Lesson-6
User Input Controls – Day 1

Agenda

- Day 1
  - Input Controls- Text and Buttons
  - AutoCompleteTextView
  - Toast Message
  - Spinner
  - ListView
  - Dialogs – Alert, DatePicker, Time Picker
  - Hands on Examples
- Day 2
  - Recycler View and CardView

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

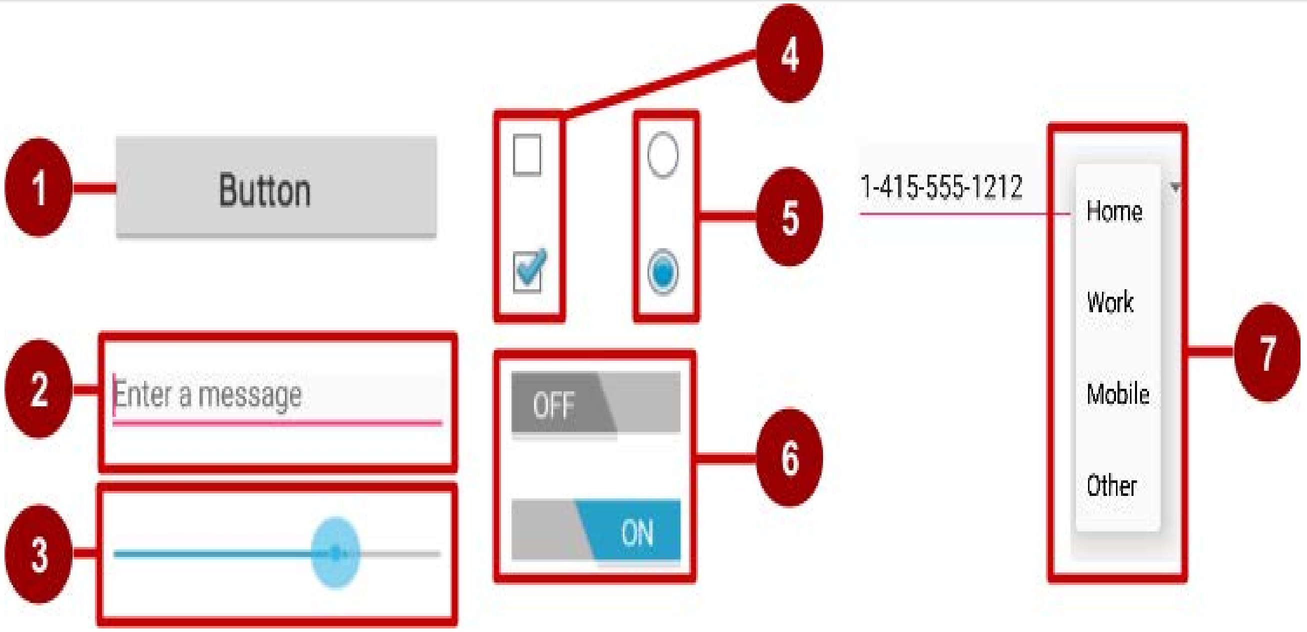
Ways to get input from the user

- Free form
  - Text and voice input
- Actions
  - Buttons
  - Contextual menus
  - Gestures
  - Dialogs

- Constrained choices
  - Pickers
  - Checkboxes
  - Radio buttons
  - Toggle buttons
  - Spinners

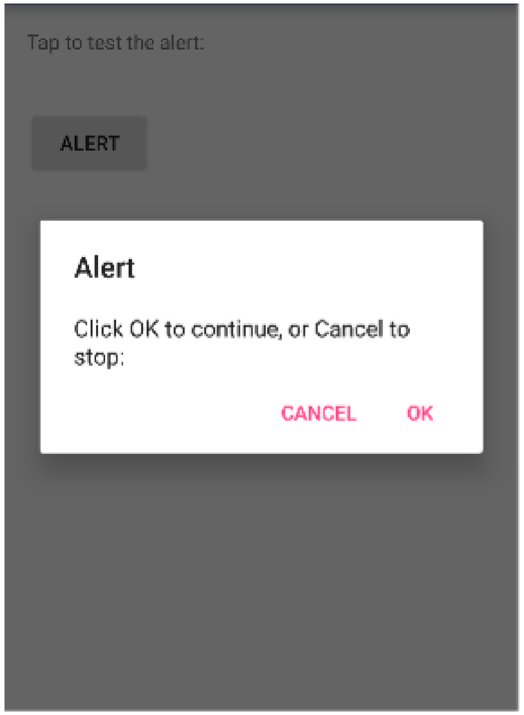
Examples of user input controls

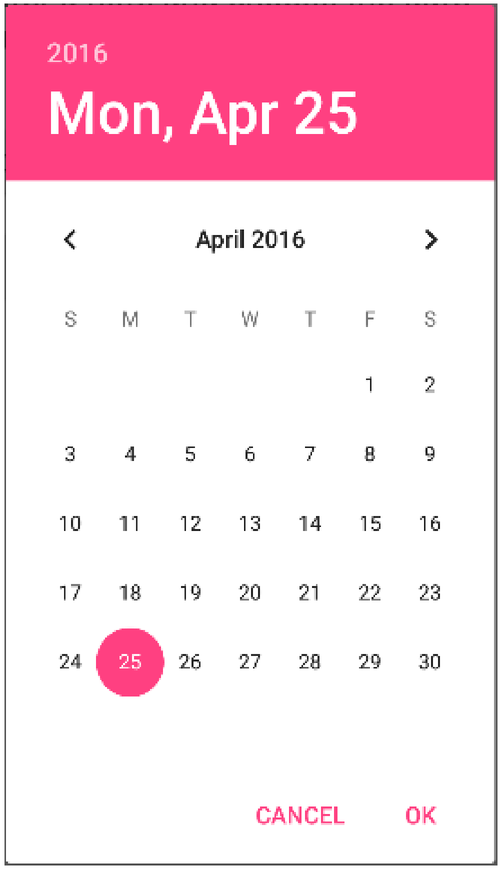
1. Button
2. Text field
3. Seek bar
4. Checkboxes
5. Radio buttons
6. Toggle
7. Spinner

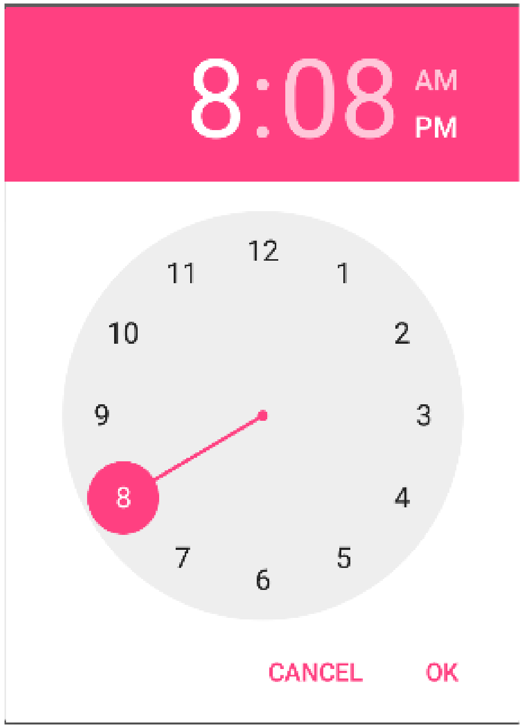


- The **View** class is the basic building block for all UI components, including input controls
- View is the base class for classes that provide interactive UI components
- View provides basic interaction through `android:onClick`

