards and achievements.

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As a game developer, you use the GameKit APIs to post scores and achievements to the Game Center service, display leaderboards in the game UI, and help users find other players. To learn how to integrate Game Center into your app, see *Game Center Programming Guide*.

The following guidelines can help you give people a great

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Game Center experience in your app.

Don't create custom UI that prompts users to sign into Game Center. When people start your Game Center-enabled app—and they're not already signed into Game Center on their device—the system automatically prompts them to sign in. Displaying custom sign-in UI is unnecessary and might confuse users.

In general, use the standard Game Center UI. In rare cases, it might make sense for a game to customize the Game Center UI, but doing so risks confusing people. The standard Game Center UI—which is familiar to both iOS and OS X users—promotes the sense of belonging to a larger gaming community.

Give users the ability to turn off voice chat. Some users might not want voice chat to be on automatically when they start your game, and most users appreciate the ability to turn off voice chat in certain situations.

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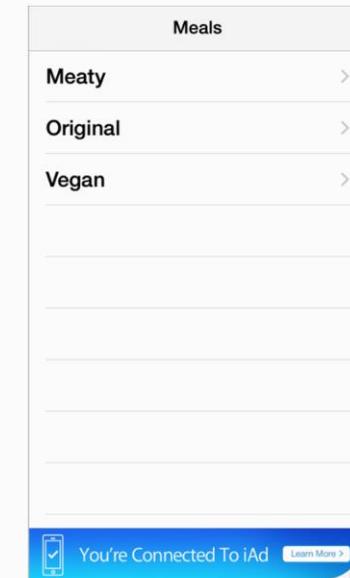
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iAd Rich Media Ads

When you allow advertisements to appear in your app, you can receive revenue when users see or interact with them. (Here you can see a placeholder for an iAd banner in a sample project.)

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You host an ad served by the iAd Network in a specific view in your UI. Initially, this view can contain the ad's banner, which functions as the entrance into the full iAd experience. When people tap the banner, the ad performs

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a preprogrammed action, such as playing a movie, displaying interactive content, or launching Safari to open a webpage. The action can display content that covers your UI or it can cause your app to transition to the background.

There are three types of banners that you can display in your app: standard, medium rectangle, and full screen. All types of banners serve the same purpose—that is, to usher users into the ad—but they differ in their appearance and behavior.

A *standard banner* takes up a small area of the screen and is often visible for as long as the screen is visible. You choose the app screens that should display a standard banner and make room for the banner view in the layout.

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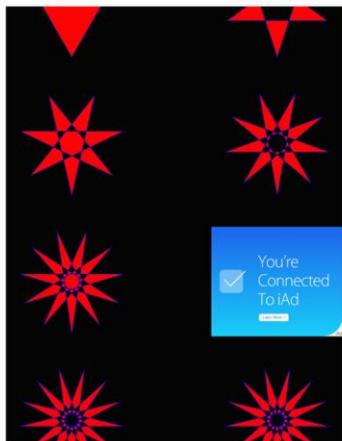
All iOS apps can display standard banners. Use a view provided by the `ADBannerView` class to contain a standard banner in your app.

A *medium rectangle banner* is similar in behavior to a

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standard banner and—as with standard banners—you choose where a medium rectangle banner should be displayed.

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Medium rectangle banners are available only in iPad apps.

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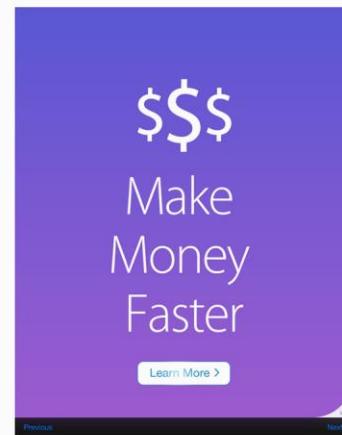
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You use a view provided by the `ADBannerView` class to contain a medium rectangle banner in your app.

A *full screen banner* occupies most or all of the screen and is usually visible at specific times during the app flow or in specific locations. You choose whether to display the banner modally or as a separate page within scrollable content. (In the example shown here, the app provides a magazine-reading experience and lets users turn the page away from or back to the full screen banner.)

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Use a view provided by the `ADInterstitialAd` class to contain a full screen banner in your app.

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All banner types appear inside the iAd frame, which displays the iAd mark in the lower-right corner. The iAd frame has been designed to look best when it is anchored to the bottom edge of your app screens.

To ensure seamless integration with banner ads and to provide the best user experience, follow these guidelines.

Place a standard banner view at or near the bottom of the screen. This placement differs slightly, depending on whether there is a bar at the bottom of the screen and if so, the kind of bar.

Bar	Standard banner view placement
No bar at the bottom of the screen	At the bottom of the screen
No bars anywhere on the screen	At the bottom of the screen
Toolbar or tab bar	Directly above the bottom bar

Place a medium rectangle banner view where it doesn't interfere with the user's content. As with the standard banner view, the medium banner view looks best at or near the bottom of the screen. Putting the

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banner near the bottom of the screen also increases the likelihood that it won't get in people's way.

Present a full screen banner modally when there are interludes in the user experience. If there are natural breaks or context changes in the flow of your app, the modal presentation style can be appropriate. When you present a full screen banner modally (by using `presentFromViewController:`), the user must either enter the ad or dismiss it. For this reason, it's a good idea to use the modal presentation style when users are expecting a change in experience, such as after they complete a task.

Present a full screen banner nonmodally when there are transitions between app views. If users experience your app by making frequent screen transitions, such as paging through a magazine or flicking through a gallery of items, the nonmodal presentation style can be appropriate. When you present a full screen banner nonmodally (by using `presentInView:`), you can preserve the bars in your UI so that users can use app controls to move past or return to the ad. As with all banners, a full screen banner launches the iAd experience when a user taps it, but your app can respond to other gestures within the banner area (such as drag or swipe) if appropriate.

Be sure to use appropriate animations to reveal and hide a nonmodal full screen banner view. For example, a magazine reader app would probably present a banner

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using the same page-turn animation it uses to reveal other content pages.

Ensure that all banners appear when and where it makes sense in your app. People are more likely to enter the iAd experience when they don't feel like they're interrupting their workflow to do so. This is especially important for immersive apps such as games: You don't want to place banner views where they will conflict with playing a game.

Avoid displaying banners on screens that users are likely to see only briefly. If your app includes screens that users move through quickly as they drill down or navigate to the content they care about, it's best to avoid displaying banners on these screens. Users are more likely to tap a banner when it stays onscreen for more than a second or two.

As much as possible, display banner ads in both orientations. It's best when users don't have to change the orientation of the device to switch between using your app and viewing an ad. Also, supporting both orientations allows you to accept a wider range of advertisements. To learn how to make sure a banner view responds to orientation changes, see *iAd Programming Guide*.

Don't allow standard or medium rectangle banners to scroll off the screen. If your app displays scrolling

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content in the screen, make sure the banner view remains anchored in its position.

While people view or interact with ads, pause activities that require their attention or interaction. When people choose to view an ad, they don't want to feel that they're missing events in your app, and they don't want your app to interrupt the ad experience. A good rule of thumb is to pause the same activities you would pause when your app transitions to the background.

Don't stop an ad, except in rare circumstances. In general, your app continues running and receiving events while users view and interact with ads, so it's possible that an event will occur that urgently requires their immediate attention. However, there are very few scenarios that warrant the dismissal of an in-progress ad. One possibility is with an app that provides Voice over Internet Protocol (VoIP) service. In such an app, it probably makes sense to cancel a running ad when an incoming call arrives.

NOTE

Cancelling an ad might adversely impact the kinds of advertisements your app can receive and the revenue you can collect.

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AirPrint

Using AirPrint, people can wirelessly print content from your app and use Print Center app to check on a print job.



You can take advantage of built-in support for printing images and PDF content, or you can use printing-specific programming interfaces to do custom formatting and rendering. iOS handles printer discovery and the scheduling and execution of print jobs on the selected printer.

Typically, users tap the standard Action button in your app when they want to print something. When they

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choose the Print item in the view that appears, they can then select a printer, set available printing options, and tap the Print button to start the job.

Users can check on the print job they requested in the Print Center app, which is a background system app that is available only while a print job is in progress. In Print Center, users can view the current print queue, get details about a specific print job, and even cancel the job.

You can support basic printing in your app with comparatively little additional code (to learn about adding print support to your code, see *Drawing and Printing Guide for iOS*). To ensure that users appreciate the printing experience in your app, follow these guidelines:

Use the system-provided Action button. Users are familiar with the meaning and behavior of this button, so it's a good idea to use it when possible. The main exception to this is if your app does not contain a toolbar or navigation bar. When this is the case, you need to design a custom print button that can appear in the main UI of your app, because the Action button can only be used in a toolbar or navigation bar.

Display the Print item when printing is a primary function in the current context. If printing is inappropriate in the current context, or if users are not likely to want to print, don't include the Print item in the view revealed by the Action button.

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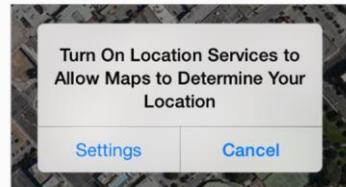
If appropriate, provide additional printing options to users. For example, you might allow users to choose a page range or to request multiple copies.

Don't display print-specific UI if users can't print. Be sure to check whether the user's device supports printing before you display UI that offers printing as an option. To learn how to do this in your code, see [UIPrintInteractionController Class Reference](#).

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Accessing User Data

Location Services allows apps to determine people's approximate location geographically, the direction they're pointing their device, and the direction in which they're moving. Other system services—such as Contacts, Calendar, Reminders, and Photo Library—also allow apps to access the data people store in them.



Although people appreciate the convenience of using an app that already knows a lot about them, they also expect to have the option of keeping their data private. For example, people like being able to automatically tag content with their physical location or find friends that are currently nearby, but they also want to be able to disable such features when they don't choose to share their location with others. (To learn more about how to make your app location-aware, see [Location and Maps Programming Guide](#).)

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The following guidelines can help you ask for user data in ways that help people feel comfortable.

Make sure users understand why they're being asked to share their personal data. It's natural for people to be suspicious of a request for their personal information if they don't see an obvious need for it. To avoid making users uncomfortable, make sure the alert appears only when they attempt to use a feature that clearly needs to know their information. For example, people can use Maps when Location Services is off, but they see an alert when they access the feature that finds and tracks their current location.

Describe why your app needs the information, if it's not obvious. You can provide text that appears in the alert, below a system-provided title such as “App Name” Would Like to Access Your Contacts” or for location notifications, “Allow “App Name” to Use Your Location While You Use the App?”. You want this text to be specific and polite so that people understand why you're asking for access to their information and don't feel pressured.

Your reason text should:

- Not include your app name. The system-provided alert title already includes your app name.

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- Clearly describe why your app needs the data. If appropriate, you might also explain ways in which your app will not use the data.
- Use user-centric terminology and be localizable.
- Be as short as possible, while still being easy to understand. As much as possible, avoid supplying more than one sentence.
- Use sentence-style capitalization. (Sentence-style capitalization means that the first word is capitalized, and the rest of the words are lowercase unless they are proper nouns or proper adjectives.)

Ask permission at app startup only if your app can't perform its primary function without the user's data. People won't be bothered by this if it's obvious that the main function of your app depends on knowing their personal information.

Avoid making programmatic calls that trigger the alert before the user actually selects the feature that needs the data. This way, you avoid causing people to wonder why your app wants their personal information when they're doing something that doesn't appear to need it. (Note that checking the user's Location Services preference does not trigger the alert.)

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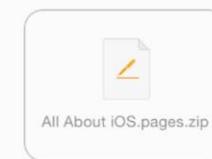
For location data, check the Location Services preference to avoid triggering the alert unnecessarily. You can use Core Location programming interfaces to get this setting (to learn how to do this, see *Core Location Framework Reference*). With this knowledge, you can trigger the alert as closely as possible to the feature that requires location information, or perhaps avoid an alert altogether.

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Quick Look

Using Quick Look, users can preview a document within your app, even if your app can't open the document. For example, you might allow users to preview documents that they download from the web or receive from other sources.



To learn more about how to support Quick Look document preview in your app, see *Document Interaction Programming Topics for iOS*.

Before users preview a document in your app, they can see information about the document in a custom view that you create. For example, after users download a document attached to an email message, Mail displays the document's icon, title, and size in a custom view within the message. Users can tap this view to preview the document.

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You can present a document preview in a new view in your app, or in a full-screen, modal view. The presentation method you choose depends on which device your app runs on.

On iPad, display a document preview modally. The large iPad screen is appropriate for displaying a document preview in an immersive environment that users can easily leave. The zoom transition is especially well-suited to reveal the preview.

On iPhone, display a document preview in a dedicated view, preferably a navigation view. Doing this allows users to navigate to and from the document preview without losing context in your app. Although it's possible to display a document preview modally in an iPhone app, it's not recommended. (Note that the zoom transition is not available on iPhone.)

Also, note that displaying a document preview in a navigation view allows Quick Look to place preview-specific navigation controls in the navigation bar. (If your view already contains a toolbar, Quick Look places the preview navigation controls in the toolbar, instead.)

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Sound

Whether sound is a primary part of your app's user experience or an optional enhancement, you need to know how users expect sound to behave and how to meet those expectations.

Understand User Expectations

People can use device controls to affect sound, and they might use wired or wireless headsets and headphones. People also have various expectations for how their actions impact the sound they hear. Although you might find some of these expectations surprising, they all follow the principle of user control in that the user, not the device, decides when it's appropriate to hear sound.

Users switch their devices to silent when they want to:

- Avoid being interrupted by unexpected sounds, such as phone ringtones and incoming message sounds
- Avoid hearing sounds that are the byproducts of user actions, such as keyboard or other feedback sounds, incidental sounds, or app

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startup sounds

- Avoid hearing game sounds that are not essential to using the game, such as sound effects and soundtracks

For example, in a theater users switch their devices to silent to avoid bothering other people in the theater. In this situation, users still want to be able to use apps on their devices, but they don't want to be surprised by sounds they don't expect or explicitly request, such as ringtones or new message sounds.

The Ring/Silent (or Silent) switch does *not* silence sounds that result from user actions that are solely and explicitly intended to produce sound. For example:

- Media playback in a media-only app is not silenced because the media playback was explicitly requested by the user.
- A Clock alarm is not silenced because the alarm was explicitly set by the user.
- A sound clip in a language-learning app is not silenced because the user took explicit action to hear it.
- Conversation in an audio chat app is not silenced because the user started the app for the sole purpose of having an audio chat.

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Users use the device’s volume buttons to adjust the volume of all sounds their devices can play, including songs, app sounds, and device sounds. Users can use the volume buttons to quiet any sound, regardless of the position of the Ring/Silent (or Silent) switch. Using the volume buttons to adjust an app’s currently playing audio also adjusts the overall system volume, with the exception of the ringer volume.

iPhone

Using the volume buttons when no audio is currently playing adjusts the ringer volume.

Users use headsets and headphones to hear sounds privately and to free their hands. Regardless of whether these accessories are wired or wireless, users have specific expectations for the user experience.

When users plug in a headset or headphones, or connect to a wireless audio device, they intend to continue listening to the current audio, but privately. For this reason, they expect an app that is currently playing audio to continue playing without pause.

When users unplug a headset or headphones, or disconnect from a wireless device (or the device goes out

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of range or turns off), they don’t want to automatically share what they’ve been listening to with others. For this reason, they expect an app that is currently playing audio to pause, allowing them to explicitly restart playback when they’re ready.

Define the Audio Behavior of Your App

If necessary, you can adjust relative, independent volume levels to produce the best mix in your app’s audio output. But the volume of the final audio output should always be governed by the system volume, whether it’s adjusted by the volume buttons or a volume slider. This means that control over an app’s audio output remains in users’ hands, where it belongs.

Ensure that your app can display the audio route picker, if appropriate. (An *audio route* is an electronic pathway for audio signals, such as from a device to headphone or from a device to speakers.) Even though people don’t physically plug in or unplug a wireless audio device, they still expect to be able to choose a different audio route. To handle this, iOS automatically displays a control that allows users to pick an output audio route (use the `MPVolumeView` class to allow the control to display in your app). Because choosing a different audio route is a user-initiated action, users expect currently playing audio to continue without pause.

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If you need to display a volume slider, be sure to use the system-provided volume slider available when you use the `MPVolumeView` class. Note that when the currently active audio output device does not support volume control, the volume slider is replaced by the appropriate device name.

If your app produces only UI sound effects that aren’t essential to its functionality, use **System Sound Services**. System Sound Services is the iOS technology that produces alerts and UI sounds and invokes vibration; it is unsuitable for any other purpose. When you use System Sound Services to produce sound, you cannot influence how your audio interacts with audio on the device, or how it should respond to interruptions and changes in device configuration. For a sample project that demonstrates how to use this technology, see *Audio UI Sounds (SysSound)*.

