Emerging Technologies: Mobile Development for Android Devices

Design Patterns & Interaction Modes

Introduction

- Rather than having to face every application design problem as if it were never solved before, it makes sense to take advantage of previous implementation experience.
- Many application design tasks have similar aspects. These problems have been solved before.
- Known approaches to application design are know as design patterns.
- Android also has design patterns and interaction modes that developers may take advantage of.

Application Design

- The developer challenge is to build an application that shows good performance and is energy efficient. However, it must also help users get tasks done quickly and easily.
- Take advantage of metaphors and gestures that the user is already familiar with.
- Consistency with other applications is a key idea in this regard.

Gestures

- Android devices support a number of gestures.
- Touch: Single press and lift triggers the default action for a given item, eg. button.
- Touch: Long press enters data selection mode. Can be used to select multiple items. Typically used with an associated context bar where the user presses and holds until feedback in the form of eg. vibration is given.
- Swipe or drag: Touch followed by movement an lift. Swipe is fast and has momentum. Lift is slow and precise.

Gestures

- Pinch open/closed: Used for eg. zooming.
- Long press/drag. Used for rearranging items on the UI.
- Double touch. Two touches in quick succession can be used for zooming in/out by a standard zoom factor.
- Double touch/drag: Double touch followed by drag can be used to define scale factor.
- Drag up increases scale. Drag down decreases scale.

Application Structure

An Android application can be structured into three main forms of views:

- Top level views: the different views that your app supports, either shows different views of the same data or different pieces of functionality
- Category views: give your user the ability to go deeper into the data they have stored in an application.
- Detail/edit views: where data is created, modified, and consumed.

Application Types

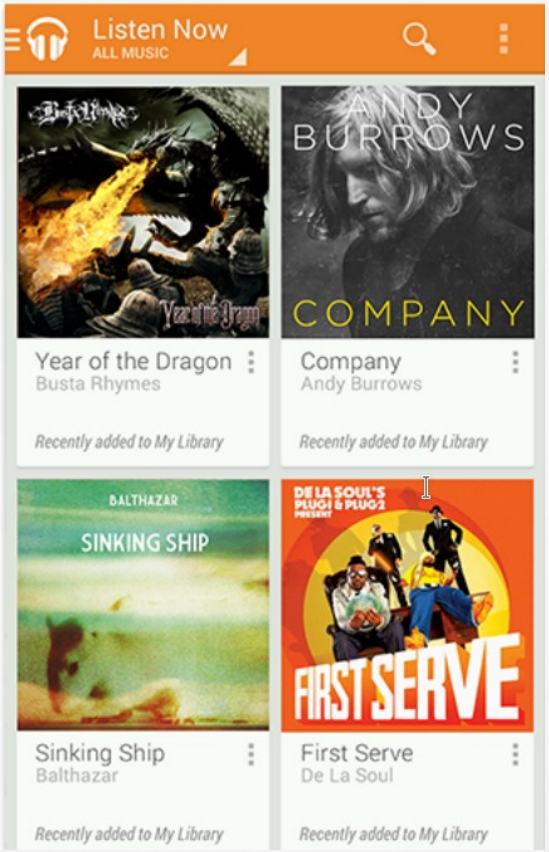
There are many different forms that an application can take in Android, the ones listed here are the most common types.

- Apps built around a single activity (e.g. camera or calculator).
- Apps that switch between many different activities without deeper navigation (e.g. the phone dialler).
- Apps that have a broad set of data views and also deep navigation (e.g. Gmail).

Top Level Views

- Top level views should be considered carefully as the top level view is what the user sees as soon as the application starts.
- Most applications will tend to show content on their top level views as a means of letting the user interact with content immediately. E.g. see Google play music app on next slide.
- The idea is to be visually engaging and to have a user interact with their content quickly. i.e. with a minimum of required effort from the user.

Top Level Views



Switching between Top Level Views

- Generally to switch between top level views it is a good idea to use something like fixed tabs or spinners.
- Fixed tabs are always present on screen and generally you expect your users to flick between views frequently.
- Spinners are generally used if you do not wish to give up screen space to a set of tabs.
- Or if your user is switching to different views of the same set of data (e.g. a calender).

Category Views

- Generally used in applications containing lots of data.
- Categories are used to organise and partition data, making it easy for users to find the data they need.
- Tabs can be used here as well, particularly tabs that scroll from side to side. These should be restricted to 5-7 tabs at most.
- Examples of such category use include the play store app and also the contacts app.

Detail Views

- Where all data is created and modified in an application.
- Time should be taken to consider what the most common actions to be performed in a detail view are.
- The ones that are considered most common should be presented to the user first when the detail view is opened.
- Other options should be easily accessible either by scrolling or hidden away in a menu.

Navigation between Detail Views

- Users may wish to switch between different items in the same detail view e.g. swiping through emails in the Gmail app.
- Permitting the user to scroll through multiple items without having to go back to a category view and then back into a detail view.
- If the list happens to be large like in a magazine or book then a thumbnail view may also be provided to aid navigation (e.g. zinio and kindle).

Navigation with Up and Back Buttons

- Android generally provides two methods by which users navigate back through an application.
- There is the back button (either hardware or software) for navigating through activities in reverse chronological order.
- And an up button (software usually a back arrow in top left corner of app) which goes to the previous activity in the application's hierarchy.
- The difference between the two is that the up button will keep a user in the current application but the back button may switch between different applications.
- Navigation within a single app (up) vs. Navigation through multiple apps (back).

