

Android Application Programming - Key Components

1. Service

Definition: A Service is an Android component that runs in the background to perform long-running tasks without a user interface. Examples include playing music, downloading files, or syncing data.

Life Cycle: onCreate() → onStartCommand() → onDestroy()

Example:

```
public class MyService extends Service {
    public void onCreate() { ... }
    public int onStartCommand(Intent i, int f, int s) { ... }
    public void onDestroy() { ... }
}
```

2. View

Definition: A View is the smallest UI element in Android. It represents a rectangular area on the screen. Examples include Button, TextView, and EditText.

Steps: Create → Set properties → Add to layout

Example: Button b = new Button(this); b.setText('Click Me'); setContentView(b);

3. ViewGroup

Definition: A ViewGroup is a container that holds multiple View objects or other ViewGroups. It defines how its children are arranged on the screen.

Steps: Choose ViewGroup → Add child Views → Display

Example:

```
LinearLayout layout = new LinearLayout(this);
layout.setOrientation(LinearLayout.VERTICAL); layout.addView(new Button(this));
setContentView(layout);
```

4. Layout

Definition: A Layout defines the structure and positioning of Views on the screen. It can be defined using XML or programmatically in Java.

Common Layouts: LinearLayout, RelativeLayout, FrameLayout, ConstraintLayout

Example (XML):

```
<LinearLayout>
    <TextView ... />
    <Button ... />
</LinearLayout>
```

5. Adapter

Definition: An Adapter acts as a bridge between data sources (like arrays or databases) and UI components (like ListView or RecyclerView). It prepares and supplies data for display.

Steps: Create data → Create adapter → Set to ListView

Example:

```
String[] items = {'Apple', 'Banana'}; ArrayAdapter adapter = new
ArrayAdapter<>(this, android.R.layout.simple_list_item_1, items);
listView.setAdapter(adapter);
```

Summary Table

Component	Definition	Example Use
Service	Runs background tasks without UI	Music or download service
View	Smallest UI element	Button, TextView
ViewGroup	Container for multiple Views	LinearLayout
Layout	Defines UI arrangement	XML or Java layout
Adapter	Connects data to UI components	ListView with ArrayAdapter