Alert dialog, date picker, time picker







EditText

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

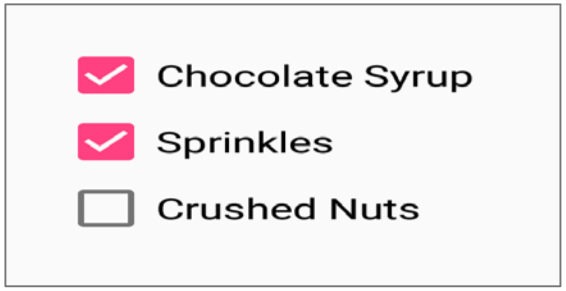
- textShortMessage—Limit input to 1 line
- textCapSentences—Set keyboard to caps at beginning of sentences
- textAutoCorrect—Enable autocorrecting
- textPassword—Conceal typed characters
- textEmailAddress—Show an @ sign on the keyboard
- phone—numeric keyboard for phone numbers

Example

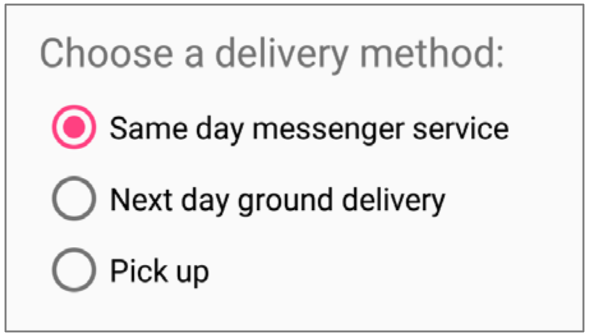
```
android:inputType="phone"
android:inputType="textAutoCorrect|textCapSentences"
```

Making Choices

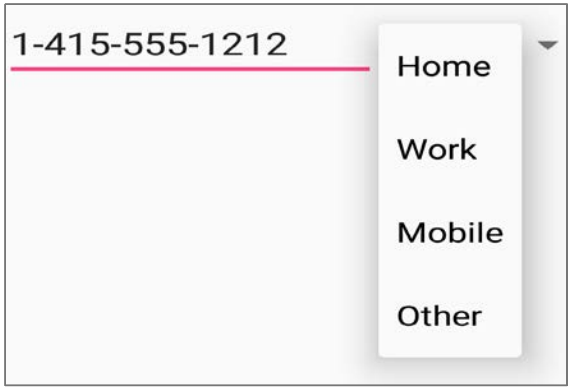
- Checkboxes



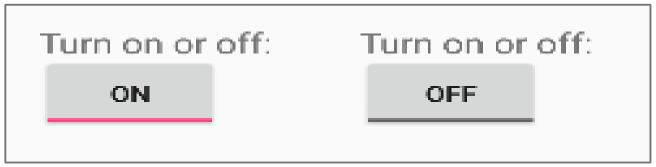
- Radio buttons


Choose a delivery method:
◉ Same day messenger service
○ Next day ground delivery
○ Pick up

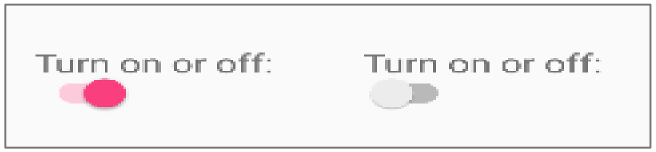
- Spinner



- Toggles



- Switch

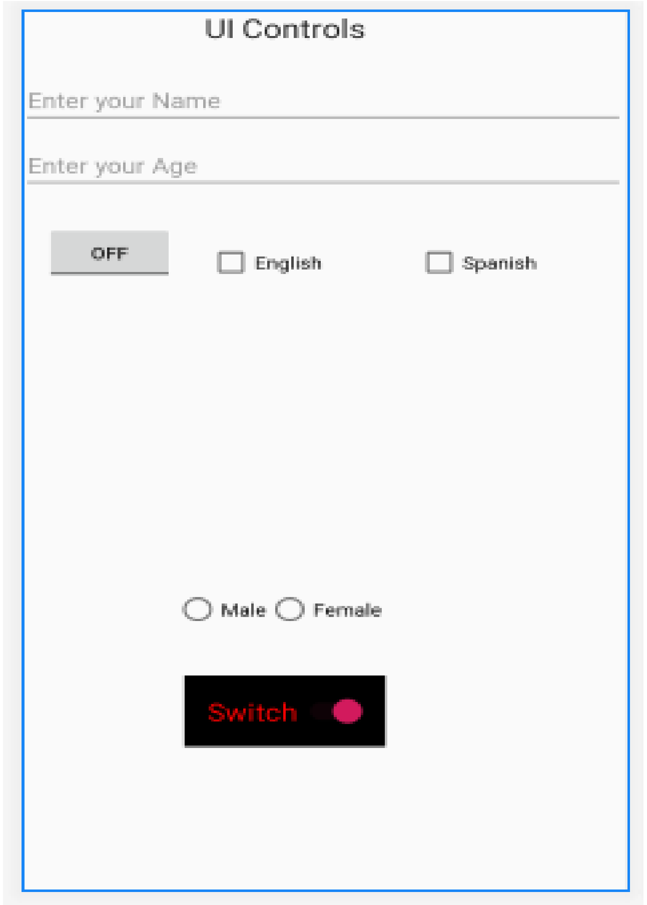


Radio buttons

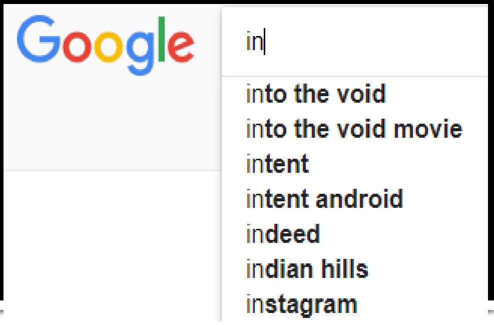
- User can select one of a number of choices
- Put radio buttons in a RadioGroup
- Checking one unchecks another
- Put radio buttons in a vertical list
  or horizontally if labels are short
- Every radio button can have an onClick handler
- Commonly used with a submit button
  for the RadioGroup

Hands on Exmaple – 1 – UI Controls

- Refer : UIDemo to know about UI Components and their click events.



AutoCompleteTextView



- The AutoCompleteTextView is sort of a hybrid between the EditText (field) and the Spinner. With auto-completion, as the user types, the text is treated as a prefix filter, comparing the entered text as a prefix against a list of candidates.
- Matches are shown in a selection list that folds down from the field. The user can either type out an entry (e.g., something not in the list) or choose an entry from the list to be the value of the field.
- In addition, AutoCompleteTextView has an Threshold property, to indicate the minimum number of characters a user must enter before the list filtering begins.
- To create a UI Component use <AutoCompleteTextView> tag in XML.
- To provide an auto completion support to the user first we have to configure the values. Configure the values either using
  - XML approach or Kotlin code approach.

