

Лекция №1.
по курсу «Мобильное программирование»

Москва 2021

Разделы курса

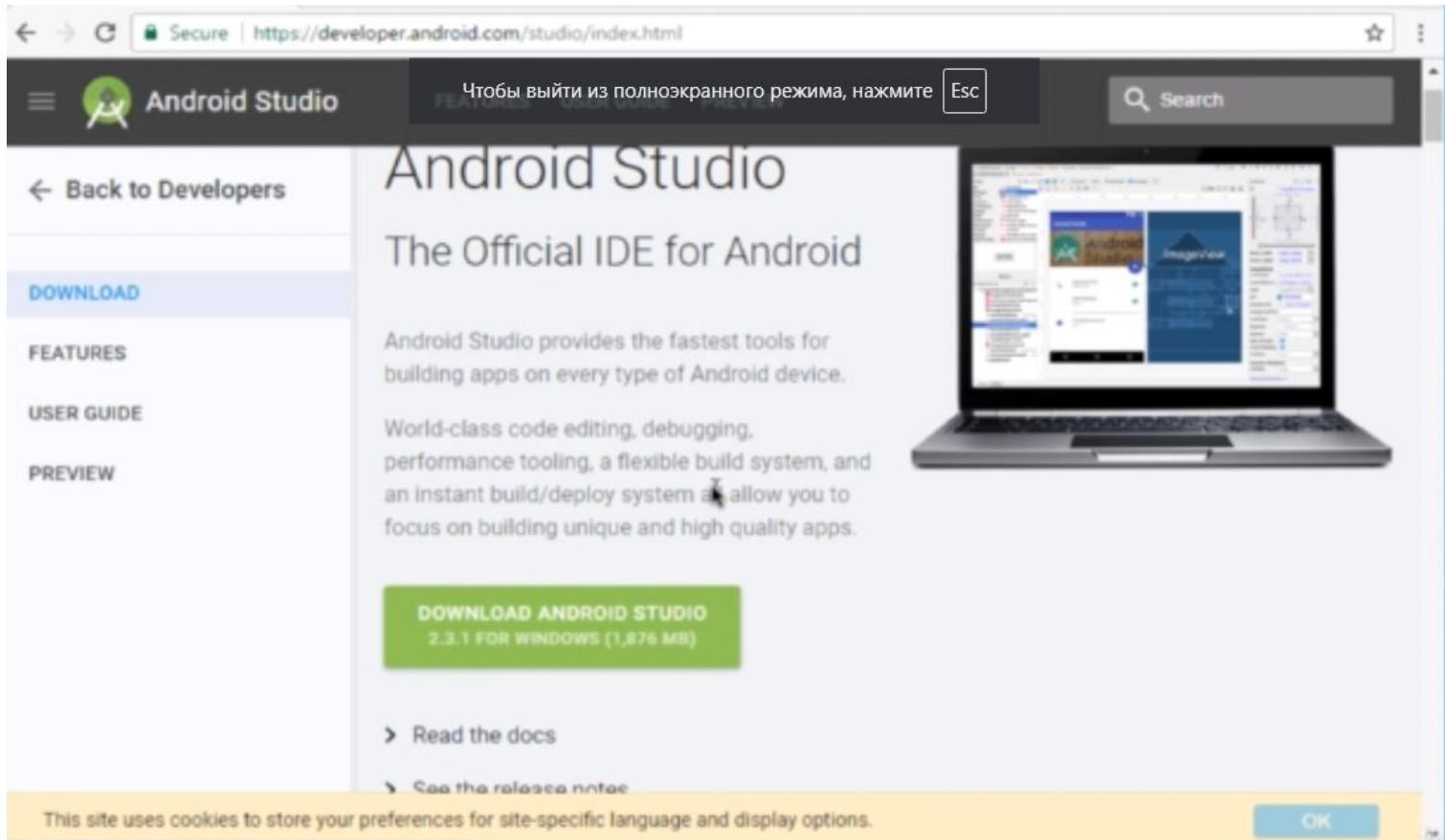
<https://vk.com/club206953786>



Java Programming Language

Android Development

Установка Android Studio



Java SDK (JDK)

Т.к. разработка приложений ведется на Java, нам нужно скачать и установить соответствующее SDK, называемое еще JDK (если, конечно, оно уже не установлено).