If sound plays an important role in your app, use **Audio Session Services** or the `AVAudioSession` class. These programming interfaces do not produce sound; instead, they help you express how your audio should interact with audio on the device and respond to interruptions and changes in device configuration.

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iPhone

No matter what technology you use to produce audio or how you define its behavior, the phone can always interrupt the currently running app. This is because no app should prevent people from receiving an incoming call.

In Audio Session Services, the *audio session* functions as an intermediary for audio between your app and the system. One of the most important facets of the audio session is the *category*, which defines the audio behavior of your app.

To realize the benefits of Audio Session Services and provide the audio experience users expect, you need to select the category that best describes the audio behavior of your app. This is the case whether your app plays audio in the foreground only or can also play audio in the background. Follow these guidelines as you make this selection:

- **Select an audio session category based on its semantic meaning, not its precise set of behaviors.** By selecting a category whose purpose is clear, you ensure that your app behaves according to users' expectations. In addition, it gives your app the best chance of

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working properly if the exact set of behaviors is refined in the future.

- **In rare cases, add a property to the audio session to modify a category's standard behavior.** A category's standard behavior represents what most users expect, so you should consider carefully before you change that behavior. For example, you might add the ducking property to make sure your audio is louder than all other audio (except phone audio), if that's what users expect from your app. (To learn more about audio session properties, see Fine-Tuning a Category.)
- **Consider basing your category selection on the current audio environment of the device.** This might make sense if, for example, users can use your app while listening to other audio instead of to your soundtrack. If you do this, be sure to avoid forcing users to stop listening to their music or make an explicit soundtrack choice when your app starts.
- **In general, avoid changing categories while your app is running.** The primary reason for changing the category is if your app needs to support recording and playback at different times. In this case, it can be better to switch between the Record category and the Playback category as needed, than to select the Play and

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Record category. This is because selecting the Record category ensures that no alerts—such as an incoming text message alert—will sound while the recording is in progress.

Table 35-1 lists the audio session categories you can use. Different categories allow sounds to be silenced by the Ring/Silent or Silent switch (or device locking), to mix with other audio, or to play while the app is in the background. (For the actual category and property names as they appear in the programming interfaces, see *Audio Session Programming Guide*.)

Table 35-1 Audio session categories and their associated behaviors

Category	Meaning	Silenced	Mixes	In Backg
Solo	Sounds enhance app functionality, and should silence other audio.	Yes	No	No
Ambient	Sounds enhance app functionality but should not	Yes	Yes	No

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	silence other audio.			
Playback	Sounds are essential to app functionality and might mix with other audio.	No (default) Yes (when the Mix With Others property is added)	No (when the Mix With Others property is added)	Yes
Record	Audio is user-recorded.	No	No	Yes
Play and Record	Sounds represent audio input and output, sequentially or simultaneously.	No (default) Yes (when the Mix With Others property is added)	No (when the Mix With Others property is added)	Yes
Audio Processing	App performs hardware-assisted audio encoding (it does not play	N/A	No	Yes *

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or record).

* If you select the Audio Processing category and you want to perform audio processing in the background, you need to prevent your app from suspending before you're finished with the audio processing. To learn how to do this, see [Implementing Long-Running Background Tasks](#).

Here are some scenarios that illustrate how to choose the audio session category that provides an audio experience users appreciate.

Scenario 1: An educational app that helps people learn a new language.

You provide:

- Feedback sounds that play when users tap specific controls
- Recordings of words and phrases that play when users want to hear examples of correct pronunciation

In this app, sound is essential to the primary functionality. People use this app to hear words and phrases in the language they're learning, so the sound should play even when the device locks or is switched to silent. Because users need to hear the sounds clearly, they expect other audio they might be playing to be silenced.

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To produce the audio experience users expect for this app, you'd use the Playback category. Although this category can be refined to allow mixing with other audio, this app should use the default behavior to ensure that other audio does not compete with the educational content the user has explicitly chosen to hear.

Scenario 2: A Voice over Internet Protocol (VoIP) app.

You provide:

- The ability to accept audio input
- The ability to play audio

In this app, sound is essential to the primary functionality. People use this app to communicate with others, often while they're currently using a different app. Users expect to be able to receive calls when they've switched their device to silent or the device is locked, and they expect other audio to be silent for the duration of a call. They also expect to be able to continue calls when the app is in the background.

To produce the expected user experience for this app, you'd use the Play and Record category, and you'd be sure to activate your audio session only when you need it so that users can use other audio between calls.

Scenario 3: A game that allows users to guide a character through different tasks.

You provide:

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- Various gameplay sound effects
- A musical soundtrack

In this app, sound greatly enhances the user experience, but isn't essential to the main task. Also, users are likely to appreciate being able to play the game silently or while listening to songs in their music library instead of to the game soundtrack.

The best strategy is to find out if users are listening to other audio when your app starts. Don't ask users to choose whether they want to listen to other audio or listen to your soundtrack. Instead, use the Audio Session Services function `AudioSessionGetProperty` to query the state of the `kAudioSessionProperty_OtherAudioIsPlaying` property. Based on the answer to this query, you can choose either the Ambient or Solo Ambient categories (both categories allow users to play the game silently):

- If users are listening to other audio, you should assume that they'd like to continue listening and wouldn't appreciate being forced to listen to the game soundtrack instead. In this situation, you'd choose the Ambient category.
- If users aren't listening to any other audio when your app starts, you'd choose the Solo

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Ambient category.

Scenario 4: An app that provides precise, real-time navigation instructions to the user's destination. You provide:

- Spoken directions for every step of the journey
- A few feedback sounds
- The ability for users to continue to listen to their own audio

In this app, the spoken navigation instructions represent the primary task, regardless of whether the app is in the background. For this reason, you'd use the Playback category, which allows your audio to play when the device is locked or switched to silent, and while the app is in the background.

To allow people to listen to other audio while they use your app, you can add the `kAudioSessionProperty_OverrideCategoryMixWithOthers` property. However, you also want to make sure that users can hear the spoken instructions above the audio they're currently playing. To do this, you can apply the `kAudioSessionProperty_OtherMixableAudioShouldDuck` property to the audio session to ensure that your audio is louder than all currently playing audio, with the exception of phone audio on iPhone. These settings allow

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the app to reactivate its audio session while the app is in the background, which ensures that users get navigation updates in real time.

Scenario 5: A blogging app that allows users to upload their text and graphics to a website. You provide:

- A short startup sound file
- Various short sound effects that accompany user actions (such as a sound that plays when a post has been uploaded)
- An alert sound that plays when a posting fails

In this app, sound enhances the user experience, but it's not essential. The main task has nothing to do with audio and users don't need to hear any sounds to successfully use the app. In this scenario, you'd use System Sound Services to produce sound. This is because the audio context of all sound in the app conforms to the intended purpose of this technology, which is to produce UI sound effects and alert sounds that obey device locking and the Ring/Silent (or Silent) switch in the way that users expect.

Manage Audio Interruptions

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Sometimes, currently playing audio is interrupted by audio from a different app. On iPhone, for example, an incoming phone call interrupts the current app's audio for the duration of the call. In a multitasking environment, the frequency of such audio interruptions can be high.

To provide an audio experience users appreciate, iOS relies on you to:

- Identify the type of audio interruption your app can cause
- Respond appropriately when your app continues after an audio interruption ends

Every app needs to identify the type of audio interruption it can cause, but not every app needs to determine how to respond to the end of an audio interruption. This is because most types of apps should respond to the end of an audio interruption by resuming audio. Only apps that are primarily or partly media playback apps—and that provide media playback controls—have to take an extra step to determine the appropriate response.

Conceptually, there are two types of audio interruptions, based on the type of audio that's doing the interrupting and the way users expect the particular app to respond when the interruption ends:

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- A *resumable interruption* is caused by audio that users view as a temporary interlude in their primary listening experience.

After a resumable interruption ends, an app that displays controls for media playback should resume what it was doing when the interruption occurred, whether this is playing audio or remaining paused. An app that doesn't have media playback controls should resume playing audio.

For example, consider a user listening to an app for music playback on iPhone when a VoIP call arrives in the middle of a song. The user answers the call, expecting the playback app to be silent while they talk. After the call ends, the user expects the playback app to automatically resume playing the song, because the music—not the call—constitutes their primary listening experience *and* they had not paused the music before the call arrived. On the other hand, if the user had paused music playback before the call arrived, they would expect the music to remain paused after the call ends.

Other examples of apps that can cause resumable interruptions are apps that play alarms, audio prompts (such as spoken driving directions), or other intermittent audio.

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- A *nonresumable interruption* is caused by audio that users view as a primary listening experience, such as audio from a media playback app.

After a nonresumable interruption ends, an app that displays media playback controls should not resume playing audio. An app that doesn't have media playback controls should resume playing audio.

For example, consider a user listening to a music playback app (music app 1) when a different music playback app (music app 2) interrupts. In response, the user decides to listen to music app 2 for some period of time. After quitting music app 2, the user wouldn't expect music app 1 to automatically resume playing because they'd deliberately made music app 2 their primary listening experience.

The following guidelines help you decide what information to supply and how to continue after an audio interruption ends.

Identify the type of audio interruption your app caused. You do this by deactivating your audio session in one of the following two ways when your audio is finished:

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- If your app caused a resumable interruption, deactivate your audio session with the `AVAudioSessionSetActiveFlags_NotifyOthersOn` flag.
- If your app caused a nonresumable interruption, deactivate your audio session without any flags.

Providing, or not providing, the flags allows iOS to give interrupted apps the ability to resume playing their audio automatically, if appropriate.

Determine whether you should resume audio when an audio interruption ends. You base this decision on the audio user experience you provide in your app.

- If your app displays media playback controls that people use to play or pause audio, you need to check the `AVAudioSessionInterruptionFlags_ShouldResume` flag when an audio interruption ends.

If your app receives the `Should Resume` flag, your app should:

- Resume playing audio if your app was actively playing audio when it was interrupted
- Not resume playing audio if your

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app was *not* actively playing audio when it was interrupted

- If your app doesn't display any media playback controls that people can use to play or pause audio, your app should always resume previously playing audio when an audio interruption ends, regardless of whether the `Should Resume` flag is present.

For example, a game that plays a soundtrack should automatically resume playing the soundtrack after an interruption.

Handle Media Remote Control Events, if Appropriate

Apps can receive remote control events when people use iOS media controls or accessory controls, such as headset controls. This allows your app to accept user input that doesn't come through your UI, whether your app is currently playing audio in the foreground or in the background.

Apps can send video to AirPlay-enabled hardware—such as Apple TV—and transition to the background while playback continues. Such an app can accept user input via remote control events, so that users can control video

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playback while the app is in the background. In addition, this type of app can also reactivate an audio session after an interruption while it's in the background.

A media playback app, in particular, needs to respond appropriately to media remote control events, especially if it plays audio or video while it's in the background.

To meet the responsibilities associated with the privilege of playing media while your app is in the background, be sure to follow these guidelines:

Limit your app's eligibility to receive remote control events to times when it makes sense. For example, if your app helps users read content, search for information, and listen to audio, it should accept remote control events only while the user is in the audio context. When the user leaves the audio context, you should relinquish the ability to receive the events. If your app lets users play audio or video on an AirPlay-enabled device, it should accept remote control events for the duration of media playback. Following these guidelines allows users to consume a different app's media—and control it with headset controls—when they're in the nonmedia contexts of your app.

As much as possible, use system-provided controls to offer AirPlay support. When you use the `MPMoviePlayerController` class to enable AirPlay playback, you can take advantage of a standard control

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that allows users to choose an AirPlay-enabled device that is currently in range. Or you can use the `MPVolumeView` class to display AirPlay-enabled audio or video devices from which users can choose. Users are accustomed to the appearance and behavior of these standard controls, so they'll know how to use them in your app.

Don't repurpose an event, even if the event has no meaning in your app. Users expect the iOS media controls and accessory controls to function consistently in all apps. You do not have to handle the events that your app doesn't need, but the events that you do handle must result in the experience users expect. If you redefine the meaning of an event, you confuse users and risk leading them into an unknown state from which they can't escape without quitting your app.

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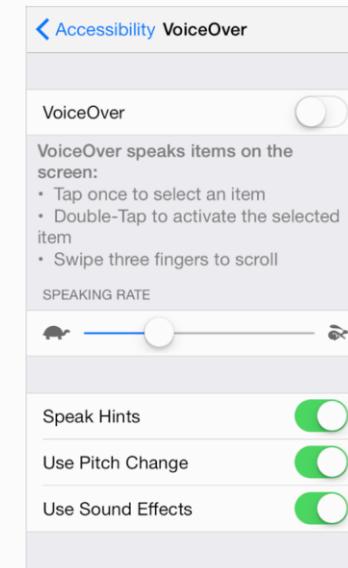
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VoiceOver

VoiceOver increases accessibility for blind and low-vision users, and for users with certain learning challenges.

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To make sure VoiceOver users can use your app, you might need to supply some descriptive information about the views and controls in your user interface. Supporting VoiceOver does *not* require you to change the visual design of your UI in any way.

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When you use standard UI elements in a completely standard way, you have little (if any) additional work to do. The more custom your UI is, the more custom information you need to provide so that VoiceOver can accurately describe your app.

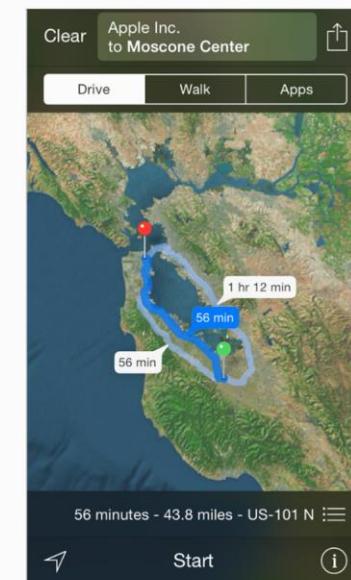
Making your iOS app accessible to VoiceOver users can increase your user base and help you enter new markets. Supporting VoiceOver can also help you address accessibility guidelines created by various governing bodies.

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Routing

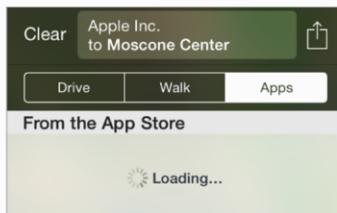
Maps can display a choice of routes to a user's destination:

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Maps can also display a list of routing apps—including apps installed on the device and in the App Store—when people want additional transit information for a route.

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A *routing app* provides information about transit options for the currently selected route. People expect routing apps to be quick, easy to use, and—above all—accurate. Following the guidelines in this section helps you give users transit information they can trust and a user experience they appreciate.

IMPORTANT

Maps gives people driving and walking directions for their route. Routing apps provide *transit information*, which focuses on step-by-step directions that use alternate modes of transportation—such as bus, train, subway, ferry, bike, pedestrian, shuttle, and so on.

If your app doesn't provide transit information for the routes that people specify, don't identify it as a routing app.

Deliver the functionality your app promises. When

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people see your app in the transit list, they assume that it can help them reach their destination. But if your app can't provide information about the selected route—or it doesn't include the type of transit it appears to include—people are unlikely to give it a second chance. It's essential to represent your app's capabilities accurately; otherwise, your app can look like it's intentionally misleading users.

There are two main ways you can give users confidence in your routing app:

- Define the geographic regions you support as precisely as possible. For example, if your app helps people get information about bus routes in Paris, your supported region should be Paris, not Île-de-France, and not France.
- Be specific about the types of transit that you support. For example, if you specialize in subway information, don't imply that you provide information about all rail-based transit types.

NOTE

Although accurately reporting your supported region can mean that your app appears in the transit list less often, doing so helps users trust it more.

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Streamline the UI for ease of use. Ease of use is especially important for routing apps because people tend to use them under challenging conditions—such as in bright sunlight or in the dim interior of a train, on a bumpy ride, and when they're in a hurry. Make sure that your text is easy to read in any light and that buttons are easy to tap accurately even when the ride is not smooth.

Focus on the route. Although auxiliary information can be useful, your app should focus on giving users step-by-step directions they can follow to their destination. In particular, you want users to know which step they're in and how to get to the next step. You can provide additional data—such as timetables and system maps—but don't make this data more prominent than the transit information.

Provide information for every step of a route. People should never feel abandoned by your app. But even when you accurately report your supported region, you can't assume that users are already at the first transit stop in a route, or that the last transit stop is at the same location as their destination. To handle this situation, first examine the distances at the beginning and end of the route. If the distances are short enough, provide walking directions from the user's current location to the first transit stop and from the last transit stop to the user's final destination. If walking is not a reasonable choice, try to describe the user's other options. If necessary, you can

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give users a way to open Maps to get walking or driving directions for these portions of the route.