XML Approach

Step 1: In your Android Project go to the folder app→res→values→strings.xml

Set the values by using the given lines of codes

```
<string-array name="array_name">
    <item>value1</item>
    <item>value2</item>
    ………….
</string-array>
```

Step 2: Create an AutoCompleteTextView UI component in XML with an id.

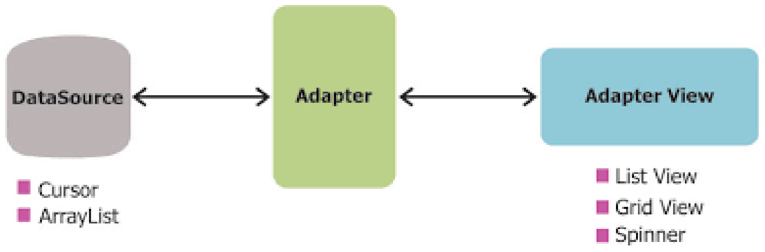
Step 3: Use the following code to get the Xml configured values into your Activity.

```
String[] values=getResources().getStringArray(R.array.array_name);
```

XML Approach

Step 4: for presenting the values we have to create an Adapter. In Android there are 3 types of Adapters.

1) ArrayAdapter
2) Custom Adapter(Customizing ListView)
3) Cursor Adapter(will discuss in SQLite)



Adapter : An Adapter object acts as a bridge between an AdapterView and the underlying data for that view. The Adapter provides access to the data items. The Adapter is also responsible for making a View for each item in the data set.

ArrayAdapter<String> adapter= new ArrayAdapter<String>(context,

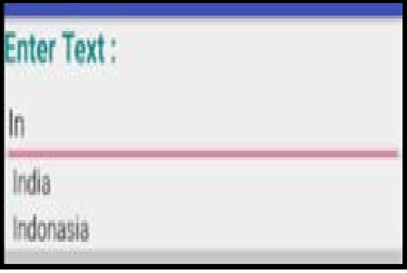
Layout_Resorce File, values);

actv.setAdapter(adapter); // To specify the Adapter Object. Here actv is an AutocompleteTextView object

actv.setThreshold(int); **// To specify the dropdown support, after how many characters of user entry**

Context : It allows access to application-specific resources and classes, as well as up-calls for application-level operations such as launching activities, broadcasting and receiving

Hands-on-Example-2– Countries list using ACTV


Enter Text :

In

India
Indonasia

strings.xml

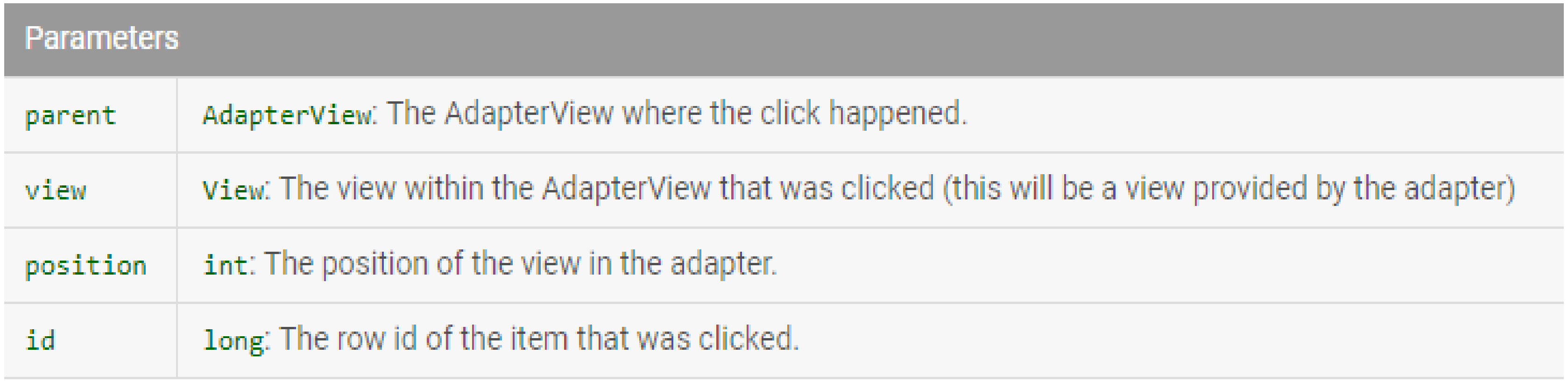
```
<resources>
    <string
name="app_name">ACTVDemo</string>
    <string-array name="countries">
        <item>India</item>
        <item>Indonasia</item>
        <item>USA</item>
        <item>Asia</item>
        <item>Africa</item>
        <item>Siria</item>
        <item>Sri Lanka</item>
        <item>Canada</item>
        <item>Koria</item>
        <item>Island</item>
        <item>Bangaladesh</item>
        <item>Nepal</item>
    </string-array>
</resources>
```

XML Code

```
<LinearLayout
xmlns:android="http://schemas.android.com/apk/re
s/android"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:orientation="vertical">
    <TextView
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="Enter Text : "
        android:textSize="20sp"
        android:textStyle="bold"
        android:textColor="#008888"
        />
     <AutoCompleteTextView
         android:layout_width="match_parent"
         android:layout_height="wrap_content"
         android:id="@+id/actv"/>
</LinearLayout>
```

AdapterView.OnItemClickListener

```
public static interface AdapterView.OnItemClickListener {
// Callback method to be invoked when an item in this AdapterView has been clicked.
onItemClick(AdapterView<?> parent, View view, int position, long id);
}
```



Parameters	
`parent`	`AdapterView`: The AdapterView where the click happened.
`view`	`View`: The view within the AdapterView that was clicked (this will be a view provided by the adapter)
`position`	`int`: The position of the view in the adapter.
`id`	`long`: The row id of the item that was clicked.

Implementers can call getItemAtPosition(position) if they need to access the data associated with the selected item.

A position starts from 0 for ListView, If you are using an ArrayAdapter, position and id become the same, whereas to get a proper row id it is important that the cursor, which was passed to the adapter, contains unique id for each row in the table.

MainActivity.kt

```
class MainActivity : AppCompatActivity() {
    private lateinit var  strings : Array<String>
    override fun onCreate(savedInstanceState: Bundle?) {
        super.onCreate(savedInstanceState)
        setContentView(R.layout.activity_main)
        strings = arrayOf  ("Asia","Australia","America","Belgium","Brazil","Canada",
                                "California","Dubai","France","Paris")
       // Get the XML configured vales into the Activity and stored into an String Array
       //strings = getResources().getStringArray(R.array.countries);
       /* Pass three parameters to the ArrayAdapter
       1. The current context,
       2. The resource ID for a built-in layout file containing a TextView to use when instantiating views,
          which are available in android.R.layout
       3. The objects to represent in the values
       */
        val adapter = ArrayAdapter<String>(this, android.R.layout.simple_spinner_item, strings)
        actv.setAdapter(adapter)
        actv.threshold = 1
```

MainActivity.kt

```
actv.onItemClickListener =
          AdapterView.OnItemClickListener {
           parent, view, position, id ->
             Toast.makeText(this,
                  "Item selected is " +
                  parent.getItemAtPosition(position),
                  Toast.LENGTH_LONG).show()
            }
    }
}
```

Toast

- Toast is one of the notification method in Android which is used to display text on the screen for few seconds.