Установка Android Studio

The Android SDK (комплект средств разработки) это комплект инструментов используемых для разработки приложений Android.

Android SDK включает:

Библиотека требует

Отладчик (Debugger)

Эмулятор (Emulator)

Связанные документы для Android API.

Пример кода.

Руководство для Android.

Android Virtual Device (AVD) это устройство конфигурации запускающий эмулятор Android (Android emulator). Оно работает с эмулятором чтобы предоставить определенную виртуальную среду, чтобы установить и запустить приложение Android.

Первое приложение

ANDROID PLATFORM VERSION	API LEVEL	CUMULATIVE DISTRIBUTION
4.0 Ice Cream Sandwich	15	
4.1 Jelly Bean	16	99,8%
4.2 Jelly Bean	17	99,2%
4.3 Jelly Bean	18	98,4%
4.4 KitKat	19	98,1%
5.0 Lollipop	21	94,1%
5.1 Lollipop	22	92,3%
6.0 Marshmallow	23	84,9%
7.0 Nougat	24	73,7%
7.1 Nougat	25	66,2%
8.0 Oreo	26	60,8%
8.1 Oreo	27	53,5%
9.0 Pie	28	39,5%
10. Android 10	29	8,2%

Nougat

User Interface

Multi-window Support
Notifications
Quick Settings Tile API
Custom Pointer API

Performance

Profile-guided JIT/AOT Compilation
Quick Path to App Install
Sustained Performance API
Frame Metrics API

Battery Life

Doze on the Go
Project Svelte: Background Optimizations
SurfaceView

Wireless & Connectivity

Data Saver
Number Blocking
Call Screening

Graphics

Vulkan API

System

Direct Boot
Multi-locale Support, More Languages
ICU4J APIs in Android
APK Signature Scheme v2
Scoped Directory Access
Keyboard Shortcuts Helper
Virtual Files

Android for Work

Work profile security challenge
Turn off work
Always on VPN
Customized provisioning

Accessibility

Vision Settings on the Welcome screen

Security

Key Attestation
Network Security Config
Default Trusted Certificate Authority

VR

Platform support and optimizations for VR Mode

Printing Framework

Print service enhancements

<https://developer.android.com/about/versions/nougat/android-7.0.html>

Основные понятия

АКТИВНОСТЬ (отвечает за взаимодействие пользователя с информацией на экране)

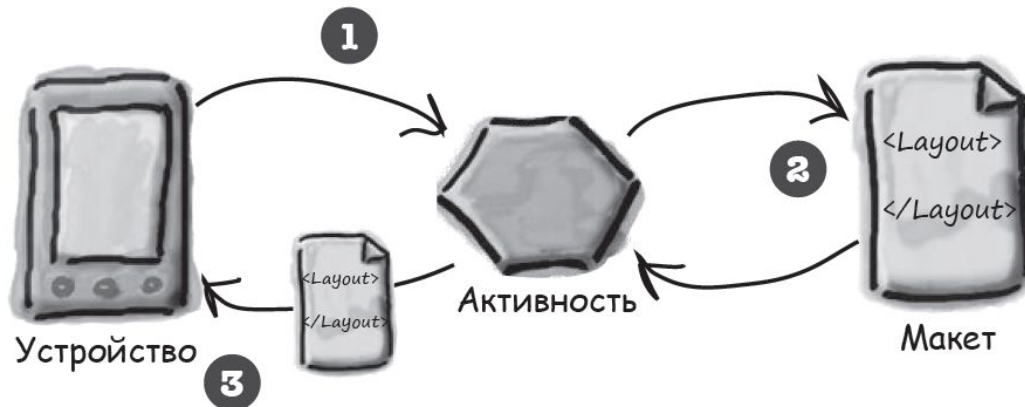
Widget (Компонент, элемент)
каждый виджет является экземпляром класса

View или одного из его subclasses)

