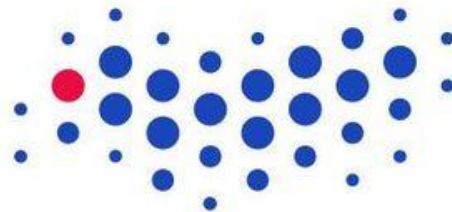


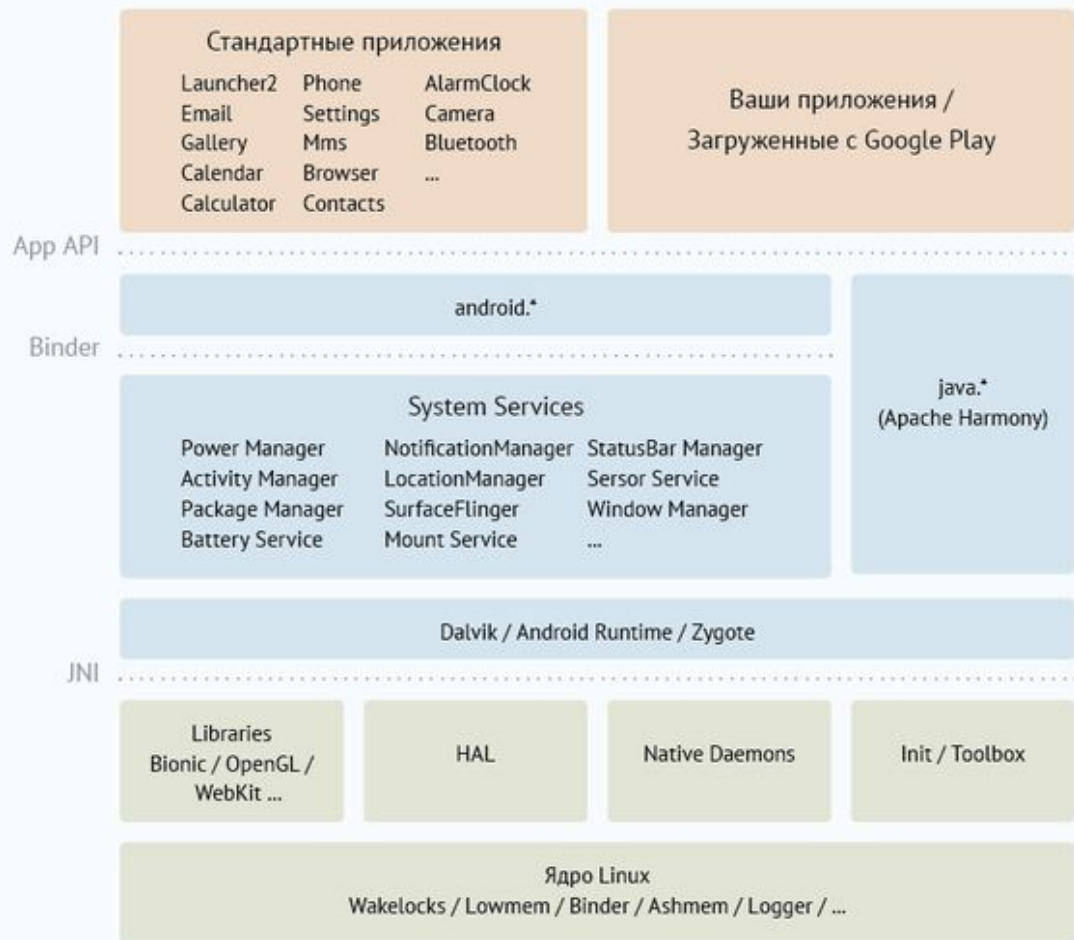
Практикум на ЭВМ.

Программирование под Android

Занятие 1



Введение



Особенности

- Малые ресурсы (ОЗУ, процессор)
- Малый экран, ввод пальцем
- Батарейка

public static void main

Android

```
public static void main(  
    String [] args) {  
    while (true) {  
        /* обработка событий */  
    }  
}
```



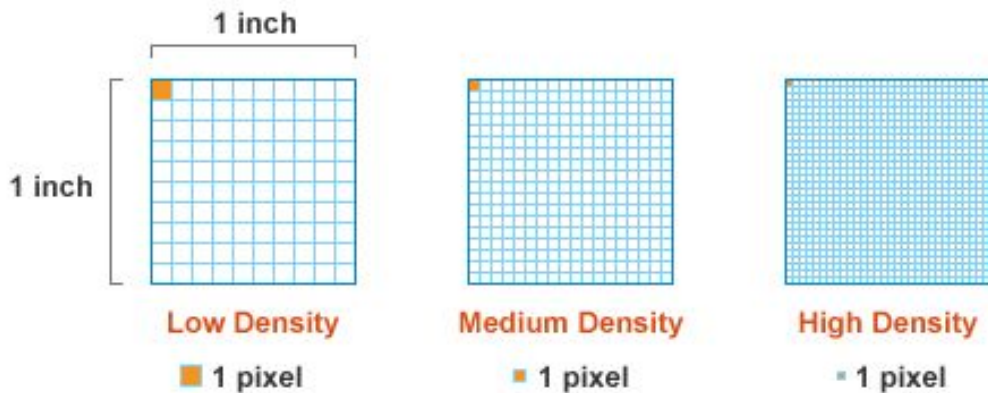
MyApp

```
class MyActivity extends Activity {  
    @Override  
    public void onCreate(  
        Bundle savedInstanceState) {}  
}  
  
class MyReceiver extends BroadcastReceiver {  
    @Override  
    public void onReceive(Bundle bundle) {}  
}
```