Toast makeText (Context context, CharSequence msg, int duration).show();

Example

```
Toast.makeText(getApplicationContext(),"Hello Toast",Toast.LENGTH_SHORT)
  .show();
Toast.makeText(getApplicationContext(),"Hello Toast",Toast.LENGTH_SHORT)
  .show();
```

Parameters	
context	Context: The context to use. Usually your Application or Activity object.
msg	CharSequence: The text to show. Can be formatted text.
duration	int: How long to display the message. Either LENGTH_SHORT(1 sec) or LENGTH_LONG(3 sec)

Difference Between XML And Java Approach

XML Approach

- To provide static data
  - Example : Country names are static
- To provide Multi language support-I18N-(Internationalization) -(Discussed later in Localization)

Kotlin code Approach

- To provide dynamic data
  - Example : Movies list

Spinners

- Spinners provide a quick way to select one value from a set. In the default state, a spinner shows its currently selected value.
- Touching the spinner displays a dropdown menu with all other available values, from which the user can select a new one.
- Spinners scroll automatically if necessary
- Implementing a spinner needs to follow the below steps

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

Creating Spinner

```
<Spinner
    android:id="@+id/planets_spinner"
    android:layout_width=“match_parent"
    android:layout_height="wrap_content“
   android:entries="@array/planets_array"/>
```

- Android:entries helps to retrieve the values from string resources to the xml.
- Configure the values either using XML approach or Kotlin code approach

Populate the spinner choices using Resources

Step 1: In your Android Project go to the folder
app→res→values→strings.xml

```
<?xml version="1.0" encoding="utf-8"?>
<resources>
    <string-array name="planets_array">
        <item>Mercury</item>
        <item>Venus</item>
        <item>Earth</item>
        <item>Mars</item>
        <item>Jupiter</item>
        <item>Saturn</item>
        <item>Uranus</item>
        <item>Neptune</item>
    </string-array>
</resources>
```

Populate the spinner with user choices

- The choices you provide for the spinner can come from any source, but must be provided through an SpinnerAdapter, such as an ArrayAdapter if the choices are available in an array or a CursorAdapter if the choices are available from a database query.
- For instance, if the available choices for your spinner are pre-determined, you can provide them with a string array defined in a string resource file:

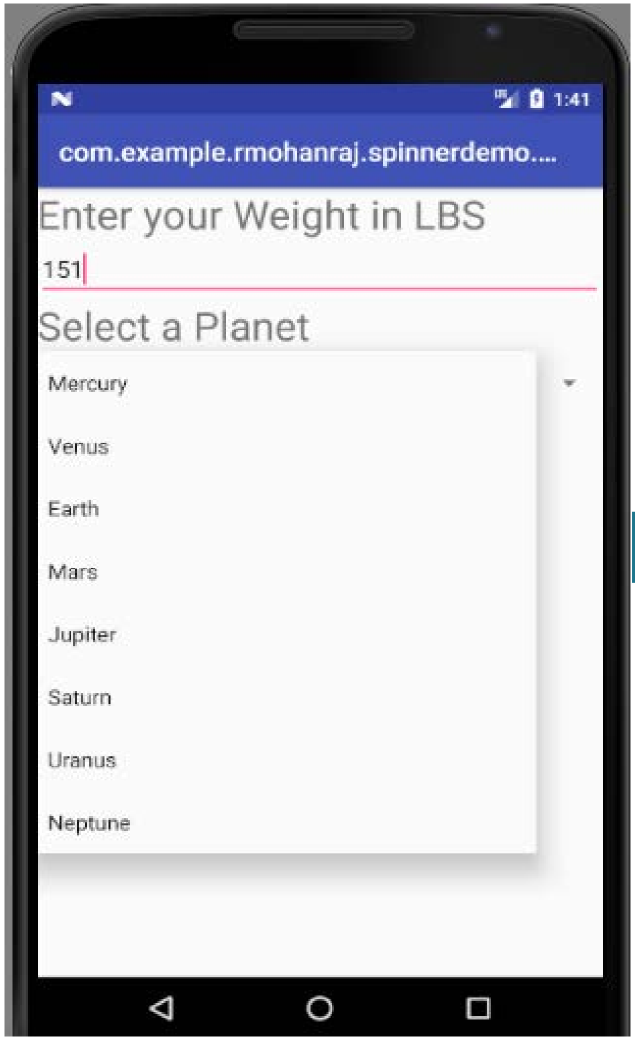
```
<?xml version="1.0" encoding="utf-8"?>
<resources>
    <string-array name="planets_array">
        <item>Mercury</item>
        <item>Venus</item>
        <item>Earth</item>
        <item>Mars</item>
        <item>Jupiter</item>
        <item>Saturn</item>
        <item>Uranus</item>
        <item>Neptune</item>
    </string-array>
</resources>
```

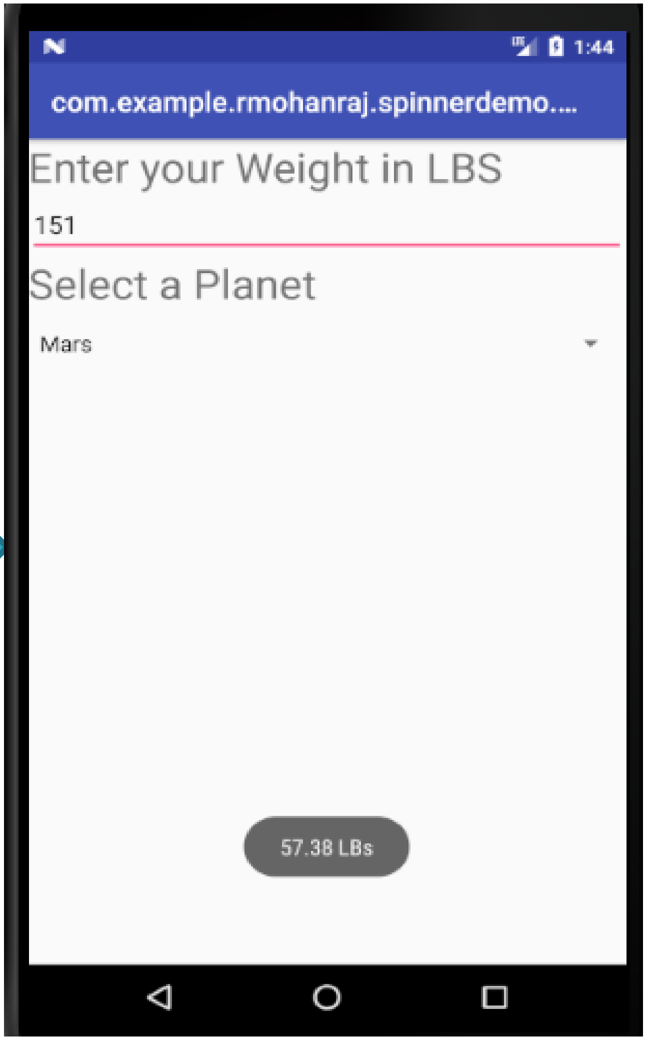
Responding to user selections

- When the user selects an item from the drop-down, the Spinner object receives an on-item-selected event.
- To define the selection event handler for a spinner, implement the AdapterView.OnItemSelectedListener interface and the corresponding onItemSelected() callback method.
- The AdapterView.OnItemSelectedListener requires the onItemSelected() and onNothingSelected() callback methods.
- Then you need to specify the interface implementation by calling setOnItemSelectedListener():

