Android Developer Fundamentals

# User Interaction and Navigation

Lesson 4

# 4.1 User Input Controls

# Contents

- User Interaction
- Focus
- Text input and keyboards
- Radio Buttons and Checkboxes
- Making Choices
  - dialogs, spinners and pickers
- Recognizing gestures

# User Interaction

# Users expect to interact with apps

- Clicking, pressing, talking, typing, and listening
- Using user input controls such buttons, menus, keyboards, text boxes, and a microphone
- Navigating between activities

# User interaction design

Important to be obvious, easy, and consistent:

- Think about how users will use your app
- Minimize steps
- Use UI elements that are easy to access, understand, use
- Follow Android best practices
- Meet user's expectations

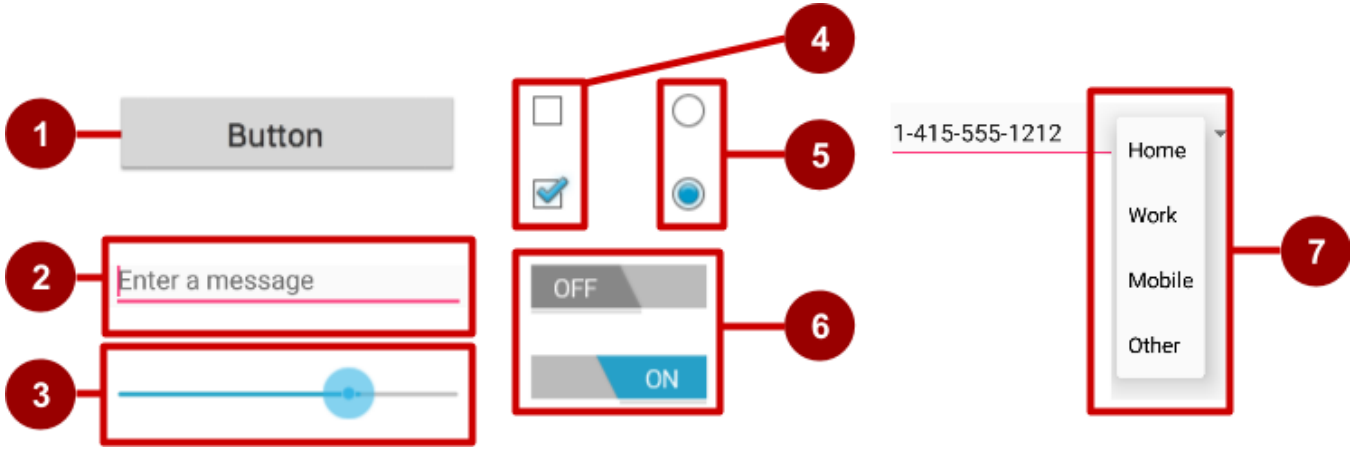
# Input Controls

# Ways to get input from the user

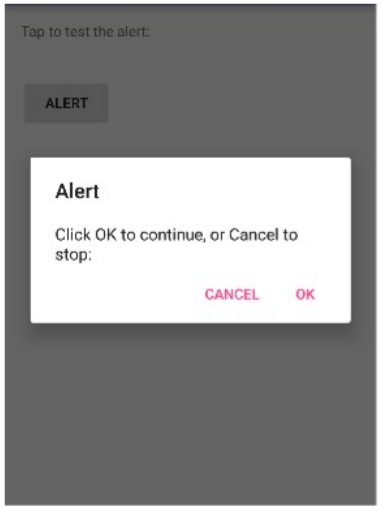
- Free form
  - Text and voice input
- Actions
  - Buttons
  - Contextual menus
  - Gestures
  - Dialogs
- Constrained choices
  - Pickers
  - Checkboxes
  - Radio buttons
  - Toggle buttons
  - Spinners