ОСНОВНЫЕ КОМПОНЕНТЫ

- Activity
- Service
- BroadcastReceiver
- ContentProvider

Единицы измерения



- Density Independent Pixel (dip, dp) =
 - $1 / 160''$
- Scaled Pixel

Инструменты разработки

- JDK 7
- Android SDK
- Android Studio

<http://developer.android.com/sdk/index.html>

Структура проекта

MyApp

src

MyActivity.java

res

drawable

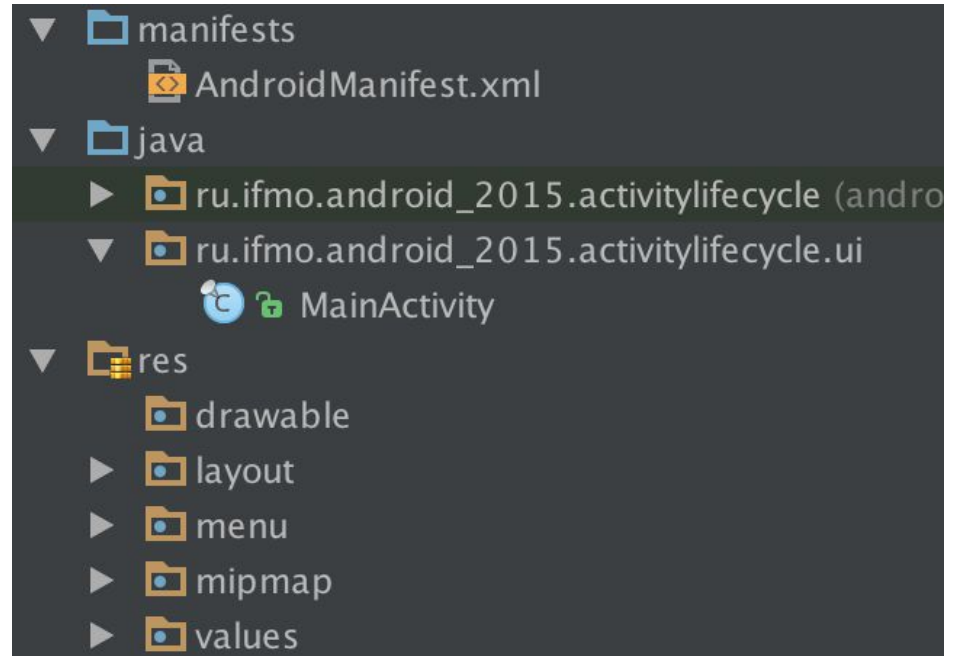
icon.png

selector.xml

layout

values

AndroidManifest.xml



AndroidManifest.xml

- Имя пакета
- Уровни API: минимальный, целевой
- Разрешения
- Компоненты приложения

AndroidManifest.xml

```
<manifest xmlns:android="http://schemas.android.com/apk/res/android"
    package="ru.ifmo.android_2015.activitylifecycle">

    <!-- android.os.Build.VERSION_CODES -->

    <uses-sdk
        android:minSdkVersion="14"
        android:targetSdkVersion="22" />

    <uses-permission android:name="android.permission.INTERNET"/>
    <uses-permission android:name="android.permission.ACCESS_FINE_LOCATION"/>
    <uses-permission android:name="android.permission.READ_CONTACTS"/>
```

AndroidManifest.xml

```
<application
    android:label="@string/app_name"
    android:icon="@mipmap/ic_launcher">

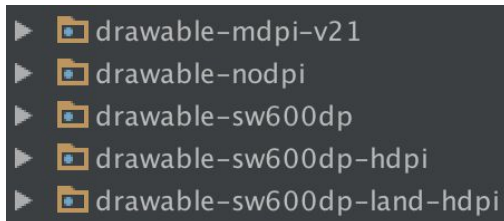
    <activity
        android:name=".ui.MainActivity"
        android:label="@string/title_activity_main">
        <intent-filter>
            <action android:name="android.intent.action.MAIN" />
            <category android:name="android.intent.category.LAUNCHER" />
        </intent-filter>
    </activity>
```

Ресурсы

- Вёрстка (layout)
- Изображения (drawable)
- Меню (menu)
- Константы (values)
- Файлы (raw, assets)
- xml (xml)