Example from Demo : SpinnerDemo folder

Hands on Example-3 for Spinner - Planet Weight Calculator



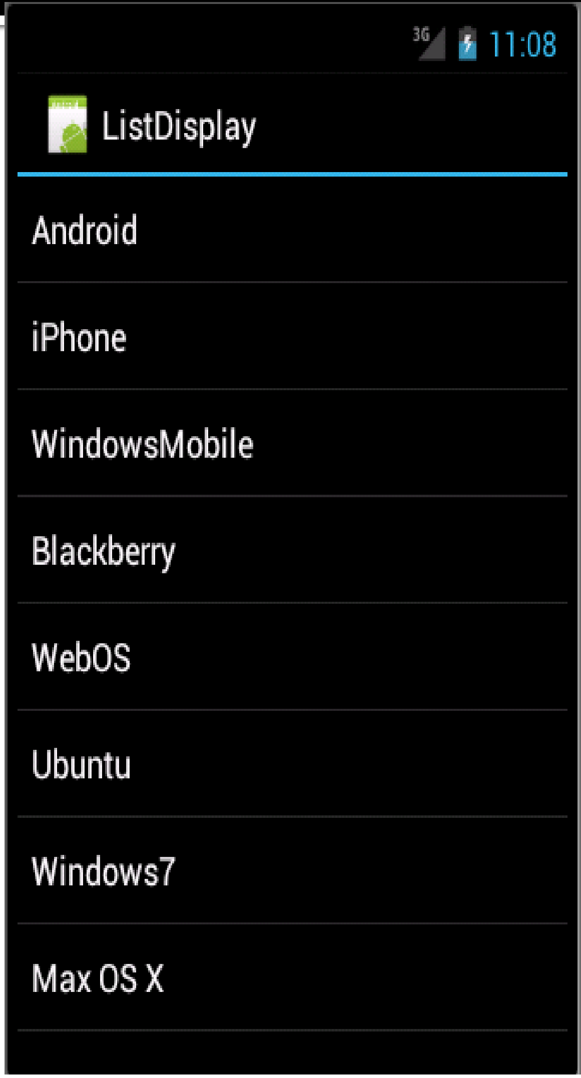


Simple ListView

- ListView is a view group that displays a list of scrollable items. An Adapter that pulls content from a source, such as, a query or an array, helps to insert the list items automatically.
- Each item result is converted into a View and added to the list by the Adapter.

```
 <ListView   android:id="@android:id/list"
android:layout_width="match_parent"
android:layout_height="wrap_content"
  </ListView>
```