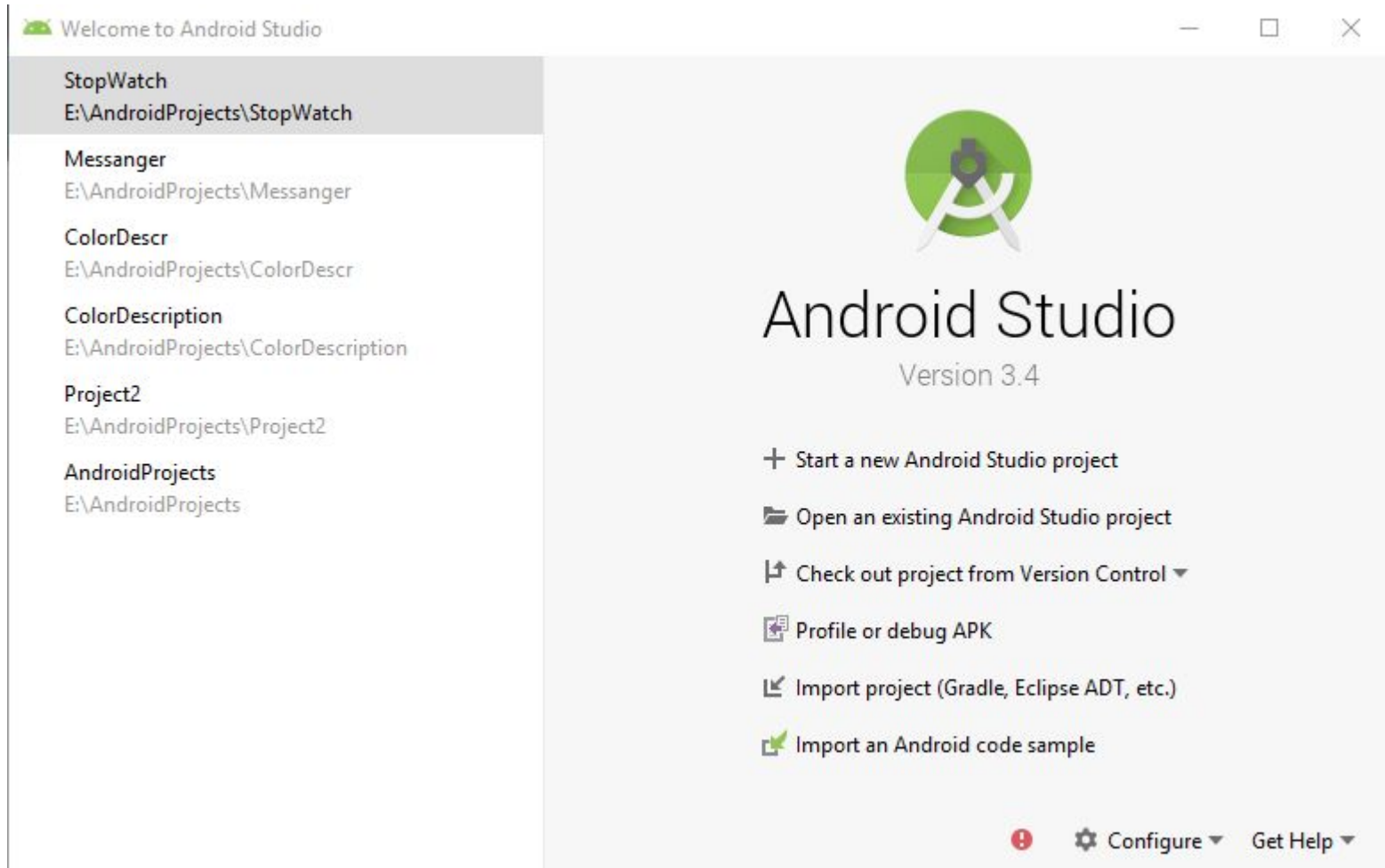
Layout (панель-контейнер)

Макет (определяет набор объектов пользовательского интерфейса и их расположение на экране)