Модификаторы ресурсов

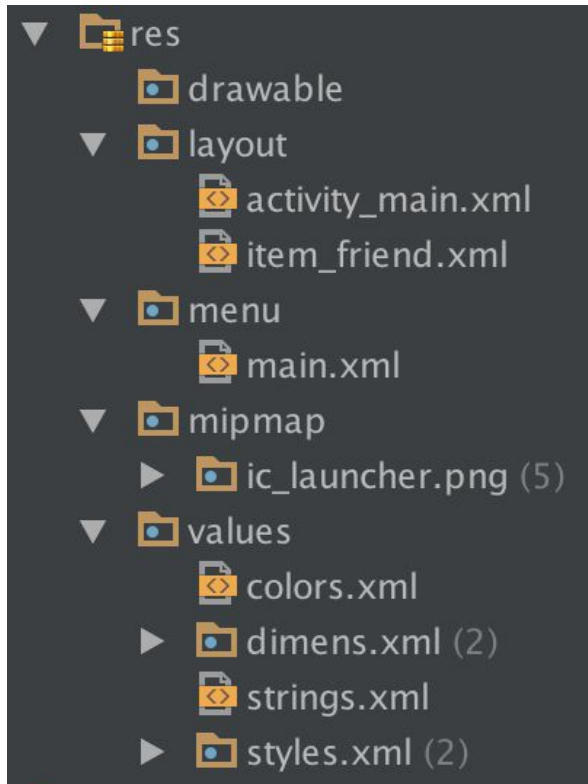
- Ориентация экрана (port, land)
- Размер экрана (w600dp, sw720dp)
- Язык (en, ru)
- Плотность точек (ldpi, mdpi, ..., xxxhdpi)
- Версия платформы (v19, v22, ...)



A screenshot of the Android Studio interface showing a list of drawable resource folders. The folders are listed with a folder icon and a small blue square icon. The folders are: drawable-mdpi-v21, drawable-nodpi, drawable-sw600dp, drawable-sw600dp-hdpi, and drawable-sw600dp-land-hdpi.

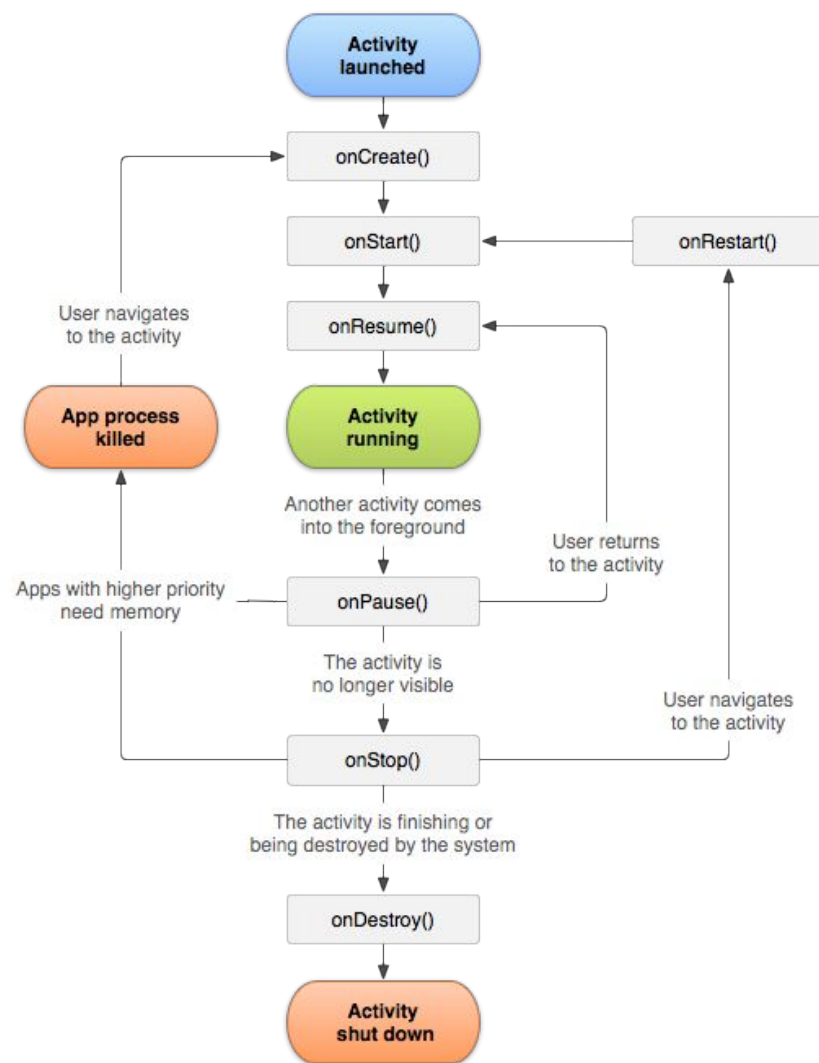
- ▶ drawable-mdpi-v21
- ▶ drawable-nodpi
- ▶ drawable-sw600dp
- ▶ drawable-sw600dp-hdpi
- ▶ drawable-sw600dp-land-hdpi