When users transition to your app from Maps, don't ask them to reenter information. If users are coming from Maps, you already know the start and end points of the route they're interested in, so you can present the appropriate transit information as soon as your app opens. If users start your app from the Home screen, provide an easy way for them to enter route details.

Display transit information both graphically and textually. A map view helps people see their complete route in a larger, physical context; a list of steps helps people focus on the actions they must take to arrive at their destination. It's best when you support both of these tasks and make it easy for users to switch between them.

NOTE

Regardless of format, it's crucial that you always display the same transit information for the user's route. For example, if a route consists of five steps, both the map and the list view of the route must describe the same five steps.

When your app is chosen from the transit list, it works

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well to start by displaying the complete route—including walking paths to and from the transit stops, if appropriate—in a map view. A map view gives users an overview of the various steps in their journey and shows them how their route fits into the surrounding geographical area.

Enrich map views with additional information. People expect the maps in your app to behave similarly to other maps they've used. In addition to letting users zoom and pan, you should display annotations that give users the information they need. For example, you could display pins that represent the user's current location, the destination, and transfers or points of interest along the way. Be sure to avoid displaying only a single pin, because it's hard for users to tell what it represents if there's no additional context. For more information about using map views in your app, see [Map View](#).

As much as possible, integrate static maps—such as a subway system map—with a map view. A good way to do this is to overlay the static image on the map view so that users can see how their route and their current location relate to the larger transit system.

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NOTE

If you decide to display a static map image by itself, be sure to use a high-resolution image that maintains good quality when users zoom into it.

Give users different ways to sort multiple transit options. Lots of factors influence people's transit decisions—such as time of day, weather, and how much they're carrying—so it's important to make it easy to compare transit options. For example, you could let users sort transit options by start or end time, amount of walking required, number of stops along the way, or number of transfers or different transit types required. Regardless of the order in which you display multiple transit options, make sure that users can instantly distinguish the differences between the options.

Consider using push notifications to give people important information about their route. As much as possible, let people know when transit information changes, so that they can adjust their plans. For example, if a train is delayed or a bus line is temporarily unavailable people might need to choose a different route to their destination. And in a route that includes long stops between steps, people might appreciate being notified when their transport is about to depart for the next part of the journey.

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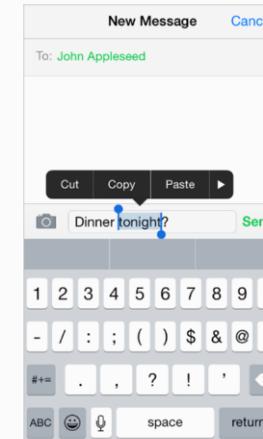
Edit Menu

Users can reveal an edit menu to perform operations such as Cut, Paste, and Select in a text view, web view, or image view.

The edit menu



The selection menu



You can adjust some of the behaviors of the menu to give users more control over the content in your app. For example, you can:

- Specify which of the standard menu commands

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are appropriate for the current context

- Determine the position of the menu before it appears so that you can prevent important parts of your app's UI from being obscured
- Define the object that is selected by default when users double-tap to reveal the menu

You can't change the color or shape of the menu itself.

For information on how to implement these behaviors in code, see [Copy, Cut, and Paste Operations](#).

To ensure that the edit menu behaves as users expect in your app, you should:

Display commands that make sense in the current context. For example, if nothing is selected, the menu should not contain Copy or Cut because these commands act on a selection. Similarly, if something is selected, the menu should not contain Select. If you support an edit menu in a custom view, you're responsible for making sure that the commands the menu displays are appropriate for the current context.

Accommodate the menu display in your layout. iOS displays the edit menu above or below the insertion point or selection, depending on available space, and places the menu pointer so that users can see how the menu commands relate to the content. You can

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programmatically determine the position of the menu before it appears so that you can prevent important parts of your UI from being obscured, if necessary.

Support both gestures that people can use to invoke the menu. Although the touch and hold gesture is the primary way users reveal the edit menu, they can also double-tap a word in a text view to select the word and reveal the menu at the same time. If you support the menu in a custom view, be sure to respond to both gestures. In addition, you can define the object that is selected by default when the user double taps.

Avoid creating a button in your UI that performs a command that's available in the edit menu. For example, it's better to allow users to perform a copy operation using the edit menu than to provide a Copy button, because users will wonder why there are two ways to do the same thing in your app.

Consider enabling the selection of static text if it's useful to the user. For example, a user might want to copy the caption of an image, but they're not likely to want to copy the label of a tab item or a screen title, such as Accounts. In a text view, selection by word should be the default.

Don't make button titles selectable. A selectable button title makes it difficult for users to reveal the edit menu without activating the button. In general, elements

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that behave as buttons don't need to be selectable.

Combine support for undo and redo with your support of copy and paste. People often expect to be able to undo recent operations if they change their minds. Because the edit menu doesn't require confirmation before its actions are performed, you should give users the opportunity to undo or redo these actions.

Follow these guidelines if you need to create custom edit menu items, such as the ones shown here:

Delete Comment Remove Highlight

Geology 101 Report

Create edit menu items that edit, alter, or otherwise act directly upon the user's selection. People expect the standard edit menu items to act upon text or objects within the current context, and it's best when your custom menu items behave similarly.

List custom items together after all system-provided items. Don't intersperse your custom items with the system-provided ones.

Keep the number of custom menu items reasonable. You don't want to overwhelm your users with too many

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choices.

Use succinct names for your custom menu items and make sure the names precisely describe what the commands do. In general, item names should be verbs that describe the action to be performed. Although you should generally use a single capitalized word for an item name, use title-style capitalization if you must use a short phrase. (Briefly, title-style capitalization means to capitalize every word except articles, coordinating conjunctions, and prepositions of four or fewer letters.)

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Undo and Redo

Users initiate an Undo operation by shaking the device, which displays an alert that allows them to:

- Undo what they just typed
- Redo previously undone typing
- Cancel the undo operation



You can support the Undo operation in a more general way in your app by specifying:

- The actions users can undo or redo

- The circumstances under which your app should interpret a shake event as the shake-to-undo gesture
- How many levels of undo to support

To learn how to implement this behavior in code, see *Undo Architecture*. If you support undo and redo in your app, follow these guidelines to provide a good user experience.

Supply brief descriptive phrases that tell users precisely what they’re undoing or redoing. iOS automatically supplies the strings “Undo” and “Redo” (including a space after the word) for the undo alert button titles, but you need to provide a word or two that describes the action users can undo or redo. For example, you might supply the text Name or Address Change, to create button titles such as “Undo Name” or “Redo Address Change.” (Note that the Cancel button in the alert cannot be changed or removed.)

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Avoid supplying text that is too long. A button title that is too long is truncated and is difficult for users to decipher. And because this text is in a button title, use title-style capitalization and do not add punctuation.

Avoid overloading the shake gesture. Even though you can programmatically set when your app interprets a shake event as shake to undo, you run the risk of confusing users if they also use shake to perform a different action. Analyze user interaction in your app and avoid creating situations in which users can't reliably predict the result of the shake gesture.

Use the system-provided Undo and Redo buttons only if undo and redo are fundamental tasks in your app. Remember that the shake gesture is the primary way users initiate undo and redo, and that it can be confusing to offer two different ways to perform the same

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task. If you decide it's important to provide explicit, dedicated controls for undo and redo, you can place the system-provided buttons in the navigation bar. (To learn more about these buttons, see [Toolbar and Navigation Bar Buttons](#).)

Clearly relate undo and redo capability to the user's immediate context, and not to an earlier context. Consider the context of the actions you allow to be undone or redone. In general, users expect their changes and actions to take effect immediately.

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Keyboards and Input Views

In iOS 8 and later, you can create a custom keyboard extension that people can use instead of the system-provided keyboard in most places. To learn more about the guidelines that govern app extensions including keyboards, see [App Extensions](#); to learn how to develop a custom keyboard extension, see [Custom Keyboard](#).

If appropriate, you can also design a custom input view to replace the system-provided onscreen keyboard within your app. For example, Numbers provides several input views that are designed to make it easy and efficient to enter amounts, dates, and other values.



If you provide a custom input view, be sure its function is obvious to people.

You can also provide a custom input accessory view,

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which is a separate view that appears above the keyboard (or your custom input view). For example, in some contexts, Numbers displays an input accessory view that helps users perform standard or custom calculations on spreadsheet values.



Use the standard keyboard click sound to provide audible feedback when people tap the custom controls in your input view. To learn how to enable this sound in your code, see the documentation for `playInputClick` in *UIDevice Class Reference*.

NOTE

The standard click sound is available only for custom input views that are currently onscreen. People can turn off all keyboard clicks—including ones that come from your custom input view—in Settings > Sounds.

iOS Human Interface Guidelines

UI Elements

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Bars

The Status Bar

The *status bar* displays important information about the device and the current environment (shown below on iPhone).

Default (dark) content



Light content



The status bar:

- Is transparent
- When present, always appears at the upper edge of the screen

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API NOTE

You can set the style of the status bar globally for the entire app or you can let individual view controllers set the style as appropriate. To learn more, read *UIApplication Class Reference* for information about the `UIStatusBarStyle` constant and *UIViewController Class Reference* for information about the `preferredStatusBarStyle` property.

Don't create a custom status bar. Users depend on the consistency of the system-provided status bar. Although you might hide the status bar in your app, it's not appropriate to create custom UI that takes its place.

Prevent scrolling content from showing through the status bar. As users scroll, you don't want them to see a confusing mix of app content and status bar items in the status bar area. To give users the impression of spaciousness while still ensuring maximum readability, make sure the status bar has a background that obscures the content behind it. Here are a few ways to keep scrolling content from showing through the status bar:

- Use a navigation controller to display content. A navigation controller automatically displays a status bar background and it ensures that its content views don't appear behind the status bar. (To learn more about navigation

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controllers, see Navigation Controllers.)

- Create a nondistracting custom image—such as a gradient—and display it behind the status bar. To ensure that the image stays behind the status bar, you could use a view controller to keep the image above a scrolling view or you could use a scrolling view to keep it pinned to the top.
- Position content to avoid the status bar area (that is, the area defined by the app's `statusBarFrame` property). If you do this, you should use the window's background color to provide a solid color behind the status bar.

Avoid putting distracting content behind the status bar. In particular, you don't want to imply that users should tap the status bar to access content or activate controls in your app.

Think twice before permanently hiding the status bar. Because the status bar is transparent, it's not usually necessary to hide it. Permanently hiding the status bar means that users must switch away from your app to read the time or to find out whether they have a Wi-Fi connection.

Consider hiding the status bar—and all other app UI—while people are actively viewing full-screen media.

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If you hide the status bar, be sure to let people retrieve it (and the appropriate app UI) with a single tap. Unless you have a compelling reason to do so, avoid defining a custom gesture to redisplay the status bar because users are unlikely to discover such a gesture or to remember it.

Choose a status bar content color that coordinates with your app. The default appearance displays dark content, which looks good on top of light-colored app content. The light status bar content looks good on top of dark-colored app content.

When appropriate, display the network activity indicator. The network activity indicator can appear in the status bar to show users that lengthy network access is occurring. To learn how to implement this indicator in your code, see [Network Activity Indicator](#).

Navigation Bar

A **navigation bar** enables navigation through an information hierarchy and, optionally, management of screen contents.

 Sounds Ringtones Store

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A navigation bar:

- Is translucent
- Generally appears at the top of an app screen, just below the status bar

In a horizontally regular environment, a navigation bar can also display within a view that doesn't extend across the screen, such as one pane of a split view controller.

- Can hide when the keyboard appears, the user makes a gesture, or when the containing view controller transitions to a vertically compact environment.
- Can be tinted. (Use `tintColor` to tint bar button items; use `barTintColor` to tint the bar background.)

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API NOTE

A navigation bar is contained in a navigation controller, which is a programmatic object that manages the display of a hierarchy of custom views. To learn more about defining a navigation bar in your code, see [Navigation Controllers](#), [UINavigationController Class Reference](#), and [UINavigationBar Class Reference](#).

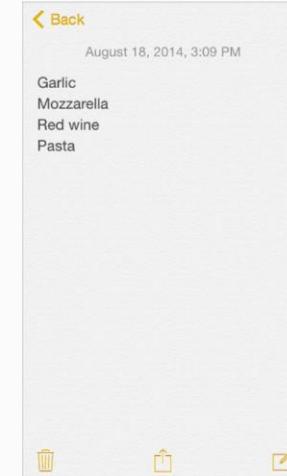
Use a navigation bar to enable navigation among different views and—if appropriate—to provide a control that manages the items in a view. If you need to provide a larger set of controls and you don't need to enable navigation, consider using a toolbar instead (to learn more, see [Toolbar](#)).

When the user goes to a new level in a navigation hierarchy, two things should happen:

- The navigation bar title should change to the new level's title, if appropriate.
- A back button should appear in the left end of the bar; it can be labeled with the previous level's title if it adds value.

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When it adds value, use the title of the current view as the title of the navigation bar. If titling a navigation bar seems redundant, you can leave the title empty. For example, Notes doesn't title the current note because the first line of content supplies all the context users need.

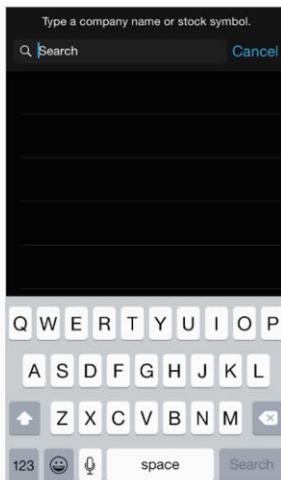
Consider putting a segmented control in a navigation bar at the top level of an app. This is especially useful if doing so helps to flatten your information hierarchy, making it easier for people to find what they're looking for. If you use a segmented control in a navigation bar, be sure to choose accurate back-button titles. (For usage

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guidelines, see [Segmented Control](#).)

If necessary, consider using a prompt to clarify what users can do in the current screen. A prompt is a brief sentence that appears near the top of the navigation bar. For example, Stocks uses a prompt to make sure users understand how to find the information they want.



If you need to use a prompt, write a succinct, one-line sentence that uses appropriate ending punctuation.

Avoid crowding a navigation bar with additional controls, even if it looks like there's enough space. In

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general, a navigation bar should contain no more than the view’s current title, the back button, and one control that manages the view’s contents. If you use a segmented control in the navigation bar, the bar shouldn’t display a title and it shouldn’t contain any controls other than the segmented control.

Make sure text-titled buttons have enough space between them. If there isn’t enough space between multiple left or right bar button items in a navigation bar, the text titles can appear to run together, making it difficult for users to distinguish them. If button titles look too close together in your navigation bar, use `UIBarButtonSystemItemFixedSpace` to add the appropriate spacing between them. (To learn more about this constant, see [UIBarButtonItem Class Reference](#).)

As much as possible, make sure that the look of a customized navigation bar is consistent throughout your app. For example, don’t combine an opaque navigation bar with a translucent toolbar. Also, it’s best to avoid changing the image, color, or translucency of the navigation bar in different screens in the same orientation.

Make sure that a customized back button still looks and behaves like a back button. Users know that the standard back button allows them to retrace their steps through a hierarchy of information. If you decide to replace the system-provided chevron with a custom

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image, be sure to supply a custom mask image, too. iOS uses the mask to make the button title appear to emerge from—or disappear into—the chevron during transitions.

IMPORTANT

Don’t create a multisegment back button. The back button always takes the user to the current screen’s parent. If you think users might get lost without a multisegment control that displays a type of breadcrumb path, it probably means that you should flatten the information hierarchy.

Consider hiding the navigation bar when users want to focus on content. If you do this, be sure to let users restore the navigation bar with a simple gesture, such as a tap.

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Maps with navigation bar
(and toolbar) visible



Maps with navigation bar
(and toolbar) hidden



Toolbar

A **toolbar** contains controls that perform actions related to objects in the screen or view.



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A toolbar:

- Is translucent
- Always appears at the bottom edge of a screen or view on iPhone
- Can also appear at the top edge of the screen or view on iPad.
- Can hide when the keyboard appears, the user makes a gesture, or when the containing view controller transitions to a vertically compact environment.

API NOTE

A toolbar is typically contained in a navigation controller, which is an object that manages the display of a hierarchy of custom views. To learn more about defining a toolbar in your code, see [Displaying a Navigation Toolbar](#) and [UIToolbar Class Reference](#).

Use a toolbar to provide a set of actions users can take in the current context.

Include the most frequently used commands that make sense in the current context. As much as possible, avoid using a toolbar to provide commands that

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are only occasionally useful.

Consider using a segmented control to provide access to different perspectives or modes in the current context. It's not a good idea to use a segmented control in a toolbar to show app-level tasks or modes, because a toolbar is specific to the current screen or view. If you need to give people access to primary tasks, views, or modes in your app, use a tab bar instead. To learn more about segmented controls, see [Segmented Control](#); to learn more about tab bars, see [Tab Bar](#).

Use icons if you need to put more than three items in a toolbar. Because text-titled buttons typically use more space than icons, it can be difficult to keep the titles from running together.