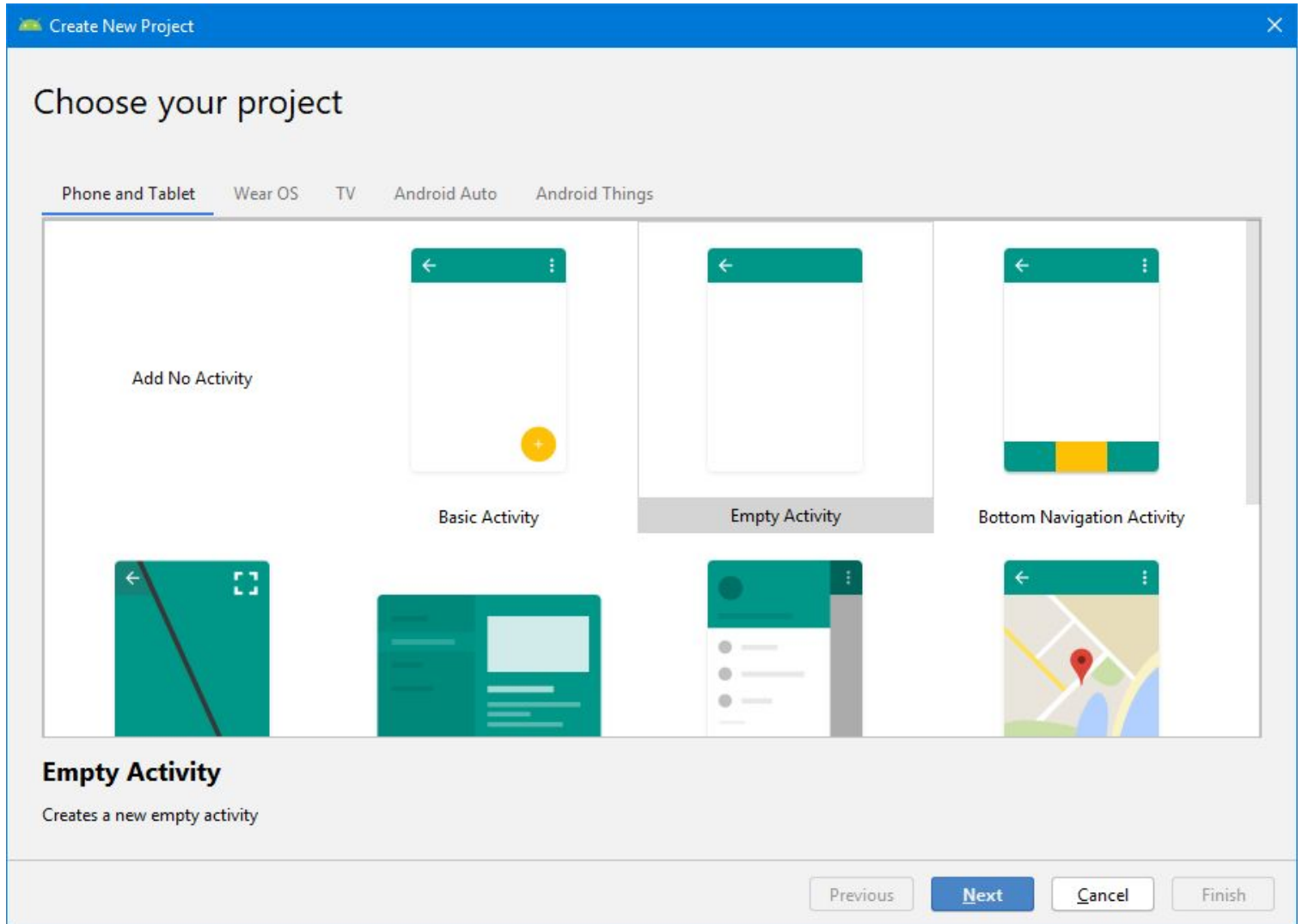
АКТИВНОСТЬ



Занык Android Studio



Создание проекта



Создание проекта

Create New Project

Configure your project

Empty Activity

Creates a new empty activity

Name
Hello world

Package name
com.example.helloworld

Save location
E:\AndroidProjects\Helloworld

Language
Java

Minimum API level
API 15: Android 4.0.3 (IceCreamSandwich)