- Example : ListViewPlanet


11:08

ListDisplay

Android

iPhone

WindowsMobile

Blackberry

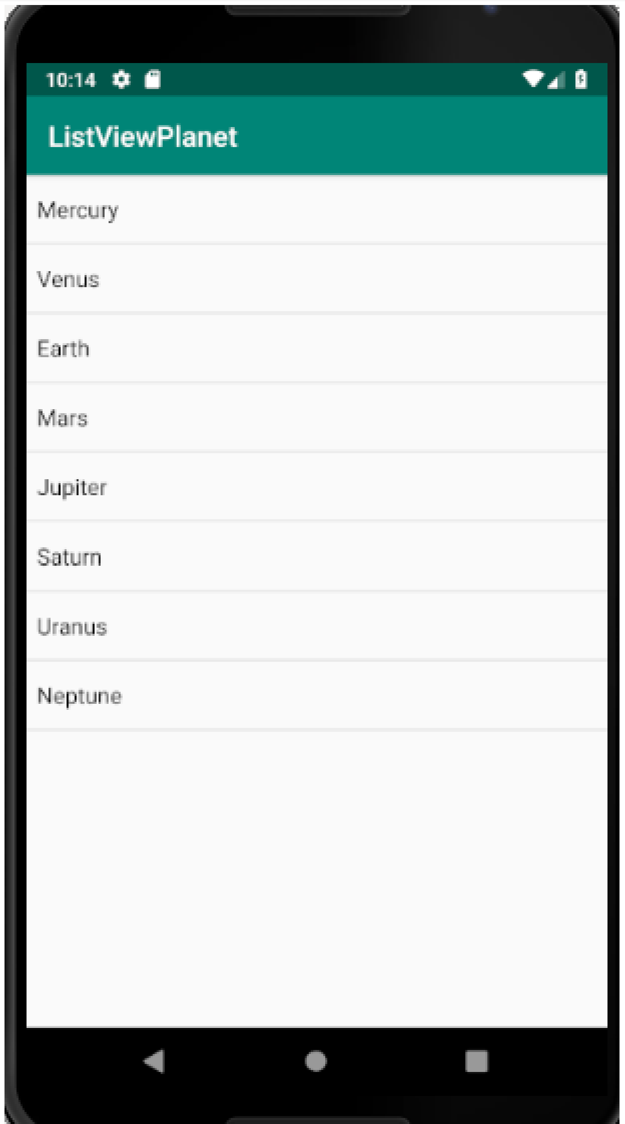
WebOS

Ubuntu

Windows7

Max OS X

Hands on Example-4 - ListView Planet Information


10:14

ListViewPlanet

Mercury

Venus

Earth

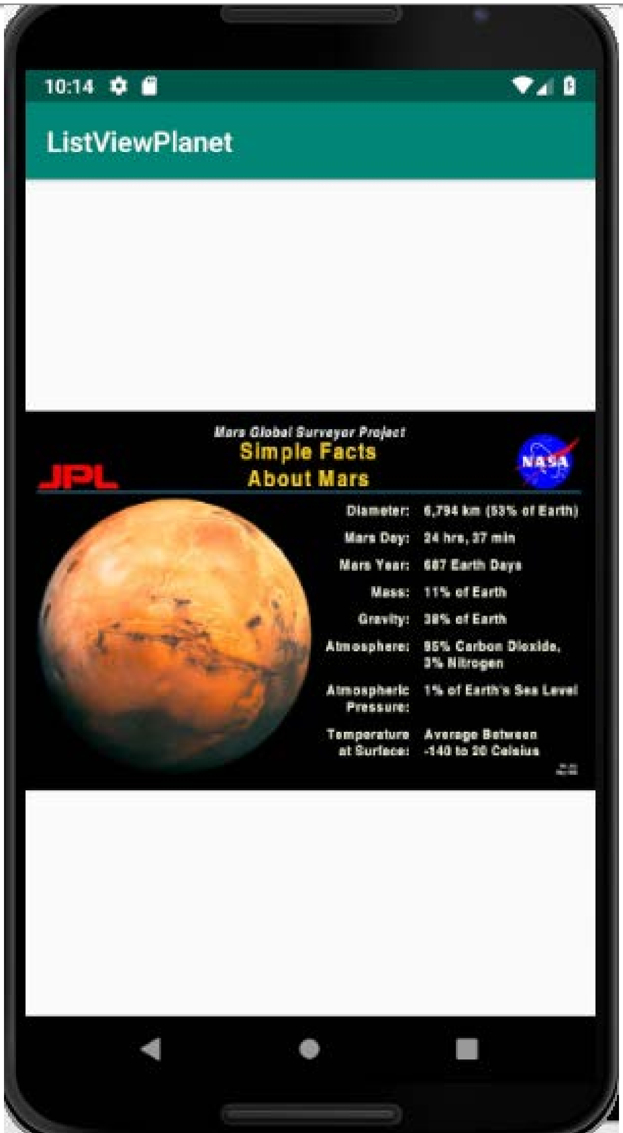
Mars

Jupiter

Saturn

Uranus

Neptune


10:14

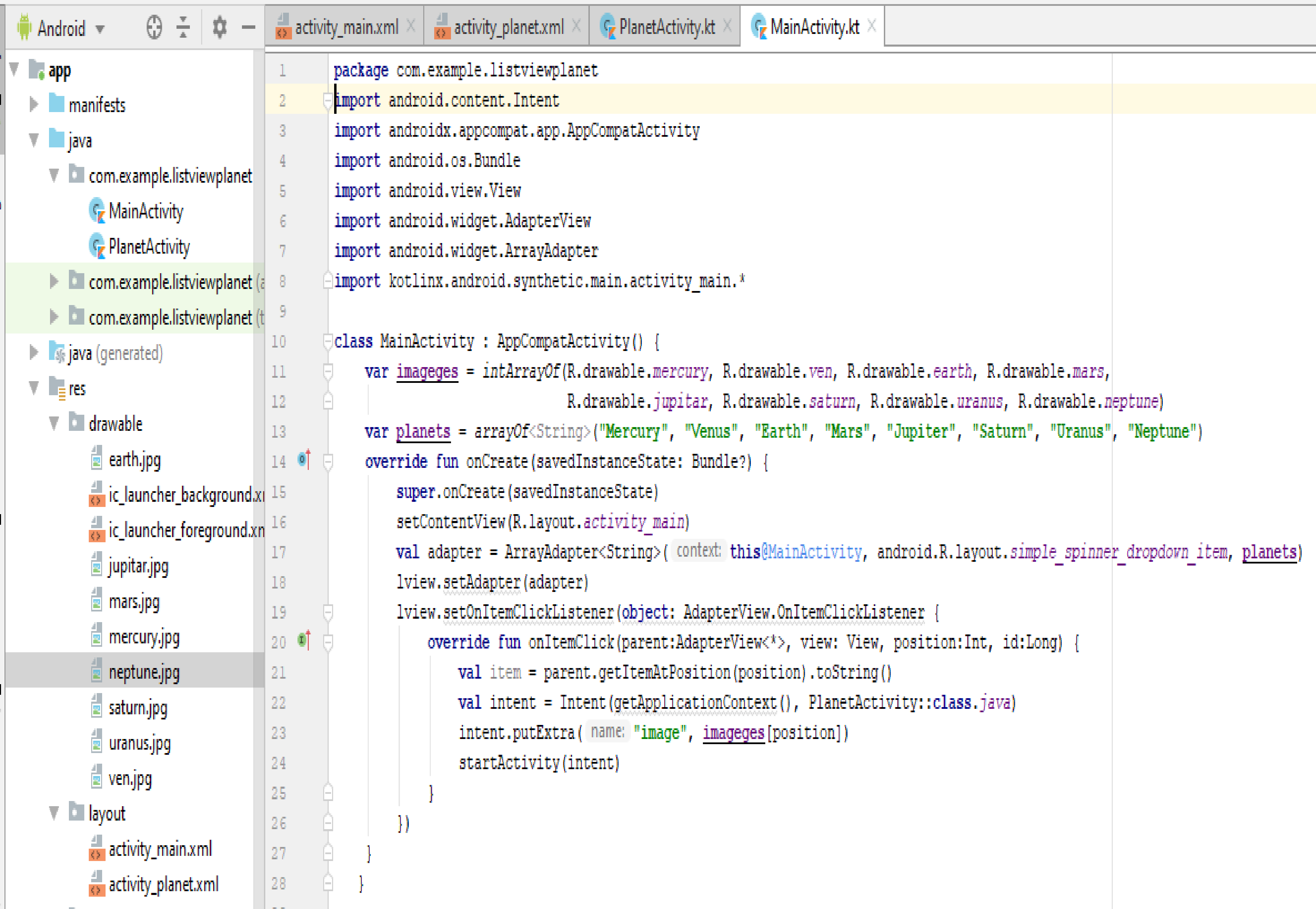
ListViewPlanet

Mars Global Surveyor Project

Simple Facts About Mars

Diameter:	6,794 km (53% of Earth)
Mars Day:	24 hrs, 37 min
Mars Year:	687 Earth Days
Mass:	11% of Earth
Gravity:	38% of Earth
Atmosphere:	95% Carbon Dioxide, 3% Nitrogen
Atmospheric Pressure:	1% of Earth's Sea Level
Temperature at Surface:	Average Between -140 to 20 Celsius

ListView Code



```kotlin
package com.example.listviewplanet
import android.content.Intent
import androidx.appcompat.app.AppCompatActivity
import android.os.Bundle
import android.view.View
import android.widget.AdapterView
import android.widget.ArrayAdapter
import kotlinx.android.synthetic.main.activity_main.*

class MainActivity : AppCompatActivity() {
    var imageges = intArrayOf(R.drawable.mercury, R.drawable.ven, R.drawable.earth, R.drawable.mars,
                              R.drawable.jupitar, R.drawable.saturn, R.drawable.uranus, R.drawable.neptune)
    var planets = arrayOf<String>("Mercury", "Venus", "Earth", "Mars", "Jupiter", "Saturn", "Uranus", "Neptune")
    override fun onCreate(savedInstanceState: Bundle?) {
        super.onCreate(savedInstanceState)
        setContentView(R.layout.activity_main)
        val adapter = ArrayAdapter<String>( context: this@MainActivity, android.R.layout.simple_spinner_dropdown_item, planets)
        lview.setAdapter(adapter)
        lview.setOnItemClickListener(object: AdapterView.OnItemClickListener {
            override fun onItemClick(parent:AdapterView<*>, view: View, position:Int, id:Long) {
                val item = parent.getItemAtPosition(position).toString()
                val intent = Intent(getApplicationContext(), PlanetActivity::class.java)
                intent.putExtra( name: "image", imageges[position])
                startActivity(intent)
            }
        })
    }
}
```

Android Dialogs

- Dialogs are prompt or alert displayed to the user to take a decision or to input any information. The dialogs are also used to notify user when a task has been completed. It does not fill the entire screen and usually appears when a user has to take a particular action before proceeding.
- Android supports different types of Dialogs
  - Alert Dialog
  - Date Picker
  - Time Picker
  - Custom Dialog
  - Progress Dialog
  - Dialog Fragment