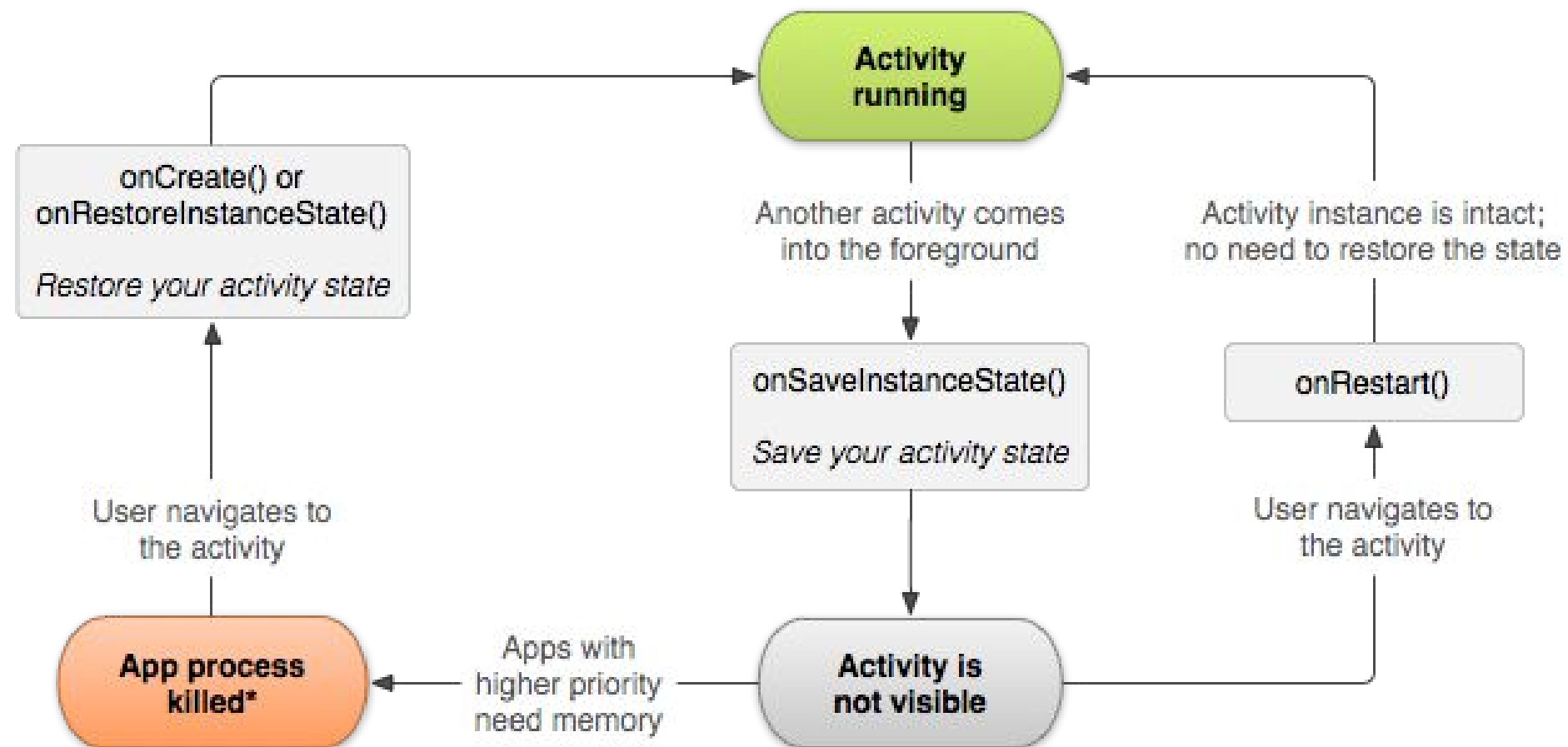
R.java



```
public static final class R {  
    public static final class layout {  
        public static final int activity_main=0x7f040000;  
        public static final int item_friend=0x7f040001;  
    }  
  
    public static final class menu {  
        public static final int main=0x7f0d0000;  
    }  
  
    /* И так далее */  
}
```


Activity





*Activity instance is destroyed, but the state from onSaveInstanceState() is saved