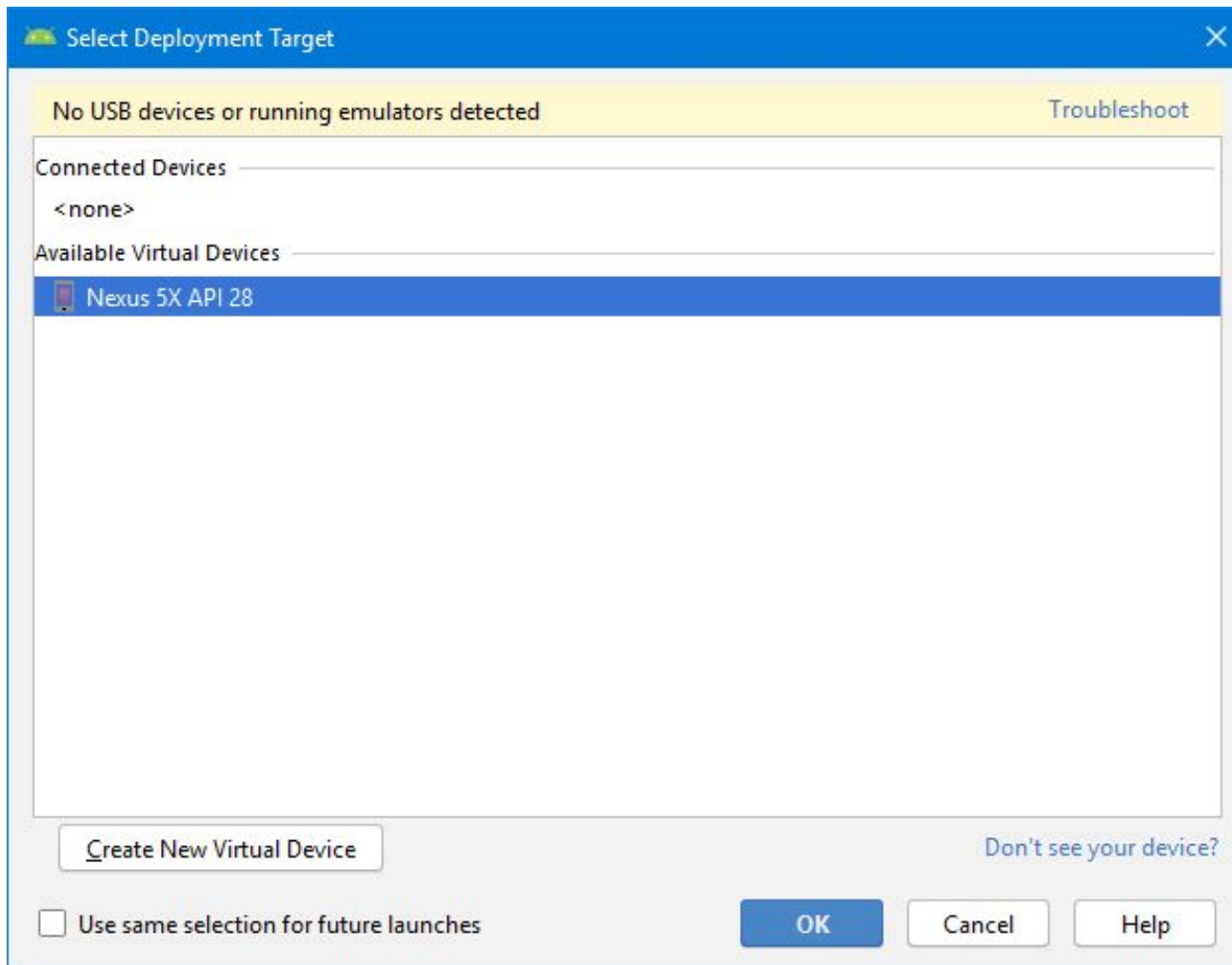
i Your app will run on approximately **100%** of devices.
[Help me choose](#)

This project will support instant apps

Use androidx.* artifacts

[Previous](#) [Next](#) [Cancel](#) [Finish](#)

Запуск проекта




Создание нового устройства

Select Hardware
Android Studio

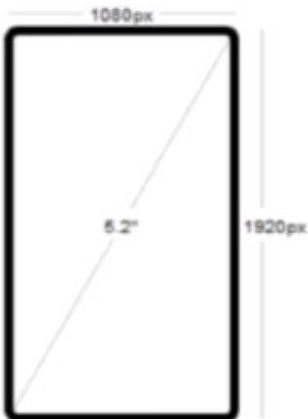
Choose a device definition

Q

Category	Name	Size	Resolution	Density
TV	Pixel XL	5.5"	1440x2560	560dpi
Wear	Pixel	5.0"	1080x1920	xhdpi
Phone	Nexus 5	4.0"	480x800	hdpi
Tablet	Nexus One	3.7"	480x800	hdpi
	Nexus 6P	5.7"	1440x2560	560dpi
	Nexus 6	5.96"	1440x2560	560dpi
	Nexus 5X	5.2"	1080x1920	420dpi
	Nexus 5	4.95"	1080x1920	xhdpi
	Nexus 4	4.7"	768x1280	xhdpi
	Galaxy Nexus	4.65"	720x1280	xhdpi