Make sure text-titled buttons have enough space between them. If there isn't enough space between two or more buttons in a toolbar, the text titles can appear to run together and users can find it difficult to distinguish between them. If button titles look too close in your toolbar, use `UIBarButtonSystemItemFixedSpace` to add the appropriate spacing between them. (To learn more about this constant, see [UIBarButtonItem Class Reference](#).)

Toolbar and Navigation Bar Buttons

iOS provides many of the standard toolbar and navigation

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bar buttons that are used in the built-in apps. To learn how to design custom bar icons, see [Bar Button Icons](#). Items in the toolbar and navigation bar can be tinted using the `tintColor` property.

To find out which symbol names to use to specify the buttons described in Table 41-1, see the documentation for `UIBarButtonSystemItem` in [UIBarButtonItem Class Reference](#).

IMPORTANT

As with all standard buttons and icons, it's essential that you base your usage of a button on its semantic meaning, not on its appearance. This will help your app's UI make sense even if the button associated with a specific meaning changes its appearance.

Table 41-1 Standard buttons available for toolbars and navigation bars

Button	Name	Meaning
	Action	Open a modal view that lists system-provided and app-provided actions that can work with the current content.

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	Camera	Open an action sheet that displays a photo picker in camera mode.
	Compose	Open a new message view in edit mode.
	Bookmarks	Show app-specific bookmarks.
	Search	Display a search field.
	Add	Create a new item.
	Trash	Delete current item.
	Organize	Move or route an item to a destination within the app, such as a folder.
	Reply	Send or route an item to another location.
	Refresh	Refresh contents (use only when necessary; otherwise, refresh automatically).
	Play	Begin media playback or slides.
	Fast Forward	Fast forward through media playback or slides.

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FORWARD	PLAYBACK OR SLIDES.
	Pause media playback or slides (note that this implies context preservation).
	Move backwards through media playback or slides.

In addition to the buttons shown in Table 41-1, you can also use the system-provided Edit, Cancel, Save, Done, Redo, and Undo buttons to support editing or other types of content manipulation in your app. The appearance of each of these buttons is provided by its text title. To find out which symbol names to use to specify these buttons, see the documentation for `UIBarButtonSystemItem` in [UIBarButtonItem Class Reference](#).

Finally, you can also use the system-provided Info button in a toolbar:



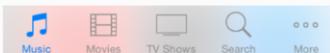
Tab Bar

A *tab bar* gives people the ability to switch between

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different subtasks, views, or modes in an app.



API NOTE

A tab bar is contained in a tab bar controller, which is an object that manages the display of a set of custom views. To learn more about defining a tab bar in your code, see [Tab Bar Controllers](#) and [UITabBar](#).

A tab bar:

- Is translucent
- Always appears at the bottom edge of the screen
- Displays no more than five tabs at one time in a horizontally compact environment (if there are more tabs, the tab bar displays four of them and adds the More tab, which reveals the additional tabs in a list)
- Maintains the same height in all orientations

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- Can display a badge on a tab to communicate app-specific information (a badge is a red oval containing white text and either a number or exclamation point)

Use a tab bar to give users access to different perspectives on the same set of data or different subtasks related to the overall function of your app.

In general, use a tab bar to organize information at the app level. A tab bar is well suited for use in the main app view because it's a good way to flatten your information hierarchy and provide access to several peer information categories or modes at one time.

Don't use a tab bar to give users controls that act on elements in the current screen or app mode. If you need to provide controls, including a control that displays a modal view, use a toolbar instead (for usage guidelines, see [Toolbar](#)).

Don't remove a tab when its function is unavailable. If you remove a tab in some cases but not in others, you make your app's UI unstable and unpredictable. The best solution is to ensure that all tabs are enabled, but explain why a tab's content is unavailable. For example, if the user doesn't have any songs on an iOS device, the Songs tab in the Music app displays a screen that explains how to download songs.

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Consider badging a tab bar icon to communicate unobtrusively. You can display a badge on a tab bar icon to indicate that there is new information associated with that view or mode.

In a horizontally regular environment, you might use a tab bar in a popover or the secondary pane of a split view controller. Do so if the tabs switch or filter the content within that view. However, it often works better to use a segmented control at the bottom edge of a popover or split view controller's pane, because the appearance of a segmented control coordinates better with the appearance of these UI elements. (For more information on using a segmented control, see [Segmented Control](#).)

Avoid crowding the tab bar with too many tabs. Putting too many tabs in a tab bar can make it physically difficult for people to tap the one they want. And with each additional tab you display, you increase the complexity of your app.

In a horizontally regular environment, avoid creating a More tab. In an app running in a horizontally regular environment, a screen devoted solely to a list of additional tabs is a poor use of space.

As much as possible, display the same tabs in every orientation. It's best when you can give users a sense of visual stability by providing the same tabs in every

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orientation. In a horizontally regular environment, you might need to center the same tabs that fill the space in a horizontally compact environment.

Tab Bar Icons

iOS provides the standard icons described in Table 41-2 for use in tab bars. To learn how to design custom tab bar icons, see [Bar Button Icons](#). Tab bar icons can be tinted using the `tintColor` property.

To find out which symbol names to use to specify these icons, see the documentation for `UITabBarSystemItem` in [UITabBarItem Class Reference](#).

IMPORTANT

As with all standard buttons and icons, it's essential that you base your usage of an icon on its semantic meaning, not its appearance. This will help your app's UI make sense even if the icon associated with a specific meaning changes its appearance.

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Table 41-2 Standard icons for use in the tabs of a tab bar

Icon	Name	Meaning
.Bookmarks	Bookmarks	Show app-specific bookmarks.
.Contacts	Contacts	Show contacts.
.Downloads	Downloads	Show downloads.
.Favorites	Favorites	Show user-determined favorites.
.Featured	Featured	Show content featured by the app.
.History	History	Show history of user actions.
...	More	Show additional tab bar items.
.MostRecent	Most Recent	Show the most recent item.
.MostViewed	Most Viewed	Show items most popular with all users.
.Recents	Recents	Show the items accessed by the user within an app-defined period.
.Search	Search	Enter a search mode.
.TopRated	Top Rated	Show the highest-rated items, as determined by the user.

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Search Bar

A *search bar* accepts text from users, which can be used as input for a search (shown here with placeholder text).



API NOTE

To learn how to define a search bar in your code, see `UISearchBar`. To learn more about displaying a search bar, see `UISearchDisplayController`.

A search bar can display optional elements, such as these:

- *Placeholder text.* This text might state the function of the control (for example, “Search” as shown above) or remind users in what context they are searching (for example, “Google”).
- *The Bookmarks button.* This button can provide a shortcut to information users want to easily find again. For example, the Bookmarks button in the Maps search mode gives access to bookmarked locations, recent searches, and

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contacts.



The Bookmarks button is visible only when there is no user-supplied or nonplaceholder text in the search bar. When the search bar contains such text, the Clear button appears so that users can erase the text.

- **The Clear button.** Most search bars include a Clear button that lets users erase the contents of the search bar with one tap.



When the search bar contains any nonplaceholder text, the Clear button is visible so users can erase the text. If there is no user-supplied or nonplaceholder text in the search bar, the Clear button is hidden.

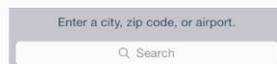
- **The results list icon.** This icon indicates the presence of search results. When users tap the results list icon, an app can display the results of their most recent search.

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- **A prompt.** A descriptive title, called a *prompt*, can be placed above the search bar. A prompt is a short, complete sentence that provides introductory or app-specific context for the search bar.



Use a search bar to enable search in your app. Don't use a text field to enable search because it doesn't have the standard search bar appearance that users expect.

In iOS 8 and later, using `UISearchController` makes it easy to put a search bar in a navigation bar. Note that when a search controller's view controller is contained within a navigation controller—as is the case in Mail—the search bar automatically transitions into the navigation bar when users initiate a search.

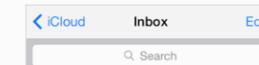
Choose a search bar style that complements the importance of search in your app. If search is a primary function in your app, you may want to use the prominent style; if users don't need to search very often, you may

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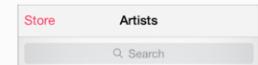
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want to use the minimal style.

The prominent search bar style (shown in Mail)



The minimal search bar style (shown in Music)



Scope Bar

A *scope bar*—which is available only in conjunction with a search bar—helps users define the scope of a search.



API NOTE

To learn more about defining a search bar and scope bar in your code, see `UISearchBar`.

When a search bar is present, a scope bar can appear near it. A scope bar adopts the same appearance that you specify for the search bar.

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It can be useful to display a scope bar when there are clearly defined or typical categories in which users might want to search. However, it's even better to improve search results so that users don't need to scope their search.

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Content Views

Activity

An *activity* represents a system-provided or custom task—accessible through an activity view controller—that can work with the current content.



API NOTE

To learn more about defining an activity in your code, see [UIActivity Class Reference](#); to learn how to incorporate an activity view controller into your app, see [Activity View Controller](#).

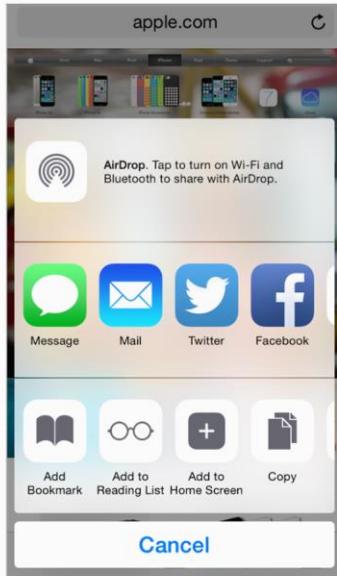
Action and Share extensions are also displayed in the activity view controller. To learn more about these extensions, see [Share and Action Extensions](#).

An *activity*:

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- Is a customizable object representing a task that an app can perform while users are in the app
- Is represented by an icon that looks similar to a bar button icon

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Users initiate an activity by tapping its icon in the activity view controller. In response, the activity either performs the task immediately, or if the task is complicated, it can request more information before performing the task.

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Use an activity to give users access to a custom service or task that your app can perform. Note that iOS provides several built-in activities and app extensions, such as Print, Twitter, Message, and AirPlay. You don't need to create a custom activity that performs a built-in task.

Create a streamlined template image that represents your task. A template image is an image that iOS uses as a mask to create the final icon that users see. To create a template image that looks good in the final icon, follow these guidelines:

- Use black or white with appropriate alpha transparency.
- Don't include a drop shadow.
- Use antialiasing.

An activity template image should be centered in an area that measures about 70 x 70 pixels (high resolution).

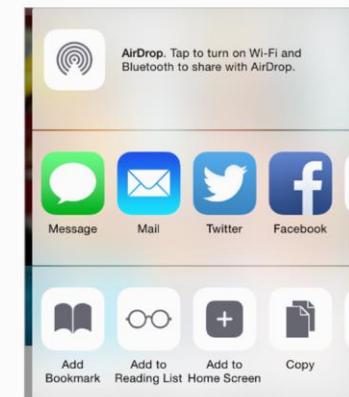
Craft an activity title that succinctly describes your task. The title is displayed below the activity's icon in the activity view controller. A short title is best, because it looks better onscreen and it's easier to localize. When a title is too long, iOS first shrinks the text and then—if the title is still too long—truncates it. In general, it's a good idea to avoid including your company or product name in the activity title.

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Activity View Controller

An *activity view controller* presents a transient view listing system-provided and custom tasks that can act on some specified content.



API NOTE

To learn more about defining an activity view controller in your code, see [UIActivityViewController Class Reference](#); to learn how to design an activity that provides a custom task, see [Activity](#).

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An activity view controller:

- Displays a configurable list of tasks that users can perform on the specified content
- Can appear in an action sheet or a popover, depending on the environment

Use an activity view controller to give people a list of tasks they can perform on content that is specified in some way. The tasks can be system-provided—such as Copy, Twitter, and Print—or custom. A common way to use an activity view controller is to allow users to post selected content to a social media account.

Don't create a custom button that reveals an activity view controller. People are accustomed to accessing system-provided tasks when they tap the Action button. You want to take advantage of this learned behavior and avoid confusing users by providing an alternative way to do the same thing.

Ensure that the listed tasks are appropriate in the current context. You can change the tasks listed in an activity view controller by specifying system-provided tasks to exclude and by identifying custom tasks to include. For example, to prevent users from printing an image, you exclude the Print activity from the activity view controller.

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NOTE

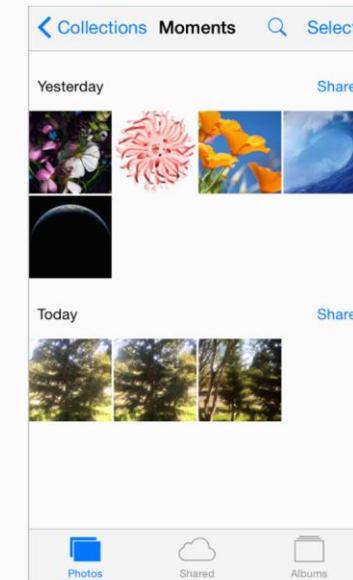
You can't change the order in which the system-provided tasks are listed in an activity view controller. Also, all system-provided tasks appear above any custom tasks.

Collection View

A *collection view* manages an ordered collection of items and presents them in a customizable layout.

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API NOTE

To learn more about defining a collection view in your code, see *Collection View Programming Guide for iOS*.

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A collection view:

- Can contain optional views that visually distinguish subsets of items or provide decorative items, such as custom backgrounds
- Supports custom animated transitions between layouts (by default, a collection view provides animations when users insert, move, or delete items)
- Supports the addition of gesture recognizers to perform custom actions. By default, a collection view recognizes tap (to select an item) and touch-and-hold (to edit an item).

Use a collection view to give users a way to view and manipulate a set of items that don't need to be displayed in a list. Because a collection view doesn't enforce a strictly linear layout, it's particularly well suited to display items that differ in size.

A collection view supports extensive customization, so it's essential to avoid becoming distracted by your ability to create radical new designs. You want a collection view to enhance the user's task; you don't want a collection view to become the focus of the user experience. The following guidelines can help you create collection views

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that people appreciate.

Don't use a collection view when a table view is a better choice. Sometimes it's easier for people to view and understand information when it's presented in a list. For example, it can be simpler and more efficient for people to view and interact with textual information when it's in a scrolling list.

Make it easy for people to select an item. If it's hard for users to tap an item in your collection view, they're less likely to enjoy using your app. As with all UI objects that users might want to tap, ensure that the minimum target area for each item in a collection view is 44 x 44 points.

Use caution if you make dynamic layout changes. A collection view allows you to change the layout of items while users are viewing and interacting with them. If you decide to dynamically adjust a collection view's layout, be sure that the change makes sense and is easy for users to track. Changing a collection view's layout without an obvious motivation can give people the impression that your app is unpredictable and hard to use. And if the current focus or context is lost during a dynamic layout change, users are likely to feel that they're no longer in control of your app.

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Container View Controller

A *container view controller* manages and presents its set of child views—or view controllers—in a custom way.

Examples of system-defined container view controllers are tab bar view controllers, navigation view controllers, and split view controllers (you can learn more about these elements in [Tab Bar](#), [Navigation Bar](#), and [Split View Controller](#)).

API NOTE

To learn more about defining a custom container view controller in your code, see [UIViewController Class Reference](#).

A container view controller has no predefined appearance or behavior.

Use a container view controller to present content through which users navigate in a custom way.

Ask yourself whether a custom container view controller is really necessary. Users are comfortable with the appearance and behavior of standard container view controllers, such as split view controllers and tab bar view controllers. You need to be sure that the potential advantages of your custom container view

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outweigh the fact that users won't recognize it or instantly know how it works.

Make sure that your custom container view controller works in both orientations. It's important to design a container view controller that gives users a consistent experience in both portrait and landscape.

In general, avoid flashy view transitions. When you use storyboards to design a custom view controller, it's easy to define custom animations for the transitions between content views. But in most cases, flamboyant view transitions distract people from their task and often decrease the aesthetic appeal of your app.

Image View

An *image view* displays one image or an animated series of images.

API NOTE

To learn more about defining an image view in your code, see `UIImageView`.

An image view:

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- Has no predefined appearance and it doesn't enable user interaction by default
- Examines properties of both the image and its parent view to determine whether the image should be stretched, scaled, sized to fit, or pinned to a specific location

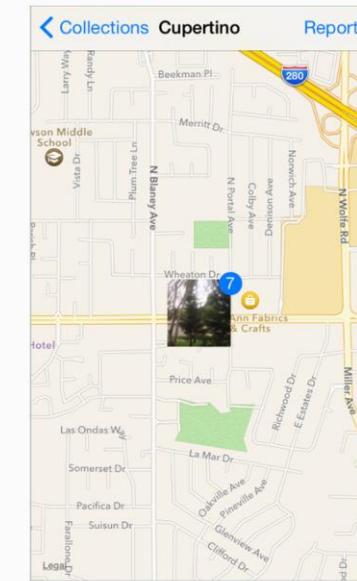
In iOS 7 and later, an image view that contains a template image applies the current tint color to the image.