Разметка

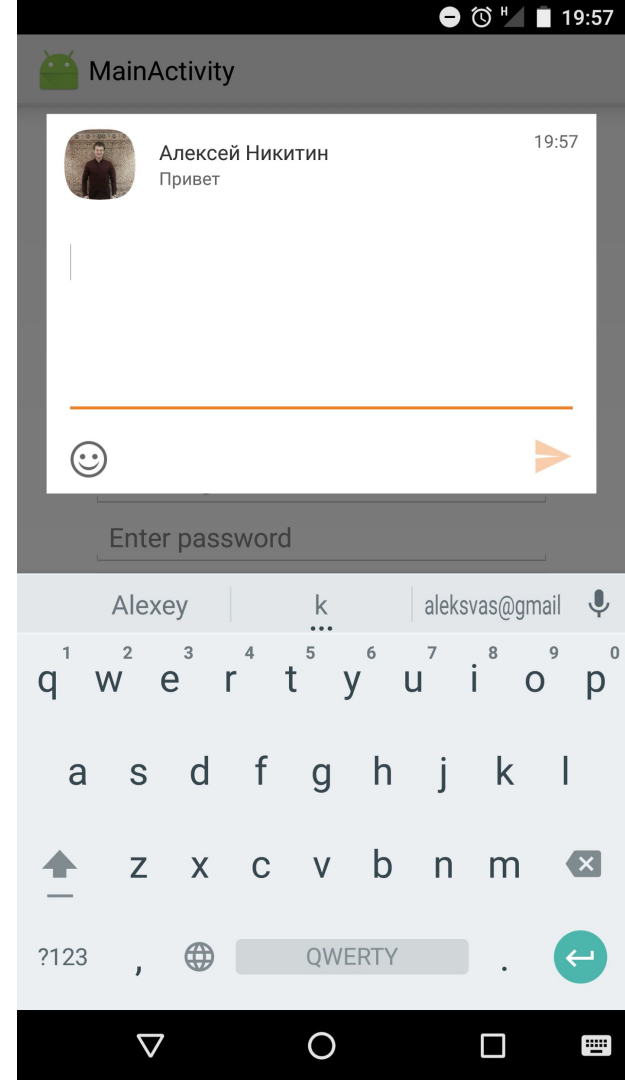
```
FrameLayout frameLayout = new FrameLayout(this);  
setContentView(frameLayout, new ViewGroup.LayoutParams(  
    ViewGroup.LayoutParams.MATCH_PARENT,  
    ViewGroup.LayoutParams.MATCH_PARENT
```

```
TextView tv = new TextView(this);  
frameLayout.addView(tv, new FrameLayout.LayoutParams(  
    FrameLayout.LayoutParams.WRAP_CONTENT,  
    FrameLayout.LayoutParams.WRAP_CONTENT));
```

Разметка

```
setContentView(R.layout.activity_main);
```

onPause



View

Размеры

XML	Java
wrap_content	LayoutParams.WRAP_CONTENT
match_parent	LayoutParams.MATCH_PARENT
100dp	100dp

Размеры

```
<LinearLayout
```

```
    android:layout_width="match_parent"
```

```
    android:layout_height="wrap_content">
```

```
LinearLayout ll = ...;
```

```
ll.setLayoutParams(
```

```
    new ViewGroup.LayoutParams(
```

```
        ViewGroup.LayoutParams.MATCH_PARENT, 100));
```

Виджеты

- TextView
- Button
- EditText
- ImageView

TextView, Button

<TextView

android:layout_width="wrap_content"

android:layout_height="wrap_content"

android:text="Hello, world!"

android:textSize="14sp"

android:textColor="#ff0"

/>

EditText

```
<EditText
```

```
    android:layout_width="wrap_content"
```

```
    android:layout_height="wrap_content"
```

```
    android:hint="Enter password"
```

```
/>
```

ImageView

```
<ImageView
```

```
    android:layout_width="wrap_content"
```

```
    android:layout_height="wrap_content"
```

```
    android:src="@mipmap/ic_launcher"
```

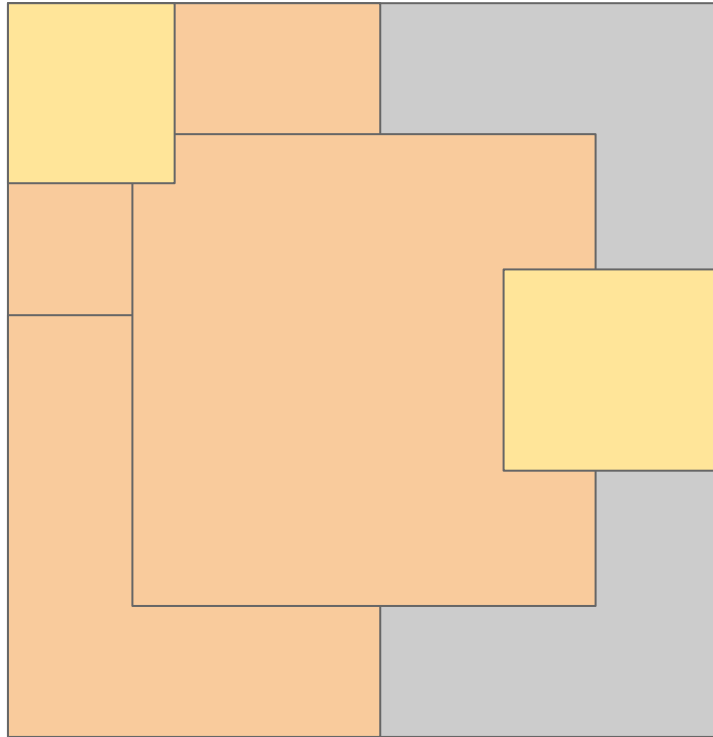
```
    android:scaleType="centerInside"
```

```
/>
```