Alert Dialogs Example

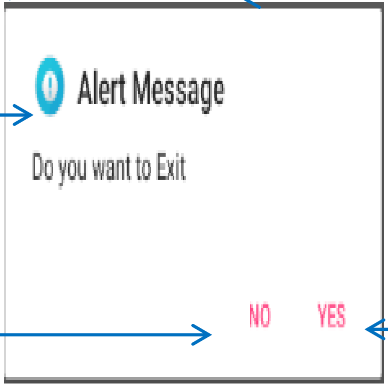
- Alert Dialog is one of the built-in Dialog box with few functionalities like title, message and icon.
- We can create three possible choices of buttons (setPositiveButton(),setNegativeButton() and setNeutralButton().
  Refer Demo : AlertDemo.
- For more info https://developer.android.com/guide/topics/ui/dialogs.html
- Sample alert dialog

```
AlertDialog.Builder builder = new AlertDialog.Builder(this);
```

```
builder.setIcon(R.drawable.alerticon);
```

```
builder.setMessage("Do you want to Exit");
```

```
builder.setNegativeButton("No",listener);
```



Alert Message

Do you want to Exit

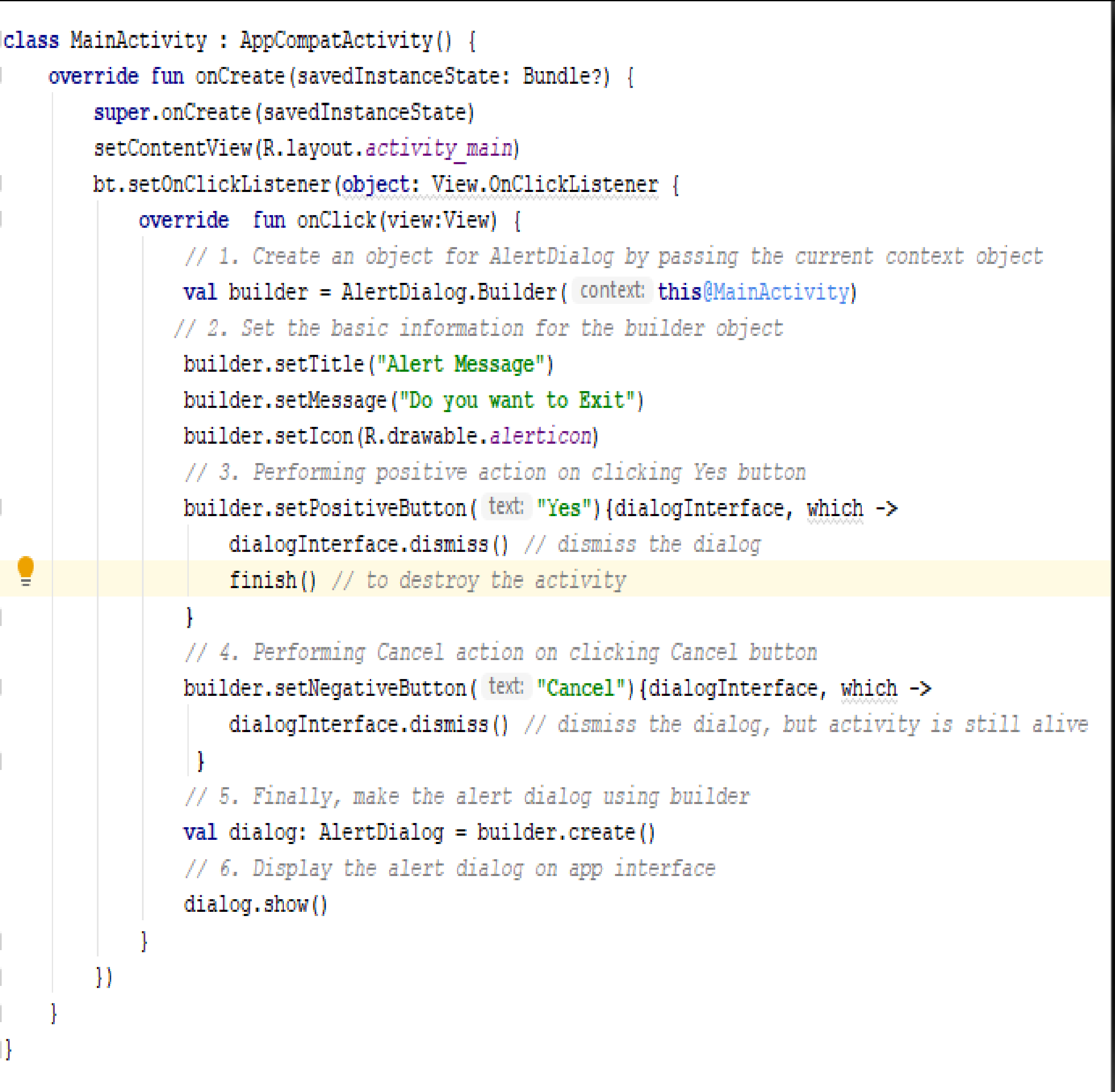
NO YES

```
builder.setTitle("Alert Message");
```

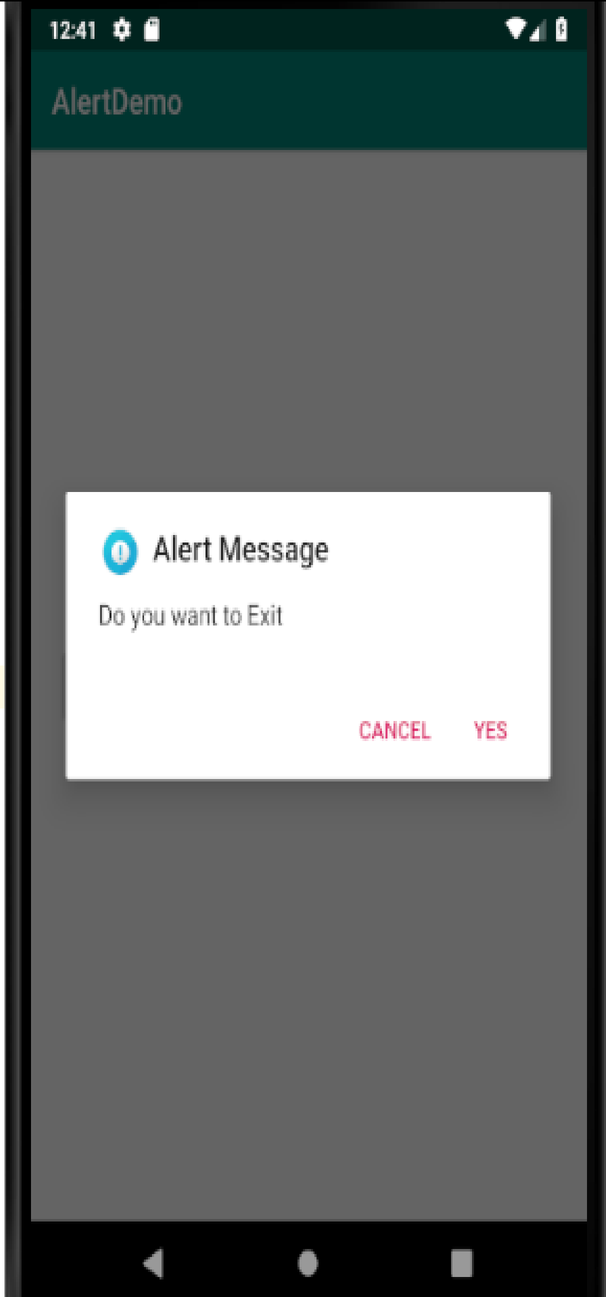
```
builder.setPositiveButton("Yes",listener);
```

```
val dialog: AlertDialog = builder.create()
dialog.show()
```