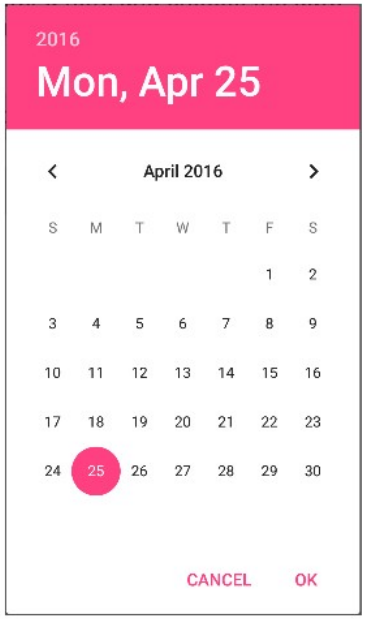
# Examples of user input controls

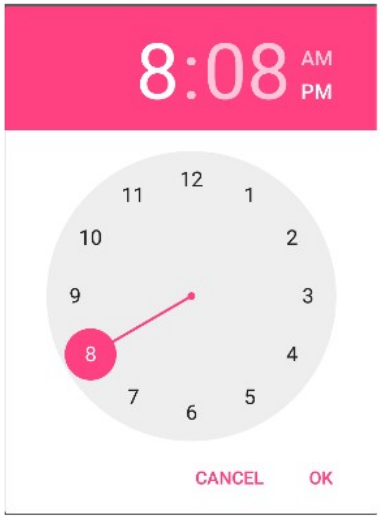
1. Button
2. Text field
3. Seek bar
4. Checkboxes
5. Radio buttons
6. Toggle
7. Spinner



# Alert dialog, date picker, time picker



# View is base class for input controls

- The View class is the basic building block for all UI components, including input controls
- View is the base class for classes that provide interactive UI components
- View provides basic interaction through `android:onClick`

# Focus

# Focus

- The view that receives user input has "Focus"
- Only one view can have focus
- Focus makes it unambiguous which view gets the input
- Focus is assigned by
  - User tapping a view
  - App guiding the user from one text input control to the next using the Return, Tab, or arrow keys
  - Calling `requestFocus()` on any view that is focusable

# Clickable versus focusable

**Clickable**—View can respond to being clicked or tapped

**Focusable**—View can gain focus to accept input

Input controls such as keyboards send input to the view that has focus

# Which View gets focus next?

- Topmost view under the touch
- After user submits input, focus moves to nearest neighbor—priority is left to right, top to bottom
- Focus can change when user interacts with a directional control

# Guiding users

- Visually indicate which view has focus so users knows where their input goes
- Visually indicate which views can have focus helps users navigate through flow
- Predictable and logical—no surprises!

# Guiding focus

- Arrange input controls in a layout from left to right and top to bottom in the order you want focus assigned
- Place input controls inside a view group in your layout
- Specify ordering in XML

```
android:id="@+id/top"
android:focusable="true"
android:nextFocusDown="@+id/bottom"
```

# Set focus explicitly

Use methods of the View class to set focus

- setFocusable() sets whether a view can have focus
- requestFocus() gives focus to a specific view
- setOnFocusChangeListener() sets listener for when view gains or loses focus
- onFocusChanged() called when focus on a view changes

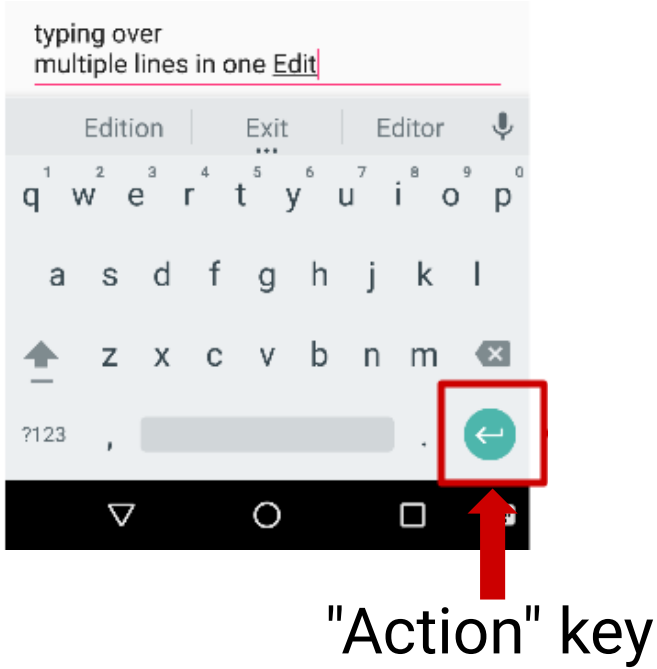
# Find the view with focus

- Activity.getCurrentFocus()
- ViewGroup.getFocusedChild()