New Hardware Profile Import Hardware Profiles 

Nexus 5X



Size: large
Ratio: long
Density: 420dpi

Clone Device...

Создание нового устройства

Android Virtual Device (AVD)
Android Studio

Verify Configuration

AVD Name:

Nexus 5X	5.2 1080x1920 xxhdpi	<input type="button" value="Change..."/>
Nougat	Android 7.1.1 x86	<input type="button" value="Change..."/>

Startup orientation: Portrait Landscape

Emulated Performance: Graphics:

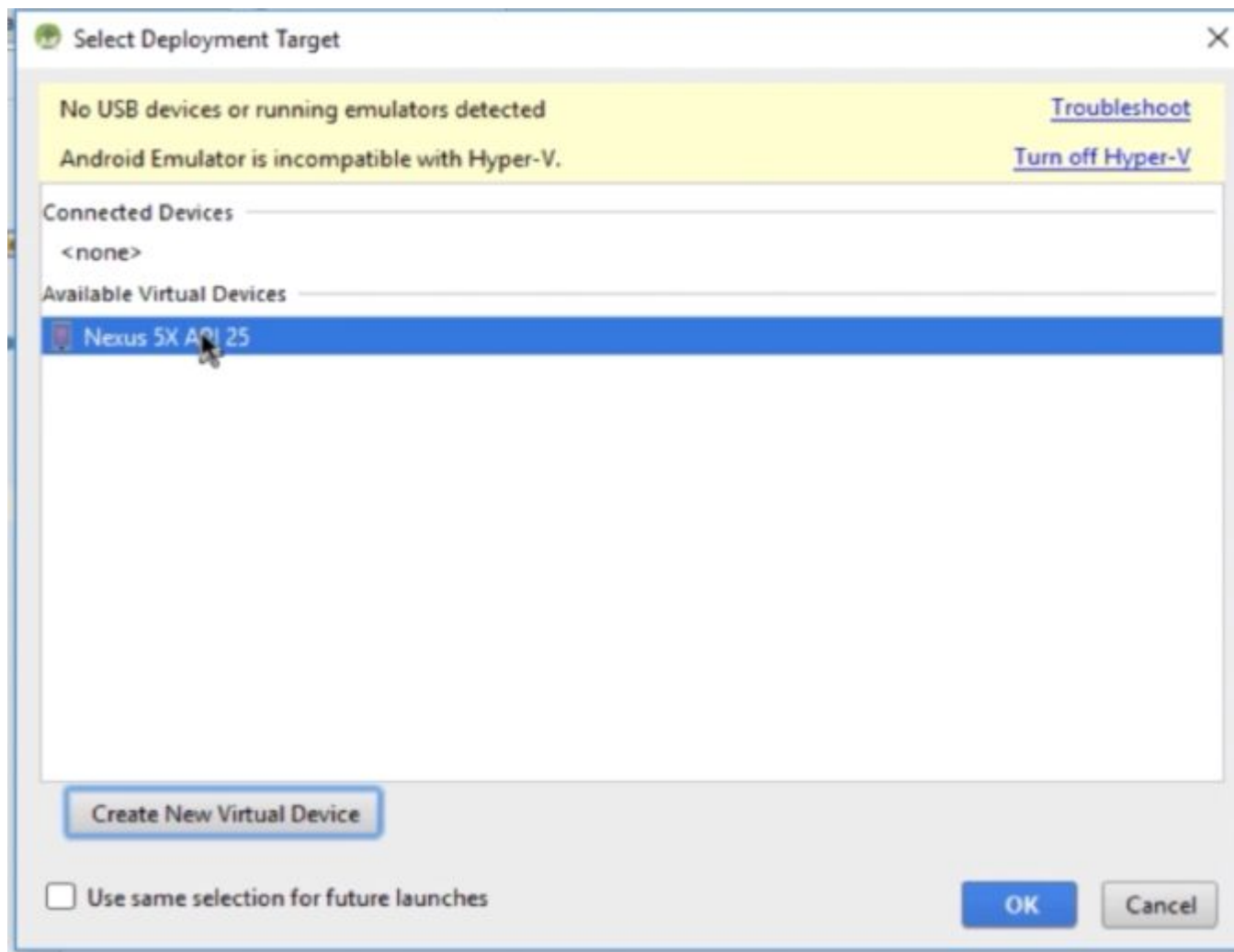
Device Frame: Enable Device Frame

AVD Name

The name of this AVD.

Recommendation: **Android Emulator is incompatible with Hyper-V.**
[Turn off Hyper-V](#)

Создание нового устройства



Sdk manager

Settings for New Projects

Appearance & Behavior > System Settings > Android SDK

Manager for the Android SDK and Tools used by Android Studio

Android SDK Location: [Edit](#)

SDK Platforms SDK Tools SDK Update Sites

Each Android SDK Platform package includes the Android platform and sources pertaining to an API level by default. Once installed, Android Studio will automatically check for updates. Check "show package details" to display individual SDK components.

	Name	API Level	Revision	Status
<input type="checkbox"/>	Android 9.+ (Q)	29	3	Not installed
<input checked="" type="checkbox"/>	Android 9.0 (Pie)	28	6	Installed
<input type="checkbox"/>	Android 8.1 (Oreo)	27	3	Not installed
<input type="checkbox"/>	Android 8.0 (Oreo)	26	2	Not installed
<input type="checkbox"/>	Android 7.1.1 (Nougat)	25	3	Not installed
<input type="checkbox"/>	Android 7.0 (Nougat)	24	2	Not installed
<input type="checkbox"/>	Android 6.0 (Marshmallow)	23	3	Not installed