As much as possible, ensure that all images in an image view have the same size and use the same scale. If your images have different sizes, the image view will adjust them separately; if your images use different scale factors, they may render incorrectly.

Map View

A *map view* presents geographical data and supports most of the functionality provided by the built-in Maps app (shown below in Photos).

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API NOTE

To learn more about defining a map view in your code, see *MapKit Framework Reference*.

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A map view:

- Displays a geographical area using standard map data, satellite imagery, or a combination of both
- Can display annotations (which mark single points) and overlays (which delineate paths or two-dimensional areas)
- Supports both programmatic and user-controlled zooming and panning

Use a map view to give users an interactive view of a geographical area. If you’re developing a routing app, use a map view to display the user’s route (for more information about creating a routing app, see [Routing](#)).

In general, let users interact with the map. People are accustomed to interacting with the built-in Maps app, and they expect to be able to interact with your map in similar ways.

Use the standard pin colors in a consistent way. A map pin shows the location of a point of interest in your map. People are familiar with the pin colors in the built-in Maps app, so it’s best to avoid redefining the meaning of these colors in your app. When you use the standard pin colors, be sure to use them in the following ways:

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- Use red for a destination point
- Use green for a starting point
- Use purple for a user-specified point

Page View Controller

A *page view controller* uses one of two styles to manage transitions through multipage content—scrolling or page-curl. Here’s how a page curl looks in iOS Simulator:

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API NOTE

To learn more about defining a page view controller in your code, see [Page View Controllers](#).

A page view controller:

- Has no default appearance for the scrolling style
For the page curl style, a page view controller can add the appearance of the inside of a book spine between pairs of pages
- Animates the transition from one page to another, according to the specified style
For the scrolling style, the current page scrolls to the next page; for the page curl style, the current page appears to turn like a page in a book or a notepad.

Use a page view controller to present content that users access in a linear fashion (such as the text of a story) or content that naturally breaks into chunks (such as a calendar).

If necessary, create a custom way to let users access content in a nonlinear way. A page view controller lets users move from one page to the next or previous page; it

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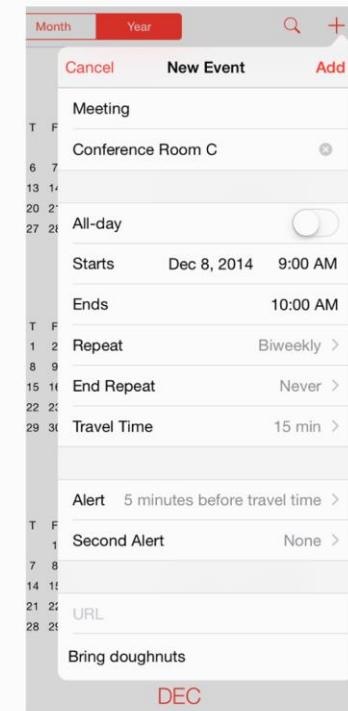
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doesn't give users a way to jump among nonadjoining pages. If you want to use a page view controller to present content that users might access in a nonlinear fashion—such as a dictionary or a book's table of contents—you must implement a custom way to let users move to different areas of the content.

Popover

A *popover* is a transient view that can be revealed when people tap a control or tap in an onscreen area.

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API NOTE

In iOS 8 and later, you use a

`UIPopoverPresentationController` to present a popover. `UIPopoverPresentationController` defines a delegate that lets you adjust the display style of your popover content to suit the current display environment. For example, in a horizontally regular environment, your content can display inside a popover; in a horizontally compact environment, your content can display in a full-screen modal view.

A popover:

- Is a self-contained modal view
- In a horizontally regular environment, displays an arrow that indicates the point from which it emerged
- Has a translucent background that blurs content behind it
- Can contain a wide variety of objects and views, such as:
 - Table, image, map, text, web, or custom views
 - Navigation bars, toolbars, or tab bars

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- Controls or objects that act upon objects in the current app view

(By default, table views, navigation bars, and toolbars in a popover use a transparent background to let the popover's blurring show through.)

In a horizontally regular environment, an action sheet always appears inside a popover.

Use a popover to display additional information or a list of items related to the focused or selected object.

NOTE

The guidelines in this section cover the UI and user experience of a popover that is displayed in a horizontally regular environment. If you're presenting a popover in a horizontally compact environment where it's displayed full screen, see [Modal View](#) for guidelines that apply to other full-screen modal views.

Avoid providing a “dismiss popover” button. A popover should close automatically when its presence is no longer necessary. To determine when a popover's presence is no longer necessary, consider the following

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scenarios:

If a popover...	Do this...
Provides options that affect the main view, but doesn't implement an inspector	Close the popover as soon as people make a choice or when they tap anywhere outside its bounds, including the control that reveals the popover.
Implements an inspector	Close the popover when people tap anywhere outside its bounds, including the control that reveals the popover. In this scenario, don't close the popover as soon as people make a choice, because they might want to make an additional choice or change the attributes of the current choice.
	Close the popover when people complete or cancel the task by tapping a

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Enables a task

button in the popover, such as Done or Cancel.

In this scenario, you may not want to close the popover when people tap outside its borders, because it might be important that people finish—or explicitly abandon—the task. Otherwise, save people's input when they tap outside a popover's borders, just as you would if they tapped Done.

In general, save users' work when they tap outside a popover's borders. Not every popover requires an explicit dismissal, so people might dismiss them mistakenly. Discard the work people do in a popover only if they tap a Cancel button.

Make the popover arrow point as directly as possible to the element that revealed it. Doing this helps people remember where the popover came from and what task or object it's associated with.

Make sure people can use a popover without seeing

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the app content behind it. A popover obscures the content behind it, and people can't drag a popover to another location.

Ensure that only one popover is visible onscreen at a time. You shouldn't display more than one popover (or custom view designed to look and behave like a popover) at the same time. In particular, you should avoid displaying a cascade or hierarchy of popovers simultaneously, in which one popover emerges from another.

Don't display a modal view on top of a popover. Except for an alert, nothing should be displayed on top of a popover.

When possible, allow people to close one popover and open a new one with one tap. This behavior is especially desirable when several different bar buttons each open a popover, because it prevents people from having to make extra taps.

Avoid making a popover too big. A popover shouldn't appear to take over the entire screen. Instead, it should be just big enough to display its contents and still point to the place it came from. The height of a popover is not constrained, so you can use it to display a long list of items. In general, though, you should try to avoid scrolling in a popover that enables a task. Note that the system might adjust both the height and the width of a

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popover to ensure that it fits well on the screen.

Use standard UI controls and views within a popover. In general, popovers look best, and are easier for users to understand, when they contain standard controls and views.

Make sure a custom popover still looks like a popover. Although it's easy to customize many of the visual aspects of a popover by using the `UIPopoverBackgroundView` APIs, avoid creating a design that people might not recognize as a popover. If you change the appearance of a popover too much, users can't rely on their prior experience to help them understand how to use it in your app.

Be cautious if you change a popover's size while it remains visible. You might want to change a popover's size if you use it to display both a minimal and an expanded view of the same information. When you adjust the size of a visible popover, it's usually a good idea to animate the change because it avoids giving the impression that a new popover has replaced the old one.

ScrollView

A *scroll view* helps people see content that is larger than the scroll view's boundaries (the image shown below is both taller and wider than the scroll view that contains

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iOS Human Interface Guidelines

it).



API NOTE

To learn more about defining a scroll view in your code, see `UIScrollView`.

A scroll view:

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- Has no predefined appearance
 - Flashes transient scroll indicators when it first appears or when users interact with it
 - Responds to the speed and direction of gestures to reveal content in a way that feels natural to people
- When users drag content in a scroll view, the content follows the touch; when users flick content, the scroll view reveals the content quickly and stops scrolling when the user touches the screen or when the end of the content is reached.
- Can operate in paging mode, in which each drag or flick gesture reveals one app-defined page of content

Use a scroll view to give people access to large views—or to large numbers of views—in a constrained space.

Support zoom behavior appropriately. If it makes sense in your app, let users pinch or double-tap to zoom into and out of a scroll view. When you enable zoom, you should also set maximum and minimum scale values that make sense in the context of the user’s task. For example, letting users zoom in on text until one character fills the screen is unlikely to make it easier for them to read the content.

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Consider using a page control with a paging-mode scroll view. When you want to display content that’s divided into pages, screenfuls, or other chunks, you can use a page control to show users how many chunks are available and which one they’re currently viewing.

When you use a page control with a paging-mode scroll view, it’s a good idea to disable the scroll indicator that’s on the same axis as the page control. Removing the scroll indicator focuses attention on the page control and gives people one unambiguous way to page through the content. For more information about using a page control in your app, see [Page Control](#).

In general, display only one scroll view at a time.

People often make large swipe gestures when they scroll, so it can be difficult for them to avoid interacting with a neighboring scroll view on the same screen. If you decide to put two scroll views on one screen, consider allowing them to scroll in different directions so that one gesture is less likely to scroll both views. For example, Stocks in portrait orientation on iPhone displays stock quotes in a vertically scrolling view above company-specific information, which is in a horizontally scrolling view.

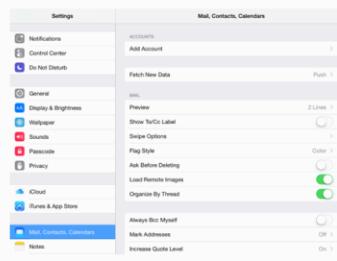
Split View Controller

A *split view controller* is a full-screen view controller that

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manages the presentation of two child view controllers.



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API NOTE

Each child view controller of a split view controller is responsible for managing the display of one pane. The split view controller itself presents these child view controllers and manages transitions between different orientations. To learn more about defining a split view controller in your code, see [UISplitViewController Class Reference](#) and Split View Controllers.

In iOS 7 and earlier, split view controller was available only on iPad.

By default, a split view controller uses the current size class to decide how to arrange its child view controllers. For example, a split view controller:

- Tries to display both panes side-by-side in a horizontally regular environment
- Can display the primary pane layered on top of the secondary pane, or can hide the primary pane offscreen until it's needed, typically in a horizontally compact environment

You can influence the arrangement of panes by asking the split view controller to pay attention to a preferred layout that you specify for a particular display environment.

A split view controller can contain a wide variety of

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objects and views, such as:

- Table, image, map, text, web, or custom views
- Navigation bars, toolbars, or tab bars

NOTE

Even though the primary pane is often called the *master pane* and the secondary pane is often called the *detail pane*, this relationship is not enforced in code.

Use a split view controller to display persistent information in the primary pane and related details or subordinate information in the secondary pane. In this design pattern, when people select an item in the primary pane, the secondary pane should display the information related to that item. (You're responsible for making this happen in code.)

Avoid creating a secondary pane that is narrower than the primary pane. If the secondary pane is narrower than the primary pane, the split view controller no longer fills the width of the screen and the overall appearance is unbalanced.

Avoid displaying a navigation bar in both panes at the same time. Doing this would make it very difficult

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for users to discern the relationship between the two panes.

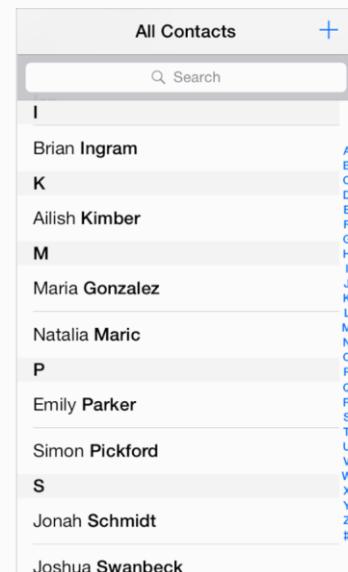
In general, indicate the current selection in the primary pane in a persistent way. Even though the content of the secondary pane can change, it should always remain related to the item selected in the primary pane. This viewing experience helps people understand the relationship between the item in the primary pane and the contents of the secondary pane.

Give people alternative ways to access the primary pane, if appropriate. By default, only the secondary pane is displayed in a horizontally compact environment and you provide users with a button (typically located in a navigation bar) to reveal and hide the primary pane. The split view controller also supports the swipe gesture to perform the reveal/hide action. Unless your app uses the swipe gesture to perform other functions, you should let people swipe to access the primary pane.

Table View

A *table view* presents data in a scrolling single-column list of multiple rows.

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A table view:

- Displays data in rows that can be divided by section or separated into groups
- Provides controls that let users add or remove rows, select multiple rows, see more information about a row item, or reveal another table view

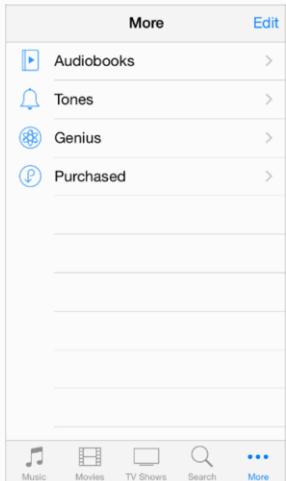
iOS defines two styles of table view:

Plain. In the plain style, rows can be separated into labeled sections and an optional index can appear vertically along the right edge of the view. A header can appear before the first item in a section, and a footer can appear after the last item.

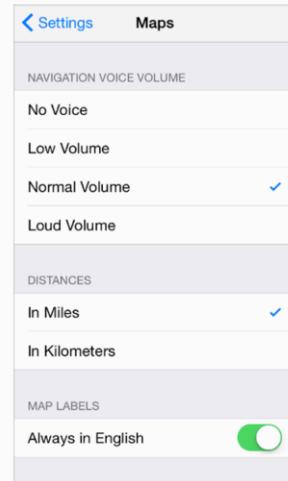
API NOTE

To learn more about defining a table view in your code, see *Table View Programming Guide for iOS* and `UITableView`.

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highlighted briefly to remind the user of the earlier selection (it doesn't remain highlighted).

iOS includes some *table view elements* that can extend the functionality of table views. Unless noted otherwise, these elements are suitable for use with table views only.

Grouped. In the grouped style, rows are displayed in groups, which can be preceded by a header and followed by a footer. A grouped table view always contains at least one group of list items—one list item per row—and each group always contains at least one item. A grouped table view doesn't include an index.

In both styles, a table row becomes highlighted briefly when a user taps a selectable item. If a row selection results in navigation to a new screen, the selected row becomes highlighted briefly as the new screen slides into place. When the user navigates back to the previous screen, the originally selected row again becomes

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Table view element	Name	Meaning
✓	Checkmark	Indicates that the row is selected.
>	Disclosure indicator	Displays another table associated with the row.
ⓘ	Detail Disclosure button	Displays additional details about the row in a new view (for information on how to use this element outside of a table, see Popover).
≡	Row reorder	Indicates that the row can be dragged to another location in the table.
+	Row insert	Adds a new row to the table.
–	Delete button control	In an editing context, reveals and hides the Delete button for a row.
Delete	Delete button	Deletes the row.

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iOS Human Interface Guidelines

In addition to the table-specific elements listed above, iOS defines the refresh control, which gives users the ability to refresh a table's contents. To learn more about using a refresh control with a table in your app, see [Refresh Control](#).

iOS defines four table cell styles that implement the most common layouts for table rows in both plain and grouped tables. Each cell style is best suited to display a different type of information.

NOTE

Programmatically, these styles are applied to a table view's cell, which is an object that tells the table how to draw its rows.

Default Cell Style	
	Text Label Detail text label
	Dahlia This is a dahlia
	Daisies These are daisies
	Dandelion This is a dandelion
	Echinacea This is echinacea
	Lavender

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Default (`UITableViewCellStyleDefault`). The default cell style includes an optional image in the left end of the row, followed by a left-aligned title.

The default style is good for displaying a list of items that don't need to be differentiated by supplementary information.

Subtitle (`UITableViewCellStyleSubtitle`). The subtitle style includes an optional image in the left end of the row, followed by a left-aligned title on one line and a left-aligned subtitle on the line below.

The left alignment of the text labels makes the list easy to scan. This table cell style works well when list items look similar, because users can use the additional information in the detail text labels to help distinguish items named in the text labels.

Subtitle Cell Style	
	Text Label Detail text label
	Dahlia This is a dahlia
	Daisies These are daisies
	Dandelion This is a dandelion
	Echinacea This is echinacea
	Lavender

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Value 1 Cell Style	
	Text Label Detail text label
	Dahlia This is a dahlia
	Daisies These are daisies
	Dandelion This is a dandelion
	Echinacea This is echinacea
	Lavender This is a field of lav...

Value 1 (`UITableViewCellStyleValue1`). The value 1 style displays a left-aligned title with, on the same line, a right-aligned subtitle in a lighter font.