# Text Input

# EditText

- EditText class
- Multiple lines of input
- Characters, numbers, and symbols
- Spelling correction
- Tapping the Return (Enter) key starts a new line
- Customizable



# Getting text

- Get the EditText object for the EditText view

```
EditText simpleEditText =
    (EditText)
findViewById(R.id.edit_simple);
```

- Retrieve the CharSequence and convert it to a string

```
String strValue =
    simpleEditText.getText().toString();
```

# Common input types

- textShortMessage—Limit input to 1 line
- textCapSentences—Set keyboard to caps at beginning of sentences
- textAutoCorrect—Enable autocorrecting
- textPassword—Conceal typed characters
- textEmailAddress—Show an @ sign on the keyboard
- phone—numeric keyboard for phone numbers

```
android:inputType="phone"
android:inputType="textAutoCorrect|textCapSentences"
```

# Buttons

# Button

- View that responds to clicking or pressing
- Usually text or visuals indicate what will happen when it is pressed
- Views: Button > ToggleButton, ImageView > FloatingActionButton (FAB)
- State: normal, focused, disabled, pressed, on/off
- Visuals: raised, flat, clipart, images, text

# Responding to button taps

- *In your code*: Use `OnClickListener` event listener.
- *In XML*: use `android:onClick` attribute in the XML layout:

```
<Button
    android:id="@+id/button_send"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:text="@string/button_send"
    android:onClick="sendMessage" />
```

# Setting listener with onClick callback

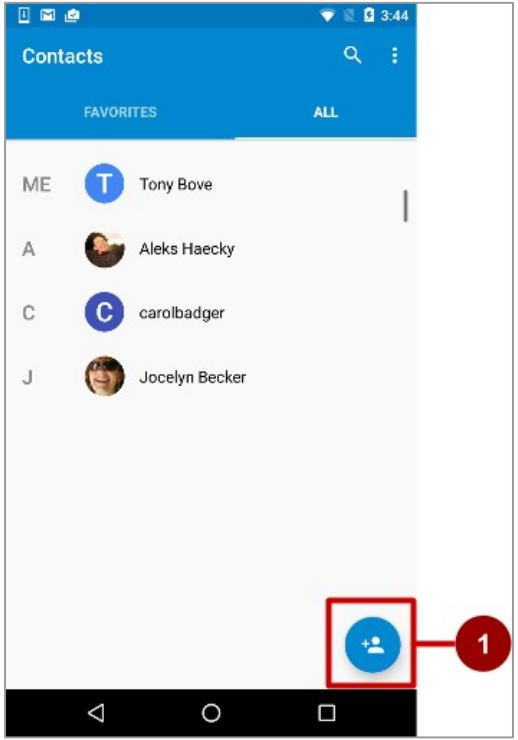
```
Button button = (Button) findViewById(R.id.button);

button.setOnClickListener(new View.OnClickListener() {
    public void onClick(View v) {
        // Do something in response to button click
    }
});
```

# Floating Action Buttons (FAB)

- Raised, circular, floats above layout
- Primary or "promoted" action for a screen
- One per screen

For example:

**Add Contact** button in Contacts app



# Using FABs

- Add design support library to build.gradle

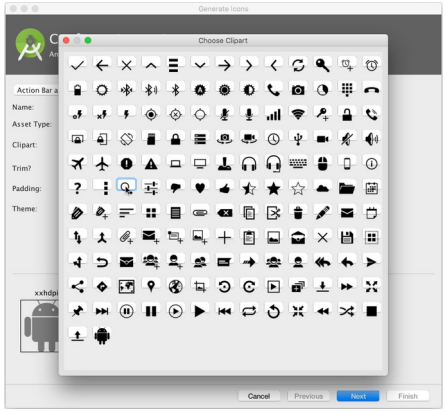
```
compile 'com.android.support:design:a.b.c'
```