Hands on example – 4 -Alert Dialogs Code and Screen shot



```kotlin
class MainActivity : AppCompatActivity() {
    override fun onCreate(savedInstanceState: Bundle?) {
        super.onCreate(savedInstanceState)
        setContentView(R.layout.activity_main)
        bt.setOnClickListener(object: View.OnClickListener {
            override  fun onClick(view:View) {
                // 1. Create an object for AlertDialog by passing the current context object
                val builder = AlertDialog.Builder( context: this@MainActivity)
               // 2. Set the basic information for the builder object
                builder.setTitle("Alert Message")
                builder.setMessage("Do you want to Exit")
                builder.setIcon(R.drawable.alerticon)
                // 3. Performing positive action on clicking Yes button
                builder.setPositiveButton( text: "Yes"){dialogInterface, which ->
                    dialogInterface.dismiss() // dismiss the dialog
                    finish() // to destroy the activity
                }
                // 4. Performing Cancel action on clicking Cancel button
                builder.setNegativeButton( text: "Cancel"){dialogInterface, which ->
                    dialogInterface.dismiss() // dismiss the dialog, but activity is still alive
                 }
                // 5. Finally, make the alert dialog using builder
                val dialog: AlertDialog = builder.create()
                // 6. Display the alert dialog on app interface
                dialog.show()
            }
        })
    }
}
```



Date and Time Picker Dialogs

- **DatePickerDialog** and **TimePickerDialog** classes have onDateSetListener() and onTimeSetListener()callback methods respectively.
- These callback methods are invoked when the user is done with selecting the date and time respectively.
- The DatePickerDialog class consists of a 5 argument constructor with the parameters listed below.

  1. Context: It requires the application context

Date and Time Picker Dialogs

2. CallBack Function: onDateSetListener() is invoked and need to override the given method.

void onDateSet(DatePicker view, int year, int month, int dayOfMonth);

Parameters are

- view the picker associated with the dialog
- year the selected year
- month the selected month (0-11)
- dayOfMonth th selected day of the month (1-31, depending on month)

3. int mYear : It shows the current year that's visible when the dialog pops up

4. int mMonth : It shows the current month that's visible when the dialog pops up

5. int mDay : It shows the current day that's visible when the dialog pops up

Hands on Example 5 - Date and Time Picker Dialogs

- The TimePickerDialog class consists of a 5 argument constructor with the parameters listed below.

1. Context: It requires the application context

2. CallBack Function: onTimeSetListener() is invoked when the user sets the time. Need to override the method

void onTimeSet(TimePicker view, int hourOfDay, int minute);

Parameter are

- view the view associated with this listener
- hourOfDay the hour that was set
- minute the minute that was set

3. int mHours : It shows the current Hour that’s visible when the dialog pops up

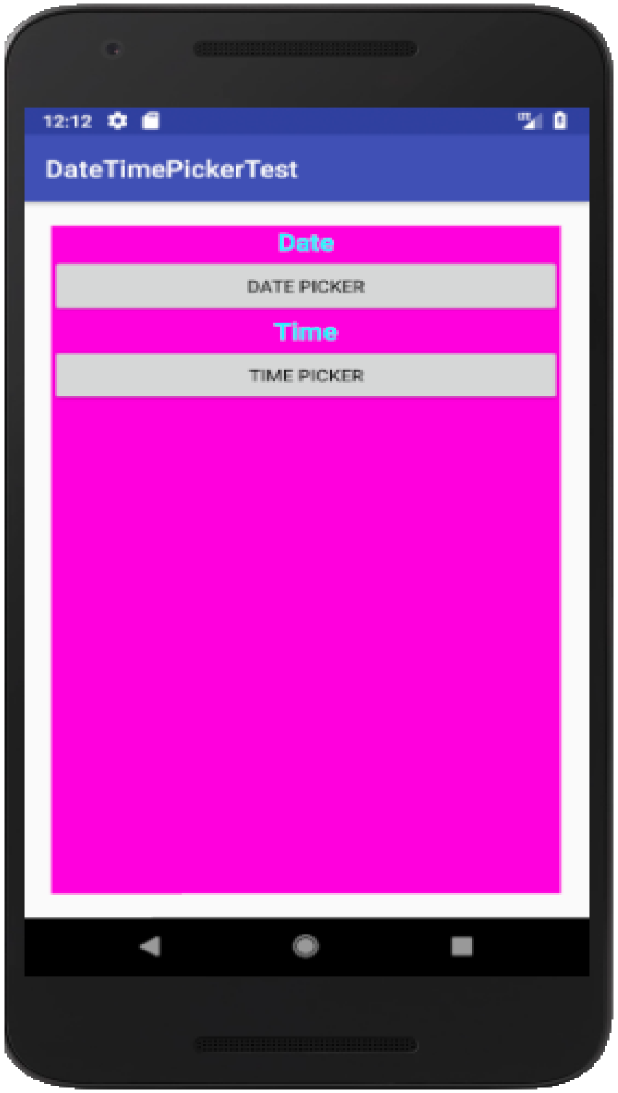
4. int mMinute : It shows the current minute that’s visible when the dialog pops up

5. boolean false : If its set to false it will show the time in 24 hour format else not

Example - Date and Time Picker Dialogs

- Problem Requirement :

  If you click the DATE PICKER button, it will open DatePicker dialog, chosen date will be replaced with Date TextView. Similar way for TIME PICKER.
- Refer : DateTimePickerDemo



Code for DatePicker Dialogs

```
// DatePicker Implementation
when(v?.id){
        R.id.bt1 -> {
            val c = Calendar.getInstance()
            val mYear = c.get(Calendar.YEAR)
            val  mMonth = c.get(Calendar.MONTH) +1
            val  mDay = c.get(Calendar.DAY_OF_MONTH)
            val dpd = DatePickerDialog(this,
            DatePickerDialog.OnDateSetListener { view, year, monthOfYear,
            dayOfMonth ->
                // Display Selected date in Toast
                tv1.text = "$dayOfMonth  $monthOfYear  $year"

            }, mYear, mMonth, mDay)

              dpd.show()
        }
```

Code for TimePicker Dialogs

```
 //  TimePicker Implementation
R.id.bt2 -> {
            val cal = Calendar.getInstance()
            val timeSetListener =
             TimePickerDialog.OnTimeSetListener { timePicker, hour,
             minute ->
                cal.set(Calendar.HOUR_OF_DAY, hour)
                cal.set(Calendar.MINUTE, minute)
               tv2.text = SimpleDateFormat("HH:mm").format(cal.time)
            }
            TimePickerDialog(this, timeSetListener,
cal.get(Calendar.HOUR_OF_DAY), cal.get(Calendar.MINUTE),
false).show()

         }
```