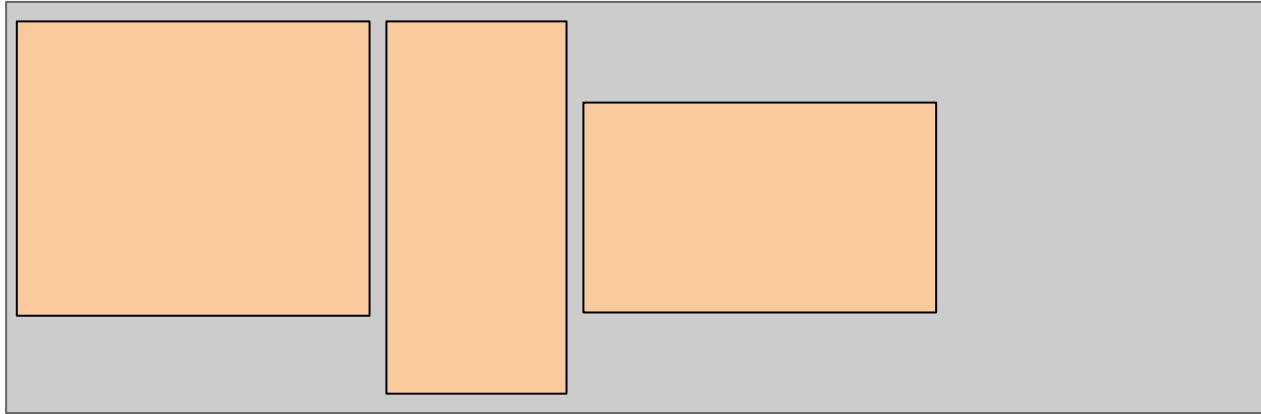
Контейнеры

- `FrameLayout`
- `LinearLayout`
- `RelativeLayout`
- `TableLayout`

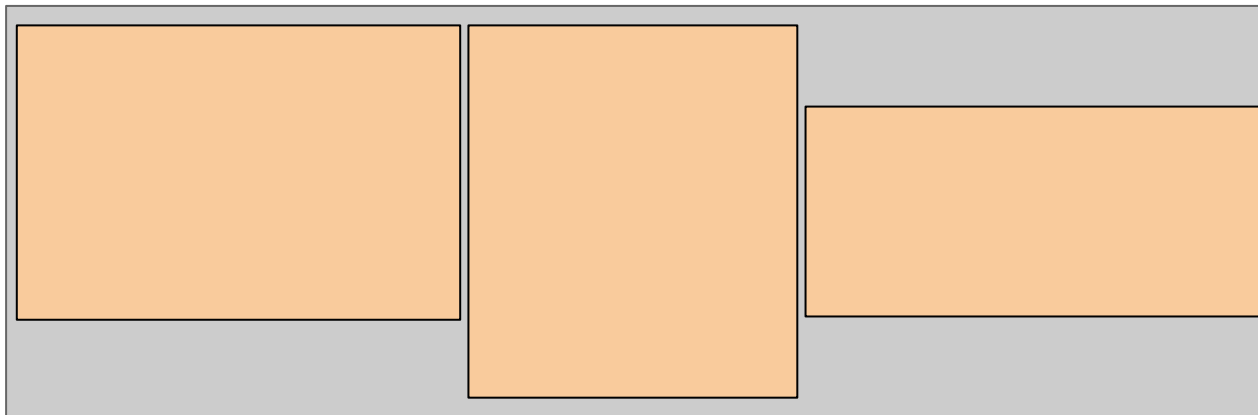
FrameLayout



LinearLayout

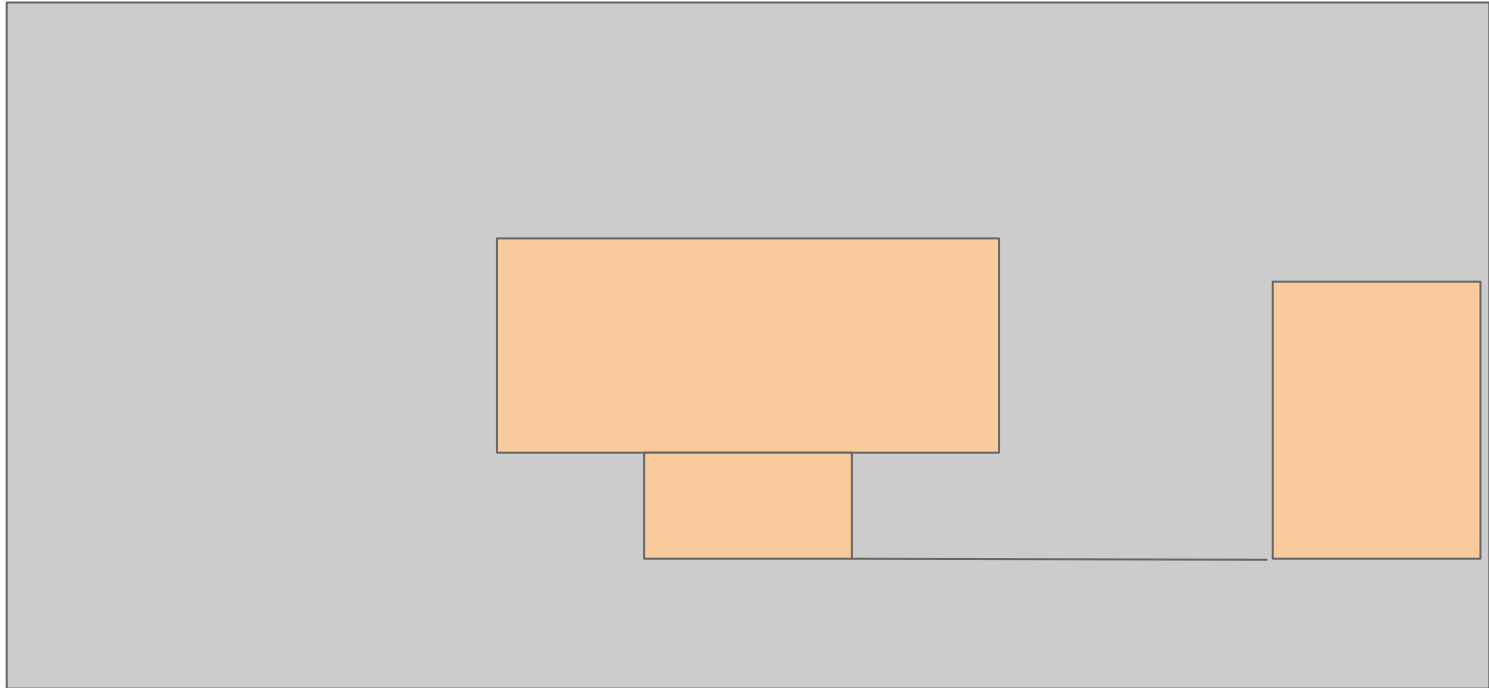


LinearLayout

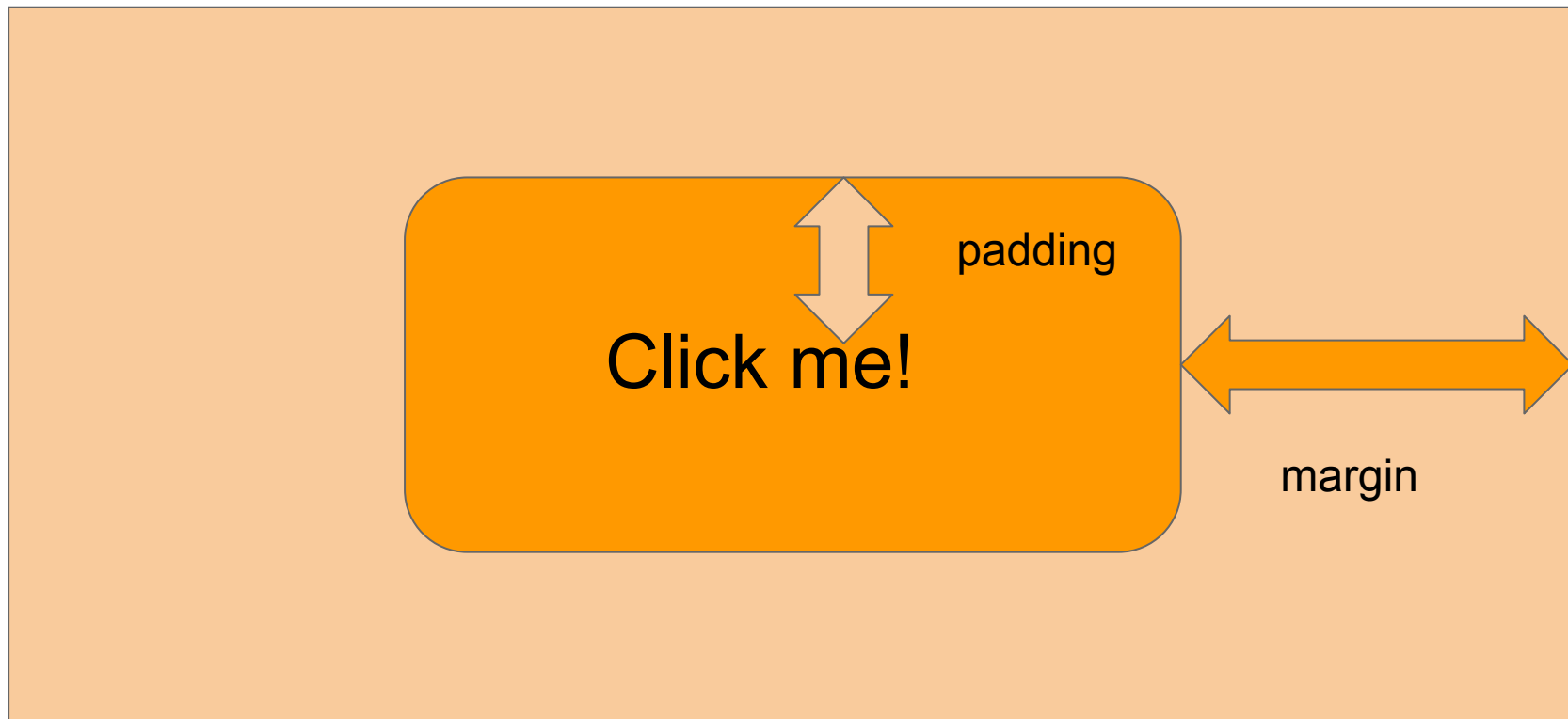


`layout_width="0dp"`
`layout_weight="1"`

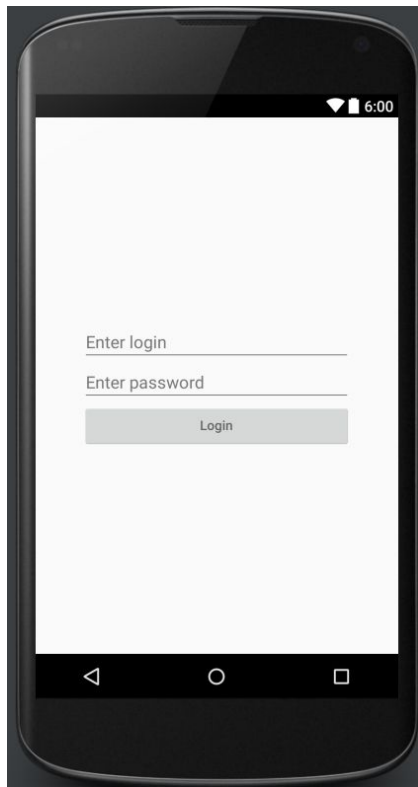
RelativeLayout



Отступы



Пример



```
<FrameLayout
    android:layout_width="match_parent"
    android:layout_height="match_parent">
    <LinearLayout
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_marginLeft="50dp"
        android:layout_marginRight="50dp"
        android:layout_gravity="center"
        android:orientation="vertical"
    >
        <EditText
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:hint="Enter login"
        />
        <EditText
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:hint="Enter password"
        />
        <Button
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:hint="Login"
        />
    </LinearLayout>
</FrameLayout>
```

Пример



First Last Names
some additional info

```