- Layout

```
<android.support.design.widget.FloatingActionButton
        android:id="@+id/fab"
        android:layout_gravity="bottom|end"
        android:layout_margin="@dimen/fab_margin"
        android:src="@drawable/ic_fab_chat_button_white"

        .../>
```

# Button image assets

1. Right-click app/res/drawable
2. Choose **New > Image Asset**
3. Choose **Action Bar and Tab Items** from drop down menu
4. Click the **Clipart:** image (the Android logo)



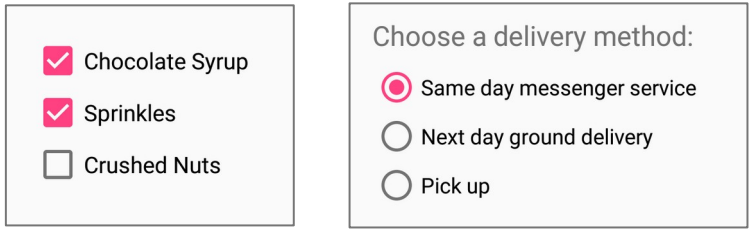

Experiment:

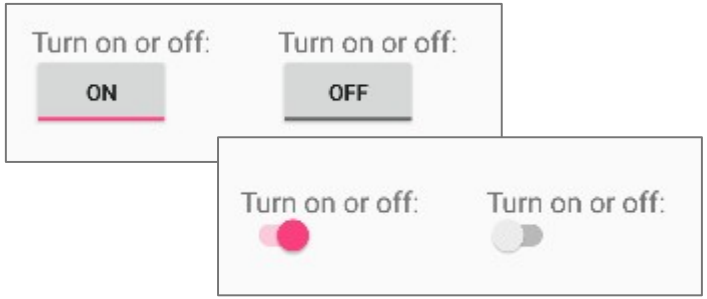
2. Choose **New > Vector Asset**

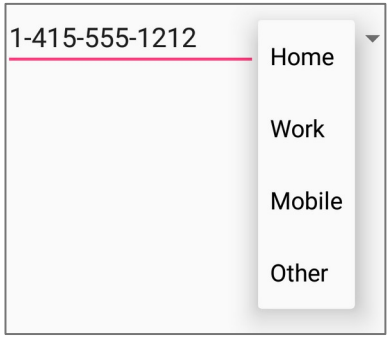
# Making Choices

# So many choices!

- Checkboxes
- Radio buttons
- Toggles
- Spinner



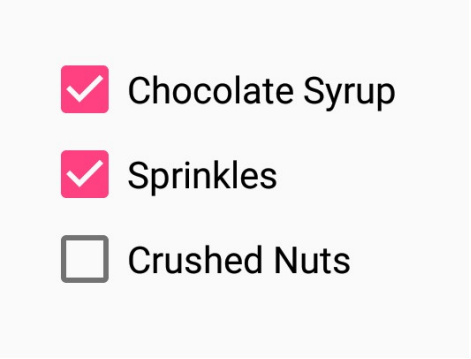



# Checkboxes, radio buttons and toggles

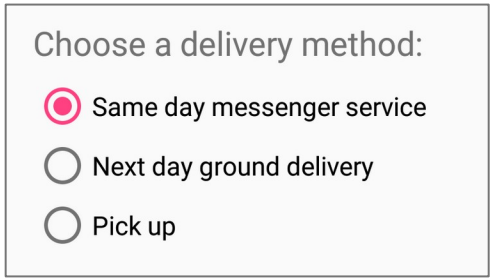
# Checkboxes

- User can select any number of choices
- Checking one box does not uncheck another
- Users expect checkboxes in a vertical list
- Commonly used with a submit button
- Every checkbox is a view and can have an onClick handler



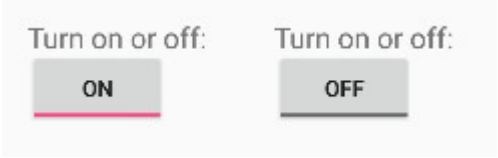
# Radio buttons

- User can select one of a number of choices
- Put radio buttons in a RadioGroup
- Checking one unchecks another
- Put radio buttons in a vertical list
  or horizontally if labels are short
- Every radio button can have an onClick handler
- Commonly used with a submit button
  for the RadioGroup