<input type="checkbox"/>	Android 5.1 (Lollipop)	22	2	Not installed
<input type="checkbox"/>	Android 5.0 (Lollipop)	21	2	Not installed
<input type="checkbox"/>	Android 4.4W (KitKat Wear)	20	2	Not installed
<input type="checkbox"/>	Android 4.4 (KitKat)	19	4	Not installed
<input type="checkbox"/>	Android 4.3 (Jelly Bean)	18	3	Not installed
<input type="checkbox"/>	Android 4.2 (Jelly Bean)	17	3	Not installed
<input type="checkbox"/>	Android 4.1 (Jelly Bean)	16	5	Not installed
<input type="checkbox"/>	Android 4.0.3 (IceCreamSandwich)	15	5	Not installed
<input type="checkbox"/>	Android 4.0 (IceCreamSandwich)	14	4	Not installed
<input type="checkbox"/>	Android 3.2 (Honeycomb)	13	1	Not installed
<input type="checkbox"/>	Android 3.1 (Honeycomb)	12	3	Not installed
<input type="checkbox"/>	Android 3.0 (Honeycomb)	11	2	Not installed
<input type="checkbox"/>	Android 2.3.3 (Gingerbread)	10	2	Not installed
<input type="checkbox"/>	Android 2.3 (Gingerbread)	9	2	Not installed
<input type="checkbox"/>	Android 2.2 (Froyo)	8	3	Not installed
<input type="checkbox"/>	Android 2.1 (Eclair)	7	3	Not installed

Hide Obsolete Packages Show Package Details

OK Cancel Apply Help

Sdk manager

Appearance & Behavior > System Settings > Android SDK Reset

Manager for the Android SDK and Tools used by Android Studio

Android SDK Location: [Edit](#)

SDK Platforms | SDK Tools | SDK Update Sites

Each Android SDK Platform package includes the Android platform and sources pertaining to an API level by default. Once installed, Android Studio will automatically check for updates. Check "show package details" to display individual SDK components.