The Action Bar

- Dedicated UI control at the top of your application that is generally there for the lifetime of your application.
- Generally the most important actions are placed on the action bar.
- Also used to enable consistent navigation and switching between views within the same application.
- Also provides a way to hide excess actions that are rarely accessed.

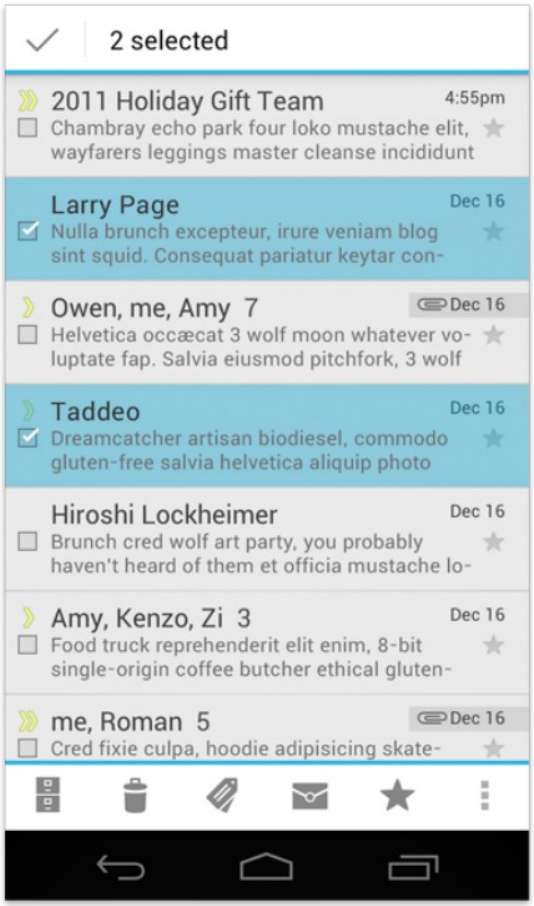
The FIT Scheme

- The FIT scheme (Frequent, Important, Typical) can be used to determine what actions should be prioritised and displayed prominently.
- Frequent asks if the action is used at least 7/10 visits to the activity or if it is used several times in a row.
- Important asks if the action is something that is a selling point for the application.
- Typical asks if the action is considered important in similar applications.

The Contextual Action Bar

- A contextual action bar is a temporary action bar that overlays the original action bar.
- Generally used when a user is in an action that involves selecting data or text e.g. text selection in a browser or multiple message selection in email.
- The action bar is contextual which means that it will disappear when the user is finished performing that action.

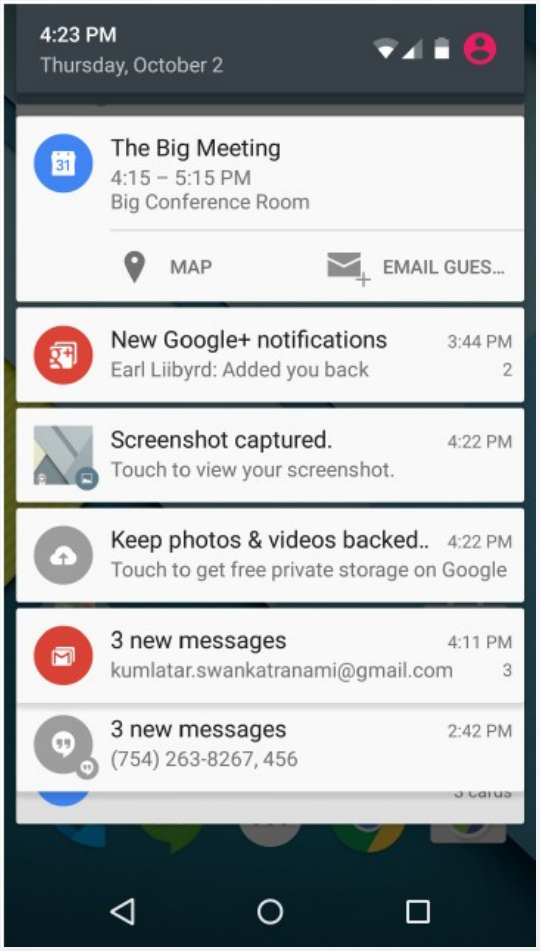
Contextual Action Bars



Notifications

- Notifications are used to inform users of important events in your application.
- New messages, calendar events, birthdays etc.
- Notifications can be a powerful non intrusive way to keep users informed at all times.
- However your application must be careful to choose what notifications it sends and how the notifications are structured.

Notifications



Notification Structure

- A notification consists of **four core components**:
- The first is a **notification icon** that will give the user a visual indication as to what the notification is about. An icon is also displayed in notification bar.
- The **title** indicates what the notification is about.
- The **timestamp** details when the notification occurred.
- The **message** gives more detail about the actual notification.

Expanded Notification

- It is also possible to show an expanded form of the notifications that will provide more detail to the user.
- This could be showing the first few lines of a message or a picture or screenshot that was taken.
- Gives the user an option to expand or contract the notification layout there and then and decide if it can be dismissed or acted upon straight away.

Notification Priorities

- There are five notification priorities in Android:
- Max: should be used for time critical urgent notifications that need quick resolution.
- High: generally used for important communications.
- Default: medium priority that is used if notification is not critical.
- Low: user should be notified of this but it is not important.
- Min: same as low but lowest priority.

Notification Icon Colour & Shape

- Notification icons are only permitted to use two colours in the notification bar.
- Either full white or completely transparent.
- The only way to distinguish between icons is by the shape of the icon.