Value 2 (`UITableViewCellStyleValue2`). The value 2 style displays a right-aligned title in a blue font, followed on the same line by a left-aligned subtitle in a black font. Images don't fit well in this style.

In the value 2 layout, the crisp vertical margin between the text and the detail text helps users focus on the first words of the detail text label.

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Value 2 Cell Style	
	Text Label Detail text label
	Dahlia This is a dahlia
	Daisies These are daisies
	Dandelion This is a dandelion
	Echinacea This is echinacea
	Lavender This is a field of lav...

NOTE

All four standard table-cell styles allow the addition of table view elements, such as a checkmark or disclosure indicator. Adding these elements decreases the width of the cell available for the title and subtitle.

Use a table view to display large or small amounts of information cleanly and efficiently. For example:

- **Provide a list of options from which users can select.** You can use the checkmark to show users the currently selected options in the list.

Use either a plain or a grouped table view to display a list of choices that appears when

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users tap an item in a table row. Use a plain table view to display a list of choices that appears when users tap a button or other UI element that is *not* in a table row.

- **Display hierarchical information.** The plain table style is well suited for displaying a hierarchy of information. Each list item can lead to a different subset of information displayed in another list. Users follow a path through the hierarchy by selecting one item in each successive list. The disclosure indicator tells users that tapping anywhere in the row reveals the subset of information in a new list.
- **Display conceptually grouped information.** Both table view styles allow you to provide context by supplying header and footer views between sections of information.

You can also use a header-footer view—that is, an instance of `UITableViewHeaderFooterView`—to display text or a custom view in a header or footer. To learn how to use a header-footer view in your code, see [UITableViewHeaderFooterView Class Reference](#).

Follow these guidelines when you use table views:

Always provide feedback when users select a list item. Users expect a table row to become highlighted

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briefly when they tap a selectable item in it. After tapping, users expect a new view to appear (or the row to display a checkmark) to indicate that the item has been selected or enabled.

If table content is extensive or complex, avoid waiting until all the data is available before displaying anything. Instead, fill the onscreen rows with textual data immediately and display more complex data—such as images—as they become available. This technique gives users useful information right away and increases the perceived responsiveness of your app.

Consider displaying “stale” data while waiting for new data to arrive. Although this technique isn’t recommended for apps that handle frequently changing data, it can help more static apps give users something useful right away. Before you decide to do this, gauge how often the data changes and how much users depend on seeing fresh data quickly.

If the data is slow loading or complex, show users that processing is continuing. If a table contains only complex data, it may be difficult to display anything useful right away. In these rare cases, it’s important to avoid displaying empty rows, because empty rows can imply that your app has stalled. Instead, the table should display a spinning activity indicator, along with an informative label (such as “Loading...”) centered in the screen. This behavior reassures users that processing is

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continuing.

If appropriate, use a custom title for the Delete button. If it helps users to better understand the way your app works, you can create a title to replace the system-provided Delete title.

As much as possible, use succinct text labels to avoid truncation. Truncated words and phrases can be difficult for users to scan and understand. Text truncation is automatic in all table cell styles, but it can present more or less of a problem, depending on which cell style you use and on where truncation occurs.

Avoid combining an index with table view elements that are displayed on the right edge of the table. Table view elements that are displayed on the right edge of the table—such as the disclosure indicator—interfere with the index.

Create a custom table cell style if you want to lay out your table rows in a nonstandard way. It’s better to create a custom table cell style than to significantly alter a standard one. To learn how to create your own cells, see Customizing Cells.

Text View

A *text view* accepts and displays multiple lines of

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attributed text.

UICatalog Text View

This is a text view that uses attributed text. You can use text attributes such as **bold**, **highlighted**, **underlined**, and **tinted**.

API NOTE

To learn more about defining a text view in your code, see `UITextView`.

A text view:

- Is a rectangle of any height
- Supports scrolling when the content is too large to fit inside its bounds
- Supports custom fonts, colors, and alignments (by default, a text view displays left-aligned system font in black)
- Can support editing, in which case a keyboard appears when the user taps inside the text view (the keyboard’s input method and layout are determined by the user’s language)

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settings)

Always make sure the text is easy to read. Although you can use attributed strings to combine multiple fonts, colors, and alignments in creative ways, it's essential to maintain the readability of the text. It's a good idea to support Dynamic Type and use the `UIFont` method `preferredFontForTextStyle` to get the text for display in a text view. For some guidelines on supporting Dynamic Type, see [Text Should Always Be Legible](#); for programmatic information, see [Text Styles](#).

Specify different keyboard types to accommodate different types of content you expect users to enter. For example, you might want to make it easy for users to enter a URL, a PIN, or a phone number. Note, however, that you have no control over the keyboard's input method and layout, which are determined by the user's language settings.

iOS provides several keyboard types, each designed to facilitate a different type of input. To learn about the keyboard types that are available, see the documentation for `UIKeyboardType`. To learn more about managing the keyboard in your app, read [Managing the Keyboard](#).

Web View

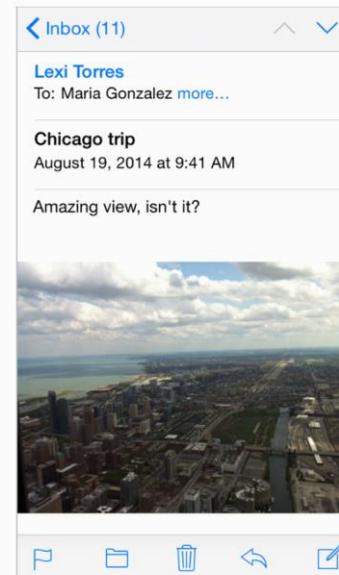
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A *web view* is a region that can display rich HTML content (shown here between the navigation bar and toolbar in Mail on iPhone).



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API NOTE

To learn more about defining a web view in your code, see [UIWebView](#).

A web view:

- Displays web content
- Performs some automatic processing on web content, such as converting a phone number to a phone link

If you have a webpage or web app, you might decide to use a web view to implement a simple iOS app that provides a wrapper for your webpage or web app. If you plan to use a web view to access web content that you control, be sure to read [Safari Web Content Guide](#).

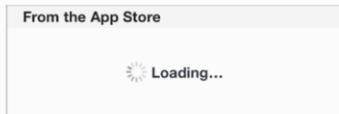
Avoid using a web view to create an app that looks and behaves like a mini web browser. People expect to use Safari on iOS to browse web content, so replicating this broad functionality within your app is not recommended.

iOS Human Interface Guidelines

Controls

Activity Indicator

An *activity indicator* shows that a task or process is progressing (shown here with text labels).



API NOTE

To learn how to define an activity indicator in your code, see [UIActivityIndicatorView Class Reference](#).

An activity indicator:

- Spins while a task is progressing and disappears when the task completes
- Doesn't allow user interaction

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Use an activity indicator in a toolbar or a main view to show that processing is occurring, without suggesting when it will finish.

Don't display a stationary activity indicator. Users associate a stationary activity indicator with a stalled process.

Use an activity indicator to reassure users that their task or process hasn't stalled. Sometimes it's more important to simply reassure users than to suggest when processing will finish.

Customize an activity indicator to harmonize with the view it's in. If appropriate, coordinate the size and color of an activity indicator with the background of the view it's in.



Contact Add Button

A *Contact Add* button lets the user add an existing contact to a text field or other text-based view.

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API NOTE

To learn how to define a Contact Add button in your code, see [UIButton](#).

A Contact Add button:

- Displays a list of the user's contacts
- Helps users add a contact to the view that contains the Contact Add button

Use a Contact Add button to give users an easy way to access a contact without using the keyboard. For example, users can tap the Contact Add button in the To field of the Mail compose view instead of typing a recipient's name.

Because the Contact Add button functions as an alternative to typing contact information, it's not appropriate to use the button in a view that doesn't accept keyboard input.

Date Picker

A *date picker* displays components of date and time, such as hours, minutes, days, and years.

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Mon Sep 2	6	57
Tue Sep 3	7	58
Wed Sep 4	8	59
Today	9	00 AM
Fri Sep 6	10	01 PM
Sat Sep 7	11	02
Sun Sep 8	12	03

API NOTE

To learn how to define a date picker in your code, see `UIDatePicker`.

A date picker:

- Displays up to four independent wheels, each of which displays values in a single category, such as month or hour
- Uses dark text to display the current value in the middle of the view
- Can't be resized (the size of a date picker is the same size as the iPhone keyboard)
- Has four modes, each of which displays wheels containing a set of different values:
 - **Date and time.** The date and time

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mode (the default mode) displays wheels for the calendar date, hour, and minute values, and an optional wheel for the AM/PM designation.

- **Time.** The time mode displays wheels for the hour and minute values, and an optional wheel for the AM/PM designation.
- **Date.** The date mode displays wheels for the month, day, and year values.
- **Countdown timer.** The countdown timer mode displays wheels for the hour and minute. You can specify the total duration of a countdown, up to a maximum of 23 hours and 59 minutes.

Use a date picker to let users pick—instead of type—a date or time value that consists of multiple parts, such as the day, month, and year.

As much as possible, display a date picker inline with the content. It's best when users can avoid navigating to a different view to use a date picker. In a horizontally regular environment, a date picker can appear within a popover or inline with content.

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If it makes sense in your app, change the interval in the minutes wheel. By default, a minutes wheel displays 60 values (0 to 59). If you need to display a coarser granularity of choices, you can set a minutes wheel to display a larger minute interval, as long as the interval divides evenly into 60. For example, you might want to display the quarter-hour intervals 0, 15, 30, and 45.

Detail Disclosure Button

A *Detail Disclosure button* reveals additional details or functionality related to an item.



API NOTE

To learn how to define a Detail Disclosure button in your code, see `UITableViewCell Class Reference` and `UIButton`.

A Detail Disclosure button reveals a separate view that contains additional information or functionality related to a specific item.

When a Detail Disclosure button appears in a table row,

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tapping elsewhere in the row doesn't activate the Detail Disclosure button; instead, it selects the row item or results in app-defined behavior.

Typically, you use a Detail Disclosure button in a table view to give users a way to see more details or functionality related to a list item. However, you can also use this element in other types of views to give users a way to see more information or functionality related to an item in that view.

Info Button

An *Info button* reveals configuration details about an app, sometimes on the back of the current view.



API NOTE

To learn more about defining an Info button in your code, see `UIButton`.

iOS includes two styles of Info button: a dark-colored button that looks good on light content and a light-

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iOS Human Interface Guidelines

colored button that looks good on dark content.

Use an Info button to reveal configuration details or options about an app. You can use the style of Info button that coordinates best with the UI of your app.

Label

A *label* displays static text.

iCloud Photo Sharing

Share photos and videos with just the people you choose, and let them add photos, videos, and comments.

API NOTE

To learn more about defining labels in your code, see `UILabel Class Reference`.

A label:

- Displays any amount of static text
- Doesn't allow user interaction except, potentially, to copy the text

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Use a label to name or describe parts of your UI or to provide short messages to the user. A label is best suited for displaying a relatively small amount of text.

Take care to make your labels legible. It's best to support Dynamic Type and use the `UIFont` method `preferredFontForTextStyle` to get the text for display in a label. If you choose to use custom fonts, don't sacrifice clarity for fancy lettering or showy colors. (For guidelines about using text in an app, see [Color and Typography](#); to learn more about Dynamic Type, see [Text Styles](#).)

Network Activity Indicator

A *network activity indicator* appears in the status bar and shows that network activity is occurring.



API NOTE

In your code, use the `UIApplication` method `networkActivityIndicatorVisible` to control the indicator's visibility.

The network activity indicator:

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- Spins in the status bar while network activity proceeds and disappears when network activity stops
- Doesn't allow user interaction

Display the network activity indicator to provide feedback when your app accesses the network for more than a couple of seconds. If the operation finishes sooner than that, you don't have to show the network activity indicator, because the indicator is likely to disappear before users notice its presence.

Page Control

A *page control* indicates the number of open views and which one is currently visible (shown here in Weather).



API NOTE

To learn more about defining a page control in your code, see [UIPageControl](#).

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A page control:

- Displays an indicator dot for each open view in an app (from left to right, the dots represent the order in which the views were opened)
- By default, uses an opaque dot to represent the currently visible view and translucent dots to represent all other open views
- Doesn't allow users to visit views nonsequentially
- Doesn't shrink or squeeze together dots as more views are opened (if you try to display more dots than will fit in the view, the dots are clipped)
- Doesn't enable navigation between views by default; you must implement view-to-view navigation and update the page control's state appropriately

Use a page control when it's more important to show users how many views are open than it is to help them choose a specific view. A page control is designed for apps in which each view is a peer of every other view.

Don't use a page control to display views in a hierarchy or other complex arrangement. A page control doesn't show how views are related to each other and it doesn't indicate which view corresponds to each

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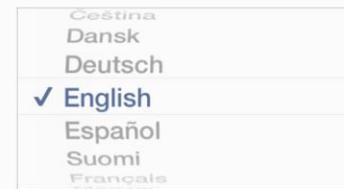
dot, so it can't help users navigate to a specific view.

Avoid displaying too many dots. More than about 10 dots are hard for users to count at a glance and more than about 20 open views are time consuming to visit in sequence. If users can open more than about 20 peer views in your app, consider displaying the views in a different arrangement that provides more information about the views and enables nonsequential navigation.

Vertically center a page control between an open view's bottom edge and the screen's bottom edge. In this position, a page control is always visible without getting in users' way.

Picker

A *picker* displays a set of values from which a user picks one.



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API NOTE

To learn more about defining a picker in your code, see [UIPickerView Class Reference](#).

A picker:

- Is a generic version of the date picker (for more information about the date picker, see [Date Picker](#))
- Displays one or more wheels, each of which contains a list of values
- Uses dark text to display the current value in the middle of the view
- Can't be resized (the size of a picker is the same size as the iPhone keyboard)

Use a picker to make it easy for people to choose from a set of values.

In general, use a picker when users are familiar with the entire set of values. Because many of the values are hidden when the wheel is stationary, it's best when users can predict what the values are. If you need to provide a large set of choices that aren't well known to your users, a picker might not be the appropriate control.

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As much as possible, display a picker inline with the content. It's best when users can avoid navigating to a different view to use a picker.

Consider using a table view, instead of a picker, if you need to display a very large number of values. This is because the greater height of a table view makes scrolling faster.

Progress View

A *progress view* shows the progress of a task or process that has a known duration (shown here with the Mail toolbar).



API NOTE

To learn more about defining a progress view in your code, see [UIProgressView Class Reference](#).

A progress view:

- Consists of a track that fills from left to right

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as the task or process proceeds

- Doesn't allow user interaction

iOS defines two styles of progress view:

- **Default.** The default style includes an unfilled track appearance so that it can stand alone in a content area.
-

- **Bar.** The bar style doesn't include the unfilled track appearance because it's intended to display with a bar, such as a navigation bar or a toolbar.
-

Use a progress view to give feedback on a task that has a well-defined duration, especially when it's important to indicate approximately how long the task will take.

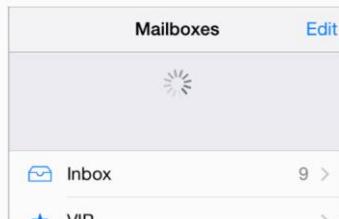
If appropriate, coordinate the appearance of a progress view with the style of your app. By customizing a progress view, you can specify, for example, a custom tint or image for both the track and the fill of a progress view.

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Refresh Control

A *refresh control* performs a user-initiated content refresh—typically in a table (shown here above the mailbox list).



API NOTE

To learn more about defining a refresh control in your code, see [UIRefreshControl Class Reference](#).

A refresh control:

- Looks similar to an activity indicator
- Can display a title
- Is hidden by default until the user initiates a refresh action by dragging down from the top edge of a table

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iOS Human Interface Guidelines

Use a refresh control to give users a consistent way to tell a table or other view to update its contents immediately, without waiting for the next automatic update.

Don't stop performing automatic content updates just because you provide a refresh control. Even though users appreciate being able to request that an update be performed *now*, they still appreciate content that refreshes itself automatically. If you rely on users to initiate all refreshes, users who are unaware of the refresh control are likely to wonder why your app displays stale data. In general, you want to give users the option to refresh contents immediately; you don't want to make users responsible for every update.

Supply a short title only if it adds value. In particular, don't use the title to describe how to use the refresh control.

Rounded Rectangle Button

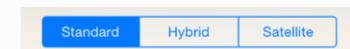
The rounded rectangle button is deprecated in iOS 7 and later. Instead, use the system button—that is, a `UIButton` of type `UIButtonTypeSystem`. For guidelines, see [System Button](#).

Segmented Control

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A *segmented control* is a linear set of segments, each of which functions as a button that can display a different view.



API NOTE

To learn more about defining a segmented control in your code, see [UISegmentedControl](#).

A segmented control:

- Consists of two or more segments whose widths are proportional, based on the total number of segments
- Can display text or images

Use a segmented control to offer choices that are closely related but mutually exclusive.