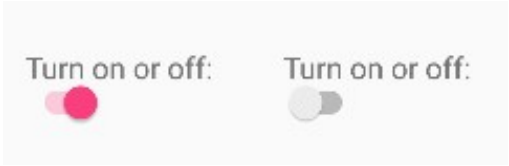


# Toggle buttons and switches

- User can switch between 2 exclusive states (on/off)
- Use `android:onClick`+callback—or handle clicks in code




Toggle buttons

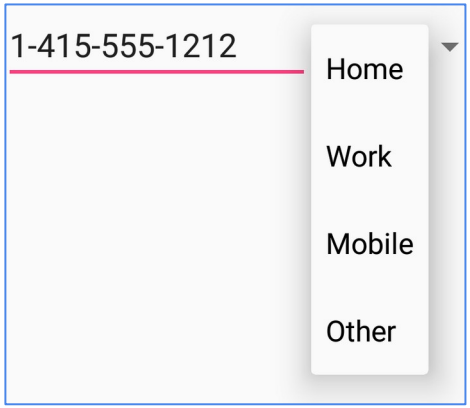



Switches

# Spinners

# Spinners

- Quick way to select value from a set
- Drop-down list shows all values, user can select only one
- Spinners scroll automatically if necessary
- Use the `Spinner` class.



# Implementing a spinner

1. Create Spinner UI element in the XML layout
2. Define spinner choices in an array
3. Create Spinner and set onItemSelectedListener
4. Create an adapter with default spinner layouts
5. Attach the adapter to the spinner
6. Implement `onItemSelectedListener` method

# Create spinner XML

In layout XML file

```
<Spinner
    android:id="@+id/label_spinner"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content">
</Spinner>
```

# Define array of spinner choices

In arrays.xml resource file

```
<string-array name="labels_array">
    <item>Home</item>
    <item>Work</item>
    <item>Mobile</item>
    <item>Other</item>
</string-array>
```

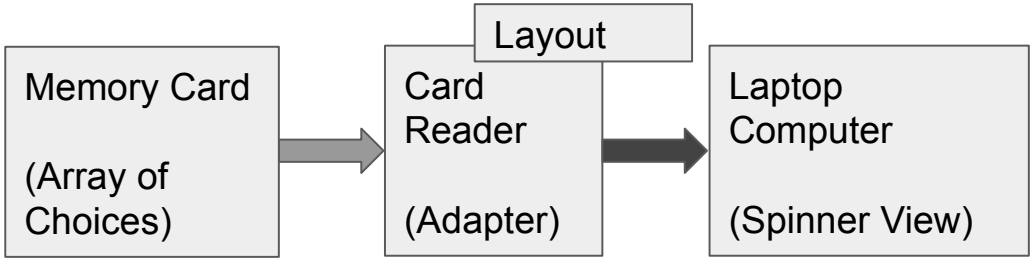
# Create spinner and attach listener

```
public class MainActivity extends AppCompatActivity implements
AdapterView.OnItemSelectedListener

// In onCreate()
Spinner spinner = (Spinner)
findViewById(R.id.label_spinner);
if (spinner != null) {
      spinner.setOnItemSelectedListener(this);
}
```

# What is an adapter?

An adapter is like a bridge, or intermediary, between two incompatible interfaces

For example, a memory card reader acts as an adapter between the memory card and a laptop



# Create adapter

Create ArrayAdapter using string array and default spinner layout

```
ArrayAdapter<CharSequence> adapter =
  ArrayAdapter.createFromResource(
        this, R.array.labels_array,
        // Layout for each item
        android.R.layout.simple_spinner_item);
```

# Attach the adapter to the spinner

- Specify the layout for the drop down menu

```
adapter.setDropDownViewResource(
        android.R.layout.simple_spinner_dropdown_item);
```