<LinearLayout
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:gravity="center_vertical"
    android:orientation="horizontal">
    <ImageView
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_margin="10dp"
        android:src="@mipmap/ic_launcher"
    />
    <LinearLayout
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:orientation="vertical"
    >
        <TextView
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:text="First Last Names"
            android:textSize="14sp"
        />
        <TextView
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:text="some additional info"
            android:textSize="10sp"
        />
    </LinearLayout>
</LinearLayout>
```

Пример



First Last Names
some additional info



```
<RelativeLayout
    android:layout_width="match_parent"
    android:layout_height="wrap_content">
    <ImageView
        android:id="@+id/image"
        android:layout_alignParentLeft="true"
        android:layout_centerVertical="true"/>
    <LinearLayout
        android:layout_toRightOf="@id/image"
        android:layout_centerVertical="true">
        <TextView/>
        <TextView/>
    </LinearLayout>
    <ImageView
        android:layout_width="20dp"
        android:layout_height="20dp"
        android:src="@mipmap/ic_launcher"
        android:layout_alignParentRight="true"
        android:layout_centerVertical="true"/>
</RelativeLayout>
```

@+id

```
<Button
```

```
    android:id="@+id/login_button"
```

```
    ...
```

```
/>
```

```
setContentView(R.layout.activity_main);
```

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

Видимость

```
<Button
```

```
    android:id="@+id/login_button"
```

```
    android:visibility="invisible"
```

```
/>
```

```
button.setVisibility(View.GONE);
```


Нажатия

```
<Button
```

```
    android:id="@+id/login_button"
```

```
    android:layout_width="match_parent"
```

```
    android:layout_height="wrap_content"
```

```
    android:onClick="onLoginClicked"
```

```
>
```

```
public void onLoginClicked(View view) { }
```

```
button.setOnClickListener(new View.OnClickListener() {
```

```
    @Override
```

```
    public void onClick(View v) { }
```

```
});
```

Вопросы?

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