Make sure that each segment is easy to tap. To maintain a comfortable hit region of 44 x 44 points for each segment, limit the number of segments. On iPhone, a segmented control should have five or fewer segments.

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iOS Human Interface Guidelines

As much as possible, make the size of each segment's contents consistent. Because all segments in a segmented control have equal width, it doesn't look good if the content fills some segments, but not others.

Avoid mixing text and images in a single segmented control. A segmented control can contain text or images. An individual segment can contain either text or an image, but not both. In general, it's best to avoid putting text in some segments and images in other segments of a single segmented control.

If necessary, adjust the positioning of content in a customized segmented control. If you customize the background appearance of a segmented control, make sure that the automatic centering of the control's content still looks good. Use the bar metrics APIs to adjust the positioning of the content inside a segmented control (to learn more about specifying bar metrics, see the appearance-customization APIs described in `UISegmentedControl`).

Slider

A *slider* allows users to make adjustments to a value or process throughout a range of allowed values (shown here with custom images on the left and the right).

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API NOTE

To learn more about defining a slider in your code, see [UISlider](#).

A slider:

- Consists of a horizontal track and a thumb (a circular control that users can slide)
- Can include optional images that convey the meaning of the left and right values
- Fills the portion of the track between the minimum value (typically on the left) and the thumb

Use a slider to give users fine-grained control over values they can choose or over the operation of the current process.

If it adds value, create custom appearances for a slider. For example, you can:

- Define the appearance of the thumb, so that users can see at a glance whether the slider is

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active

- Supply images to appear at both ends of the slider to help users understand what the slider does

Typically, these custom images correspond to the minimum and maximum values of the value range that the slider controls. A slider that controls image size, for example, could display a very small image at the minimum end and a very large image at the maximum end.

- Define a different appearance for the track, depending on which side of the thumb it is on and which state the control is in

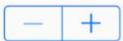
Don't use a slider to display a volume control. If you need to display a volume slider, use the system provided volume slider available when you use the `MPVolumeView` class. Note that when the currently active audio output device doesn't support volume control, the volume slider is replaced by the appropriate device name.

Stepper

A *stepper* increases or decreases a value by a constant amount.

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API NOTE

To learn more about defining a stepper in your code, see [UISlider](#).

A stepper:

- Is a two-segment control in which one segment displays a plus symbol and the other segment displays a minus symbol by default
- Supports custom images
- Doesn't display the value that the user changes

Use a stepper when users might need to make small adjustments to a value.

Avoid using a stepper when users are likely to make large changes to a value. It makes sense to use a stepper to set the number of copies in the Printer Options action sheet, because users rarely change this value by very much. On the other hand, it wouldn't make sense to use a stepper to help users choose a page range, because even a reasonable page range would require a lot of taps.

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iOS Human Interface Guidelines

Make it obvious which value the stepper affects. A stepper doesn't display any values, so you need to make sure that users know which value they're changing when they use a stepper.

Switch

A *switch* presents two mutually exclusive choices or states.

On



Off



API NOTE

To learn more about defining a switch in your code, see [UISwitch](#).

A switch:

- Indicates the binary state of an item
- Is used in table views only

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iOS Human Interface Guidelines

Use a switch in a table row to give users a way to specify one of two options, such as yes/no or on/off, that govern the state of an item.

You can use a switch control to change the state of other UI elements in the view. Depending on the choice users make, new list items might appear or disappear, or list items might become active or inactive.

System Button

A system button performs an app-specific action.

Button

API NOTE

In iOS 7, `UIButtonTypeRoundedRect` was redefined as `UIButtonTypeSystem`. To learn more about defining a system button in your code, see [UIButton](#).

A system button:

- Has no border or background appearance by default

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iOS Human Interface Guidelines

- Can contain an icon or a text title
- Supports custom decoration, such as a border or background image (to add a custom appearance, use a button of type `UIButtonTypeCustom` and supply a custom background image)

Use a system button to initiate an action. When you supply a title for a system button, follow this approach:

- **Use a verb or verb phrase to describe the action the button performs.** An action-specific title shows users that the button is interactive and tells them what will happen when they tap it.
- **Use title-style capitalization.** Capitalize every word except articles, coordinating conjunctions, and prepositions of four or fewer letters.
- **Avoid creating a title that is too long.** Overly long text gets truncated, which can make it difficult for users to understand it.

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iOS Human Interface Guidelines



If appropriate, add a border or background appearance to a system button in a content region. Most of the time, you can avoid adding ornamentation to a button by crafting a clear call-to-action title, defining a tint, and providing contextual clues. In some content areas, however, it can be appropriate to focus attention on a button by adding a border or background appearance.

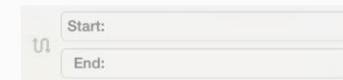
In Phone, for example, the bordered number keys reinforce the mental model of making a call and the background of the Call button gives users an eye-catching target that's easy to hit.

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Text Field

A *text field* accepts a single line of user input (shown here with a purpose description and placeholder text).



API NOTE

To learn more about defining a text field and customizing it to display images and buttons, see `UITextField`.

A text field:

- Is a fixed-height field with rounded corners
- Automatically displays a keyboard when users tap within it
- Can include system provided buttons, such as the Bookmarks button
- Can display text that uses multiple styles (to learn more about this, see `UITextView`)

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iOS Human Interface Guidelines

Use a text field to get a small amount of information from the user.

Customize a text field if it helps users understand how they should use it. For example, you can display custom images in the left or right sides of the text field, or you can add a system-provided button, such as the Bookmarks button. In general, you should use the left end of a text field to indicate its purpose and the right end to indicate the presence of additional features, such as bookmarks.

Display the Clear button in the right end of a text field when appropriate. When this element is present, tapping it clears the contents of the text field, regardless of any other image you might display over it.

Display a hint in the text field if it helps users understand its purpose. A text field can display placeholder text—such as Name (or Address)—when there is no other text in the field.

Specify a keyboard type that's appropriate for the type of content you expect users to enter. For example, you might want to make it easy for users to enter a URL, a PIN, or a phone number. iOS provides several different keyboard types, each designed to facilitate a different type of input. To learn about the keyboard types that are available, see `UIKeyboardType` in *UITextInputTraits Protocol Reference*. To learn more about

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managing the keyboard in your app, read *Managing the Keyboard*. Note that you have no control over the keyboard's input method and layout, because these attributes are determined by the user's language settings.

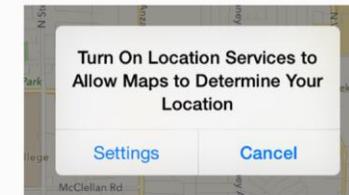
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Temporary Views

Alert

An *alert* gives people important information that affects their use of an app or the device.



API NOTE

To use an alert in your code, you create a `UIAlertController` and specify the `UIAlertControllerStyleAlert`.

An alert:

- Displays a required title and an optional

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message

- Contains one or more buttons

The infrequency with which alerts appear helps users take them seriously. It's best to minimize the number of alerts your app displays, and make sure each one offers critical information and useful choices.

Avoid creating unnecessary alerts. In general, alerts are unnecessary in the following scenarios:

iOS Human Interface Guidelines

If an alert does this...	Do this instead of using an alert...
Provides information related to the standard functioning of an app	Design an eye-catching way to display the information, one that harmonizes with the app's style.
Updates users on tasks that are progressing normally	Use a progress view or activity indicator (described in Progress View and Activity Indicator) or integrate status information into the app UI.
Asks for confirmation of user-initiated tasks	Use an action sheet (described in Action Sheet).
Informs users of problems they can do nothing about	If the problem isn't critical, integrate the information into the app's UI; otherwise, use an alert.

As you read the guidelines for designing alert text, it's useful to know the following definitions:

- *Title-style capitalization* means that every word is

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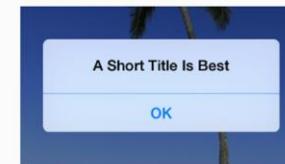
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capitalized, except articles, coordinating conjunctions, and prepositions of four or fewer letters when they aren't the first word.

- *Sentence-style capitalization* means that the first word is capitalized, and the rest of the words are lowercase unless they are proper nouns or proper adjectives.

Succinctly describe the situation and explain what people can do about it. Ideally, the text you write gives people enough context to understand why the alert has appeared and to decide which button to tap.



Keep the title short enough to display on a single line, if possible. A long alert title is difficult for people to read quickly, and it might get truncated or force the alert message to scroll.

Avoid single-word titles. Single-word titles, such as Error or Warning, rarely provide any useful information.

When possible, use a sentence fragment. A short,

iOS Human Interface Guidelines

informative statement tends to be easier to understand than a complete sentence.

As much as possible, write a title that makes it unnecessary to add a message. For example, you might be able to avoid adding a message if you use a question—or, less frequently, two sentences—for the alert title.

Avoid sounding accusatory or judgmental when you need to deliver negative news. People understand that many alerts tell them about problems or warn them about dangerous situations. As long as you use a friendly tone, it's better to be negative and direct than it is to be positive but oblique.

As much as possible, avoid “you,” “your,” “me,” and “my.” Sometimes, text that identifies people directly can be ambiguous and can even be interpreted as insulting or patronizing.

Use capitalization and punctuation appropriately. Specifically:

iOS Human Interface Guidelines

When the alert title...	Use...
Is a sentence fragment or a single sentence that is not a question	Title-style capitalization and no ending punctuation
Is a single sentence that is a question	Sentence-style capitalization and an ending question mark
Consists of two or more sentences	Sentence-style capitalization and appropriate ending punctuation for each sentence

If you must provide an optional alert message, write a short, complete sentence. If possible, keep the message short enough to be displayed on one or two lines. If the message is too long, it will scroll, giving users a poor experience. Use sentence-style capitalization and appropriate ending punctuation in the message.

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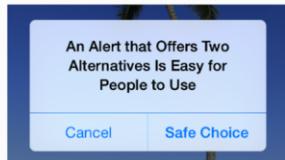


Avoid lengthening alert text with descriptions of which button to tap. Ideally, the combination of unambiguous alert text and logical button labels gives people enough information to understand the situation and their choices. If you must provide detailed guidance, follow these guidelines:

- Be sure to use the word “tap” (not “touch” or “click” or “choose”) to describe the selection action.
- Don’t enclose a button title in quotation marks, but do preserve its capitalization.

Be sure to test the appearance of an alert in both orientations. Because in landscape the height of an alert is constrained, the alert’s appearance may differ from its appearance in portrait. It’s recommended that you optimize the length of the alert text so that it can be read without scrolling no matter what the orientation.

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Generally, use a two-button alert. A two-button alert is often the most useful, because it's easiest for people to choose between two alternatives. A single button alert is less likely to be helpful because it informs people without giving them any control over the situation. An alert that contains three or more buttons is significantly more complex than a two-button alert and should be avoided as much as possible. If you add too many buttons to an alert, it can cause the alert to scroll, which is a bad user experience.

NOTE

If you find that you need to offer people more than two choices, consider using an action sheet instead (to learn how to use an action sheet, see [Action Sheet](#)).

Place buttons appropriately. Ideally, the button that's most natural to tap should meet two criteria: It should

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perform the action that users are most likely to want and it should be the least likely to cause problems if a user taps it inadvertently. Specifically:

- When the most likely button performs a nondestructive action, it should be on the right in a two-button alert. The button that cancels this action should be on the left.
- When the most likely button performs a destructive action, it should be on the left in a two-button alert. The button that cancels this action should be on the right.

NOTE

Pressing the Home button while an alert is visible should quit the app, as expected. Doing so should also be identical to tapping the Cancel button—that is, the alert is dismissed and the action isn't performed.

Give alert buttons short, logical titles. The best button titles consist of one or two words that describe the result of tapping the button. Follow these guidelines as you create titles for alert buttons:

- As with all button titles, use title-style capitalization and no ending punctuation.

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- As much as possible, use verbs and verb phrases that relate directly to the alert text—for example, “Cancel,” “View All,” “Reply,” or “Ignore.”
- Use “OK” for a simple acceptance option if there is no better alternative. Avoid using “Yes” or “No.”
- Avoid “you,” “your,” “me,” and “my” as much as possible. Button titles that use these words are often ambiguous and can appear patronizing.

Action Sheet

An **action sheet** displays a set of choices related to a task the user initiates.

iOS Human Interface Guidelines

In a horizontally compact environment, an action sheet emerges from the bottom of the screen



In a horizontally regular environment, an action sheet is always displayed in a popover



API NOTE

To use an action sheet in your code, you create a `UIAlertController` and specify the `UIAlertControllerStyleActionSheet`.

An action sheet:

- Appears as the result of a user action
- Displays two or more buttons

Use an action sheet to:

- Provide alternative ways to complete a

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task. An action sheet lets you to provide a range of choices that make sense in the context of the current task, without giving these choices a permanent place in the UI.

- **Get confirmation before completing a potentially dangerous task.** An action sheet prompts users to think about the potentially dangerous effects of the step they're about to take and gives them some alternatives.

In a horizontally compact environment, include a Cancel button so that users can easily and safely abandon the task. Place the Cancel button at the bottom of the action sheet to encourage users to read through all the alternatives before making a choice.

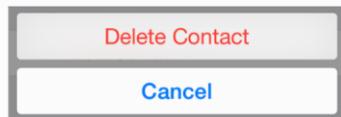
In a horizontally regular environment, base the way the action sheet is displayed on the way the user initiates the task. Specifically:

iOS Human Interface Guidelines

If the task is initiated from...	Display the action sheet...	Include a Cancel button?
Outside of a popover	Without animation—that is, the action sheet and the popover appear simultaneously	No, because users can tap outside the popover to dismiss the action sheet
Inside a popover	With animation—that is, the action sheet slides up on top of the popover's content	Yes, because users need to be able to dismiss the action sheet without closing the popover

In all environments, use red for the button that performs a potentially destructive action. Display a red button at the top of the action sheet, because the closer to the top of the action sheet a button is, the more eye-catching it is.

iOS Human Interface Guidelines



Avoid making users scroll an action sheet. If you include too many buttons in an action sheet, users must scroll to see all their choices. This is a disconcerting experience for users, because they must spend extra time to distinguish the choices. Also, it can be very difficult for users to scroll without inadvertently tapping a button.

Modal View

A *modal view*—that is, a view presented modally—provides self-contained functionality in the context of the current task or workflow.

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API NOTE

To use a modal view in your code, you create a `UIPresentationController` and specify an appropriate style (for a complete list of styles, see [Modal Presentation Styles](#)).

A modal view:

- Can occupy the entire screen, the entire area of a parent view (such as a popover), or a portion of the screen
- Contains the text and controls that are necessary to complete the task
- Usually displays a button that completes the task and dismisses the view and a Cancel button that abandons the task and dismisses the view

Use a modal view when you need to offer the ability to accomplish a self-contained task related to your app's primary function. A modal view is especially appropriate for a multistep subtask that requires UI elements that don't belong in the main app UI all the time.

Choose a modal view style that suits the current task, the current environment, and the visual style of

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your app. You can use any of these styles, defined here:

Modal view style	Appearance	Recommended for
Full screen	Covers the entire screen.	Presenting a potentially complex task that people can complete within the context of the modal view.
Page sheet	In a horizontally regular environment, a style that partially covers the underlying content. All uncovered areas are dimmed to prevent the user from interacting with them. (In a horizontally compact environment, this style behaves the	Presenting a potentially complex task that people can complete within the context of the modal view.

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	same as the full screen style.)	
	In a horizontally regular environment, a style that displays the content centered in the screen. All uncovered areas are dimmed to prevent the user from interacting with them. In some cases, the position of the modal view is adjusted when a keyboard is present. (In a horizontally compact environment, this style behaves the same as the full screen style.)	Gathering structured information from the user.
		Displaying modal

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Current context	Uses the same size as its parent view.	content within a split view pane, popover, or other non-full-screen view.
-----------------	--	---

Don't display a modal view on top of a popover. With the possible exception of an alert, nothing should display on top of a popover. In rare cases when you might need to display a modal view as a result of an action the user takes in a popover, close the popover before you open the modal view.

Coordinate the overall look of a modal view with the appearance of your app. For example, a modal view often includes a navigation bar that contains a title and buttons that cancel or complete the modal view's task. When this is the case, the navigation bar should use the same appearance as the navigation bar in the app.

Display a title that identifies the task, if appropriate. You might also display text in other areas of the view that more fully describes the task or provides some guidance.

Choose an appropriate transition style for revealing the modal view. Use a style that coordinates with your app and enhances the user's awareness of the temporary context shift that the modal view represents. To do this,

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you can specify one of the following transition styles:

- **Vertical.** In the vertical style, the modal view slides up from the bottom edge of the screen and slides back down when dismissed (this is the default transition style).
- **Flip.** In the flip style, the current view flips horizontally from right to left to reveal the modal view. Visually, the modal view looks as if it is the back of the current view. When the modal view is dismissed, it flips horizontally from left to right, revealing the previous view.