- Attach the adapter to the spinner

```
spinner.setAdapter(adapter);
```

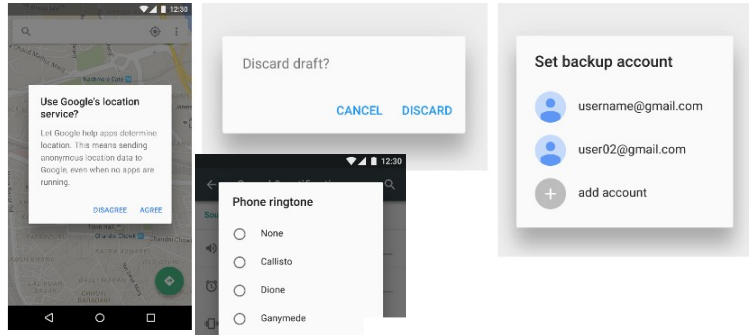
# Implement onItemSelectedListener

```
public class MainActivity extends AppCompatActivity implements
AdapterView.OnItemSelectedListener

    public void onItemSelected(AdapterView<?> adapterView,
        View view, int pos, long id) {
            String spinner_item =
              adapterView.getItemAtPosition(pos).toString();
            // Do something here with the item
    }

    public void onNothingSelected(AdapterView<?> adapterView) {
       // Do something
    }
```

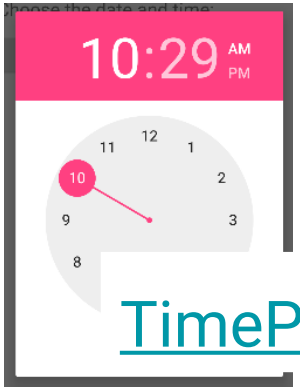
# Dialogs

# Dialogs

- Dialog appears on top, interrupting the flow of activity
- Require user action to dismiss




AlertDialog



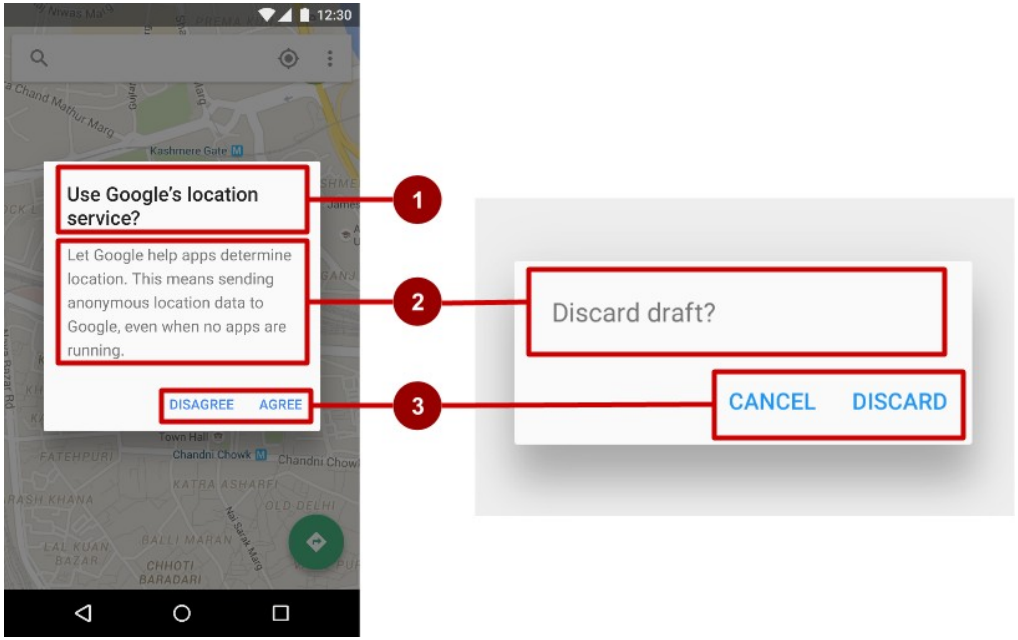

TimePickerDialog


DatePickerDialog

# AlertDialog

AlertDialog can show:

1. Title (optional)
2. Content area
3. Action buttons



# Build the AlertDialog

Use `AlertDialog.Builder` to build a standard alert dialog and set attributes:

```
public void onClickShowAlert(View view) {
    AlertDialog.Builder alertDialog = new

AlertDialog.Builder(MainActivity.this);
    alertDialog.setTitle("Connect to Provider");
    alertDialog.setMessage(R.string.alert_message);
    ...
```

# Add the button actions

- `alertDialog.setPositiveButton()`
- `alertDialog.setNeutralButton()`
- `alertDialog.setNegativeButton()`