If you vary the transition styles for modal views in an app, do so in a way that makes sense to users. Users are quick to notice behavioral differences in an app and will assume that they mean something. It's best to establish a logical, consistent pattern that users can easily detect and remember, and avoid changing transition styles without a good reason.

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Icon and Image Sizes

Every app needs an app icon and a launch file or image. In addition, some apps need custom icons to represent app-specific content, functions, or modes in navigation bars, toolbars, tab bars, and other areas. Table 45-1 lists the sizes required for these custom icons and images.

Table 45-1 Size (in pixels) of custom icons and images

Asset	iPhone 6s Plus and iPhone 6 Plus (@3x)	iPhone 6s, iPhone 6, and iPhone 5 (@2x)	iPhone 4s (@2x)	iPad air and iPad mini (@2x)
App icon (required for all apps)	180 x 180	120 x 120	120 x 120	152 x 152
App icon for the App Store (required for all apps)	1024 x 1024	1024 x 1024	1024 x 1024	1024 x 1024
Launch file or image	For iPhone 6s and iPhone 6, use a launch file	Use a launch file	For iPhone 6s and iPhone 6, use a launch file	1536 x 2048 (portrait)

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(required for all apps)	(see Launch Files)	(see Launch Files)	640 x 960 For iPhone 5, 640 x 1136	2048 x 1536 (landscape)
Spotlight search results icon (recommended)	180 x 180	For iPhone 6s and iPhone 6, use 120 x 120 For iPhone 5, use 80 x 80	80 x 80	120 x 120
Settings icon (recommended)	87 x 87	58 x 58	58 x 58	58 x 58
Toolbar and navigation bar icon (optional)	About 66 x 66	About 44 x 44	About 44 x 44	About 44
Tab bar icon (optional)	About 75 x 75 (maximum: 144 x 96)	About 50 x 50 (maximum: 96 x 64)	About 50 x 50 (maximum: 96 x 64)	About 50 (maximum: 96 x 64)
Web clip icon (recommended for web apps and websites)	180 x 180	120 x 120	120 x 120	152 x 152

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NOTE

If you need to create custom icons for Home screen quick actions, see [Home Screen Quick Actions](#) for details.

With the exception of the App Store icon—which must be named `iTunesArtwork`—you can name your icons anything you want. Use image asset entries in your Xcode project for your app’s icon files. To add icons, assign the corresponding image files to the image assets of your project. At build time, Xcode adds the appropriate keys to your app’s `Info.plist` file and places the images in your app bundle. iOS chooses an icon based on whether its size is appropriate for the intended usage. To learn more about asset catalogs, see [Asset Catalog Help](#).

For all images and icons, the PNG format is recommended. You should avoid using interlaced PNGs.

The standard bit depth for icons and images is 24 bits.

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App Icon

Every app needs a beautiful, memorable app icon that attracts people in the App Store and stands out on their Home screen. iOS can use versions of the app icon in Game Center, search results, Settings, and to represent app-created documents.

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For the best results, enlist the help of a professional graphic designer. An experienced graphic designer can help you develop an overall visual style for your app and apply that style to all the icons and images in it.

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Use universal imagery that people will easily recognize. In general, avoid focusing on a secondary or obscure aspect of an element. For example, the Mail app icon uses an envelope, not a rural mailbox, a mail carrier's bag, or a post office symbol.

Embrace simplicity. In particular, avoid cramming lots of different images into your icon. Find a single element that captures the essence of your app and express that element in a simple, unique shape. Add details cautiously. If an icon's content or shape is overly complex, the details can become confusing and may appear muddy at smaller sizes.

TIP

To test the appearance of your app icon at small sizes, move it into a folder on the Home screen. Even better, move several app icons into a folder and see if your app icon looks good and remains distinctive.

Create an abstract interpretation of your app's main idea. It rarely works well to use a photo or screenshot in an app icon because photographic details can be very hard to see at small sizes. Typically, it's better to interpret reality in an artistic way, because doing so lets you emphasize the aspects of the subject that you want users to notice.

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If you want to portray real substances, do it accurately. Icons that depict real objects should accurately replicate the characteristics of substances such as fabric, glass, paper, and metal, and convey the object's weight and feel.

Make sure the app icon looks good on a variety of backgrounds. Don't just test your icon on a light or dark background, because you can't predict which wallpaper people will choose.

Avoid transparency. An app icon should be opaque. If the icon's boundaries are smaller than the recommended sizes—or you use transparency to create "see-through" areas—the resulting icon can appear to float on a dark background, which tends to look especially unattractive on the beautiful wallpapers that users choose.

Don't use iOS interface elements in your artwork. You don't want users to confuse your icons or images with the iOS UI.

Don't use replicas of Apple hardware products in your artwork. The symbols that represent Apple products are copyrighted and can't be reproduced in your icons or images. In general, it's a good idea to avoid replicas of any specific devices in your artwork, because these designs change frequently and icons that are based on them can quickly look dated.

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Don't reuse iOS app icons in your interface. It can be confusing to users to see the same icon used to mean slightly different things in multiple locations throughout the system.

Create different sizes of the app icon for different devices. You want to make sure that your app icon looks great on all the devices you support. For device-specific measurements, see [Table 45-1](#).

When iOS displays an app icon on the Home screen of a device, it automatically applies a mask that rounds the corners. Make sure your icon has 90° corners so it looks good after the mask is applied. For example:

A 120 x 120 pixel icon
before the mask is
applied



A 120 x 120 pixel icon
after the mask is applied



Create a large version of your app icon for display in the App Store. Although it's important that this version be instantly recognizable as your app icon, it can be subtly richer and more detailed. There are no visual effects added to this version of your app icon.

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As shown in [Table 45-1](#), the large version of your app icon should measure 1024 x 1024 pixels and be named `iTunesArtwork@2x`. (If necessary to support some @1x devices, create a version that measures 512 x 512 pixels and name it `iTunesArtwork`.)

NOTE

iOS might also use the large image in other ways. In an iPad app, for example, iOS uses the large image to generate the large document icon.

If you're developing an app for ad-hoc distribution (that is, to be distributed in-house only, not through the App Store), you must also provide the large versions of your app icon. This icon identifies your app in iTunes.

Document Icons

If your iOS app creates documents of a custom type, you want users to be able to recognize these documents at a glance. You don't need to design a custom icon for this purpose because iOS uses your app icon to create document icons for you.

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Spotlight and Settings Icons

Every app should supply a small icon that iOS can display when the app name matches a term in a Spotlight search. Apps that supply settings should also supply a small icon to identify them in the built-in Settings app.

These icons should clearly identify your app so that people can recognize it in a list of search results or in Settings. For example, the icons of the built-in apps are easy to discern in Settings, even though the icons are small:

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As with app icons, you can name these small icons anything you want, because iOS chooses an icon based on whether its size is appropriate for the intended usage.

For all devices, supply separate icons for Spotlight search

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results and Settings. If you don't provide these icons, iOS might shrink your app icon for display in these locations. See [Table 45-1](#) for details about specific sizes.

NOTE

If the background of your icon is white, don't add a gray overlay in an effort to increase its visibility in Settings. iOS adds a 1-pixel border stroke so that all icons look good on the white background of Settings.

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Launch Files

A launch file (or image) provides a simple placeholder image that iOS displays when your app starts up. The placeholder image gives users the impression that your app is fast and responsive because it appears instantly and is quickly replaced by the first screen of your app. Every app must supply a launch file or at least one static image.

In iOS 8 and later, you can create a XIB or storyboard file instead of a static launch image. When you create a launch file in Interface Builder, you use size classes to define different layouts for different display environments and you use Auto Layout to make minor adjustments. Using size classes and Auto Layout means that you can create a single launch file that looks good on all devices and display environments. (For an overview of display environments and size classes, see [Build In Adaptivity](#); to learn how to use size classes in Interface Builder, see [Size Classes Design Help](#).)

If you also need to support earlier versions of iOS, you can continue to supply static launch images in addition to a launch file.

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IMPORTANT

You use a launch XIB or storyboard file to indicate that your app runs on iPhone 6 Plus or iPhone 6.

The following design guidelines apply to both launch files and static launch images.

Design a plain launch image that improves the user experience. In particular, the launch image isn't an opportunity to provide:

- An “app entry experience,” such as a splash screen
- An About window
- Branding elements, unless they are a static part of your app’s first screen

Because users are likely to switch among apps frequently, you should make every effort to cut launch time to a minimum, and you should design a launch image that downplays the experience rather than drawing attention to it.

Design a launch image that is identical to the first screen of the app, except for:

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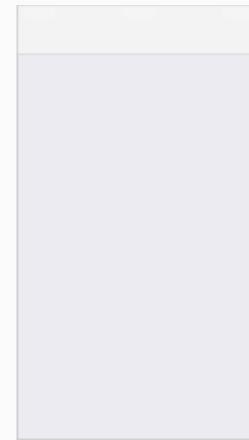
- **Text.** The launch image is static, so any text you display in it won’t be localized.
- **UI elements that might change.** If you include elements that might look different when the app finishes launching, users can experience an unpleasant flash between the launch image and the first app screen.

If you think that following these guidelines will result in a plain, boring launch image, you’re right. Remember, the launch image doesn’t provide you with an opportunity for artistic expression. It’s solely intended to enhance the user’s perception of your app as quick to launch and immediately ready for use. For example, Settings and Weather each supply a launch image that is little more than a background image.

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The Settings launch image



The Weather launch image



If you need to use static launch images, you create images in different sizes for different devices. Static launch images for all devices must include the status bar region. For specific measurements, see [Table 45-1](#).

Although it’s best to use a launch file for iPhone 6 and iPhone 6 Plus, you can instead supply static launch images if necessary. If you need to create static launch images for these devices, use the following sizes:

For iPhone 6:

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- 750 x 1334 (@2x) for portrait
- 1334 x 750 (@2x) for landscape

For iPhone 6 Plus:

- 1242 x 2208 (@3x) for portrait
- 2208 x 1242 (@3x) for landscape

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Template Icons

A custom icon that you create for a bar or Home screen quick action is also known as a *template* icon or image, because iOS uses it as a mask to produce the icon you see when your app runs.

iOS defines lots of standard small icons, such as Refresh, Action, Add, and Favorites. As much as possible, you should use these buttons and icons to represent standard tasks in your app. (To learn more about the standard buttons and icons you can use in bars, see [Toolbar and Navigation Bar Buttons](#) and [Tab Bar Icons](#).)

If your app includes tasks or modes that can't be represented by a standard icon—or if the standard icons don't coordinate with your app's style—you can design your own small icons. At a high level, you should aim for an icon design that is:

- **Simple and streamlined.** Too many details can make an icon appear sloppy or indecipherable.
- **Not easily mistaken for one of the system-provided icons.** Users should be able to distinguish your custom icon from the standard icons at a glance.

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- **Readily understood and widely acceptable.** Strive to create a symbol that most users will interpret correctly and that no users will find offensive.

IMPORTANT

Be sure to avoid using images that replicate Apple products in your designs. These symbols are copyrighted and product designs can change frequently.

Whether you use only custom icons or a mix of custom and standard, all icons in your app should look like they belong to the same family in terms of perceived size, level of detail, and visual weight.

For example, take a look at the family of iOS bar icons and notice how the similarities in size, detail, and weight produce a sense of harmonious unity:



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To create a coherent family of icons, consistency is key: As much as possible, each icon should use the same perspective and the same stroke weight. To ensure that all icons have a consistent perceived size, you may have to create some icons at different actual sizes. For example, the set of system provided icons shown here all have the same perceived size, even though the Favorites and Voicemail icons are actually a bit larger than the other three icons.



If you're designing a custom tab bar icon, you should provide two versions—one for the unselected appearance and one for the selected appearance. The selected appearance is often a filled-in version of the unselected appearance, but some designs call for variations on this approach.

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To create a filled-in version of an icon that has interior details (such as the Radio icon) invert the details so they retain their prominence in the selected version. The Keypad icon also has interior details, but the selected version would be confusing and hard to recognize if its background was filled in and the circles became white outlines.



Sometimes, a design needs a slight alteration to look good when it's selected. For example, because the Timer and Podcasts icons include open areas, the selected versions condense the strokes a bit to fit into a circular

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closure.



If an icon becomes less recognizable when it's filled in, a good alternative is to use a heavier stroke to draw the selected version. For example, the selected versions of the Voicemail and Reading List icons are drawn with a 2-point stroke, instead of the 1-point stroke that was used to draw the unselected versions.



Sometimes, an icon's shape has details that don't look good in a stroked outline. When this is the case—as it is for the Music and Artists icons—you can use the filled-in appearance for both versions of the icon. It's easy for

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users to distinguish the selected and unselected appearances of such icons because the selected appearance is darker and gets the tint.

To design a custom small icon, follow these guidelines:

- Use transparency to define the icon's shape. iOS ignores all color information, so there's no need to use more than one fill color.
- Don't include a drop shadow.
- Use antialiasing.

If you want to create a small icon that looks like it's related to the iOS icon family, use a very thin stroke to draw it. Specifically, a 1-point stroke (that is, a 2-pixel stroke for @2x resolution) works well for most icons.

Regardless of the icon's visual style, use the sizes listed in [Table 45-1](#) to create custom toolbar, navigation bar, and tab bar icons. If you're designing a custom template icon for a Home screen quick action, see [Home Screen Quick Actions](#) for details.

Don't include text in a custom tab bar icon. Instead, use the tab bar item APIs to set the title for each tab (for example, `initWithTitle:image:tag:`). If you need to adjust the automatic layout of the title, you can use the title adjustment APIs, such as `setTitlePositionAdjustment:`.

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Web Clip Icons

If you have a web app or a website, you can provide a custom icon that users can display on their Home screens using the web clip feature. Users tap the icon to reach your web content in one easy step. You can create an icon that represents your website as a whole or an icon that represents a single webpage.

iOS also displays web clip icons in Safari Favorites, which is the grid of icons that appears when users tap the URL field or open a new tab in Safari.

If your web content is distinguished by a familiar image or recognizable color scheme, it makes sense to incorporate it in your icon. However, to ensure that your icon looks great on the device, you should also follow the guidelines in this section. (To learn how to add code to your web content to provide a custom icon, see [Specifying a Webpage Icon for Web Clip](#).)

For icon measurements, see [Table 45-1](#).

NOTE

You can prevent the addition of any effects by naming your icon `apple-touch-icon-precomposed.png`.

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Creating Resizable Images

You can create a resizable image to customize the background of several standard UI elements, such as popovers, buttons, navigation bars, tab bars, and toolbars (including the items on these bars). Providing resizable images for these elements can result in better app performance.

For many UI elements, you can also specify end caps in addition to a background appearance. An *end cap* defines an area of the image that should not be resized. For example, you might create a resizable image that includes four end caps that define the four corners of a button. When the image is resized to fill the button's background area, the portions defined by the end caps are drawn unchanged.

Depending on the dimensions of the resizable image you supply, iOS either stretches or tiles it as appropriate to fill a UI element's background area. To *stretch* an image means to scale up the image, without regard for its original aspect ratio. Stretching is performant, but it isn't usually desirable for a multipixel image that can distort. To *tile* an image is to repeat the original image as many times as necessary to fill the target area. Tiling is less performant than stretching, but it's the only way to achieve a textured or patterned effect.

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As a general rule, you should supply the smallest image (excluding end caps) that will result in the look you want. For example:

- If you want a solid color with no gradient, create a 1 x 1 point image.
- If you want a vertical gradient, create an image that has a width of 1 point and a height that matches the height of the UI element's background.
- If you want to provide a repeating textured appearance, you need to create an image with dimensions that match the dimensions of the repeating portion of the texture.
- If you want to provide a nonrepeating textured appearance, you need to create a static image with dimensions that match the dimensions of the UI element's background area.

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Document Revision History

This table describes the changes to *iOS Human Interface Guidelines*.

Date	Notes
2015-11-05	Emphasized the importance of supporting peek and pop throughout the entire app.
2015-10-21	Added guidelines for creating a great research app and for displaying Live Photos.
2015-09-16	Added guidance on supporting 3D Touch; updated guidance for using the system font and for supporting Apple Pay and Wallet.
2015-04-08	Applied minor edits throughout.
2014-12-18	Added a chapter with HealthKit guidance and a chapter with Apple Pay guidance.
2014-10-20	Made minor corrections and enhanced color contrast guidelines.
2014-09-17	Updated for iOS 8; included guidelines for designing more flexible layouts and creating app extensions.
2014-	Added guidelines about onboarding; made

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03-10	minor corrections and updated some artwork.
2014-02-11	Corrected typos and replaced some outdated artwork.
2013-10-22	Added app icon size for high resolution iPad mini, corrected Newsstand icon sizes, and reinstated iPhone 5 design guidelines.
2013-09-18	Reorganized and updated for iOS 7.

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