# alertDialog code example

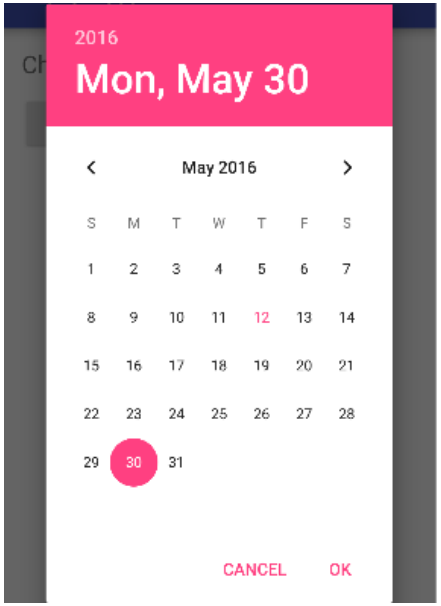
```
alertDialog.setPositiveButton(
    "OK", newDialogInterface.OnClickListener() {
        public void onClick(DialogInterface dialog, int
which) {
        // User clicked OK button.
    }
});
```

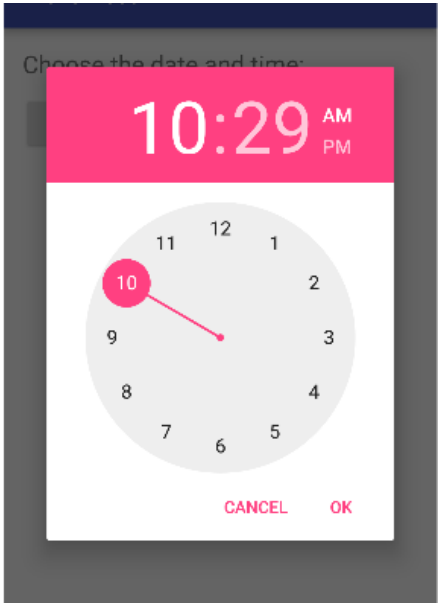
Same pattern for setNegativeButton() and setNeutralButton()

# Pickers

# Pickers

- DatePickerDialog
- TimePickerDialog



# Pickers use fragments

- Use DialogFragment to show a picker
- DialogFragment is a window that floats on top of activity's window

# Introduction to fragments

- A fragment is like a mini-activity within an activity
  - Manages its own own lifecycle.
  - Receives its own input events.
- Can be added or removed while parent activity is running
- Multiple fragments can be combined in a single activity
- Can be reused in multiple activities

# Creating a date picker dialog

1. Add a blank fragment that extends `DialogFragment` and implements `DatePickerDialog.OnDateSetListener`
2. In `onCreateDialog()` initialize the date and return the dialog
3. In `onDateSet()` handle the date
4. In Activity show the picker and add a method to use the date

# Creating a time picker dialog

1. Add a blank fragment that extends `DialogFragment` and implements `TimePickerDialog.OnTimeSetListener`
2. In `onCreateDialog()` initialize the time and return the dialog
3. In `onTimeSet()` handle the time
4. In Activity, show the picker and add a method to use the time

# Common Gestures

# Touch Gestures

Touch gestures include:

- long touch
- double-tap
- fling
- drag
- scroll
- pinch

Don’t depend on touch gestures for app's basic behavior!

# Detect gestures

Classes and methods are available to help you handle gestures.

- GestureDetectorCompat class for common gestures
- MotionEvent class for motion events

# Detecting all types of gestures

1. Gather data about touch events.
2. Interpret the data to see if it meets the criteria for any of the gestures your app supports.

Read more about how to handle gestures in the Android developer documentation

# Learn more

- Input Controls
- Drawable Resources
- Floating Action Button
- Radio Buttons
- Specifying the Input Method Type
- Handling Keyboard Input
- Text Fields
- Buttons
- Spinners
- Dialogs
- Fragments
- Input Events
- Pickers
- Using Touch Gestures
- Gestures design guide

# What's Next?

- Concept Chapter: 4.1 C User Input Controls
- Practical:
  4. P Using Keyboards, Input Controls, Alerts, and Pickers

# END