	Name	API Level	Revision	Status
▼ <input checked="" type="checkbox"/>	Android 7.1.1 (Nougat)			
<input checked="" type="checkbox"/>	Android SDK Platform 25	25	3	Installed
<input checked="" type="checkbox"/>	Sources for Android 25	25	1	Installed
<input checked="" type="checkbox"/>	Android TV Intel x86 Atom System Image	25	3	Not installed
<input checked="" type="checkbox"/>	Android Wear ARM EABI v7a System Image	25	3	Not installed
<input checked="" type="checkbox"/>	Android Wear Intel x86 Atom System Image	25	3	Not installed
<input checked="" type="checkbox"/>	Google APIs ARM 64 v8a System Image	25	4	Not installed
<input checked="" type="checkbox"/>	Google APIs ARM EABI v7a System Image	25	4	Not installed
<input checked="" type="checkbox"/>	Google APIs Intel x86 Atom System Image	25	4	Installed
<input checked="" type="checkbox"/>	Google APIs Intel x86 Atom_64 System Image	25	4	Not installed
▼ <input type="checkbox"/>	Android 7.0 (Nougat)			
<input checked="" type="checkbox"/>	Google APIs	24	1	Installed
<input type="checkbox"/>	Android SDK Platform 24	24	2	Not installed
<input type="checkbox"/>	Sources for Android 24	24	1	Not installed
<input type="checkbox"/>	Android TV Intel x86 Atom System Image	24	10	Not installed
<input type="checkbox"/>	ARM 64 v8a System Image	24	7	Not installed
<input type="checkbox"/>	ARM EABI v7a System Image	24	7	Not installed
<input type="checkbox"/>	Intel x86 Atom System Image	24	7	Not installed
<input type="checkbox"/>	Intel x86 Atom_64 System Image	24	7	Not installed
<input type="checkbox"/>	Google APIs ARM 64 v8a System Image	24	11	Not installed
<input type="checkbox"/>	Google APIs ARM EABI v7a System Image	24	11	Not installed
<input checked="" type="checkbox"/>	Google APIs Intel x86 Atom System Image	24	11	Installed
<input type="checkbox"/>	Google APIs Intel x86 Atom_64 System Image	24	11	Not installed

Show Package Details

Aktipawan Windows

VTX emulator

Сведения о системе

Файл Правка Вид Справка

Сведения о системе

- Аппаратные ресурсы
- Компоненты
- Программная среда

Элемент	Значение
Конфигурация PCR7	Привязка невозможна
Папка Windows	C:\WINDOWS
Системная папка	C:\WINDOWS\system32
Устройство загрузки	\Device\HarddiskVolume1
Язык системы	Россия
Аппаратно-зависимый уровень...	Версия = "10.0.17134.858"
Имя пользователя	DESKTOP-BH94OS2\1
Часовой пояс	RTZ 2 (зима)
Установленная оперативная п...	8,00 ГБ
Полный объем физической па...	7,90 ГБ
Доступно физической памяти	1,72 ГБ
Всего виртуальной памяти	12,7 ГБ
Доступно виртуальной памяти	3,29 ГБ
Размер файла подкачки	4,75 ГБ
Файл подкачки	C:\pagefile.sys
Защита DMA ядра	Откл.
Безопасность на основе вирту...	Не включено
Поддержка шифрования устр...	Причины сбоя автоматического шифрования устройства: Доверенный пла...
Hyper-V — расширения режи...	Да
Hyper-V — расширения для п...	Да
Hyper-V — виртуализация вкл...	Да
Hyper-V — предотвращение в...	Да

Искать: Найти

Поиск только в выделенной категории Поиск только в именах категорий

Активация Windows

Чтобы активировать Windows, перейдите в раздел "Параметры".

Закреть

IDE

The screenshot displays the Android Studio IDE interface for a project named "ShowNameNow". The top toolbar includes standard IDE actions like File, Edit, View, and Run. The breadcrumb navigation shows the current file path: `src > main > res > layout > activity_main.xml`. The left sidebar shows the project structure with folders for `manifests`, `java`, `generatedJava`, `res`, and `Gradle Scripts`. The `MainActivity` class is highlighted.

The central design surface shows a visual representation of the `activity_main.xml` layout. It features a `ConstraintLayout` containing an `Ab TextView` with the text "Hello World!". The design surface is split into two views: a light theme on the left and a dark theme on the right.

The right sidebar contains the `Attributes` panel, which currently displays the message: "No component selected. Select a component in the Component Tree or on the Design Surface."

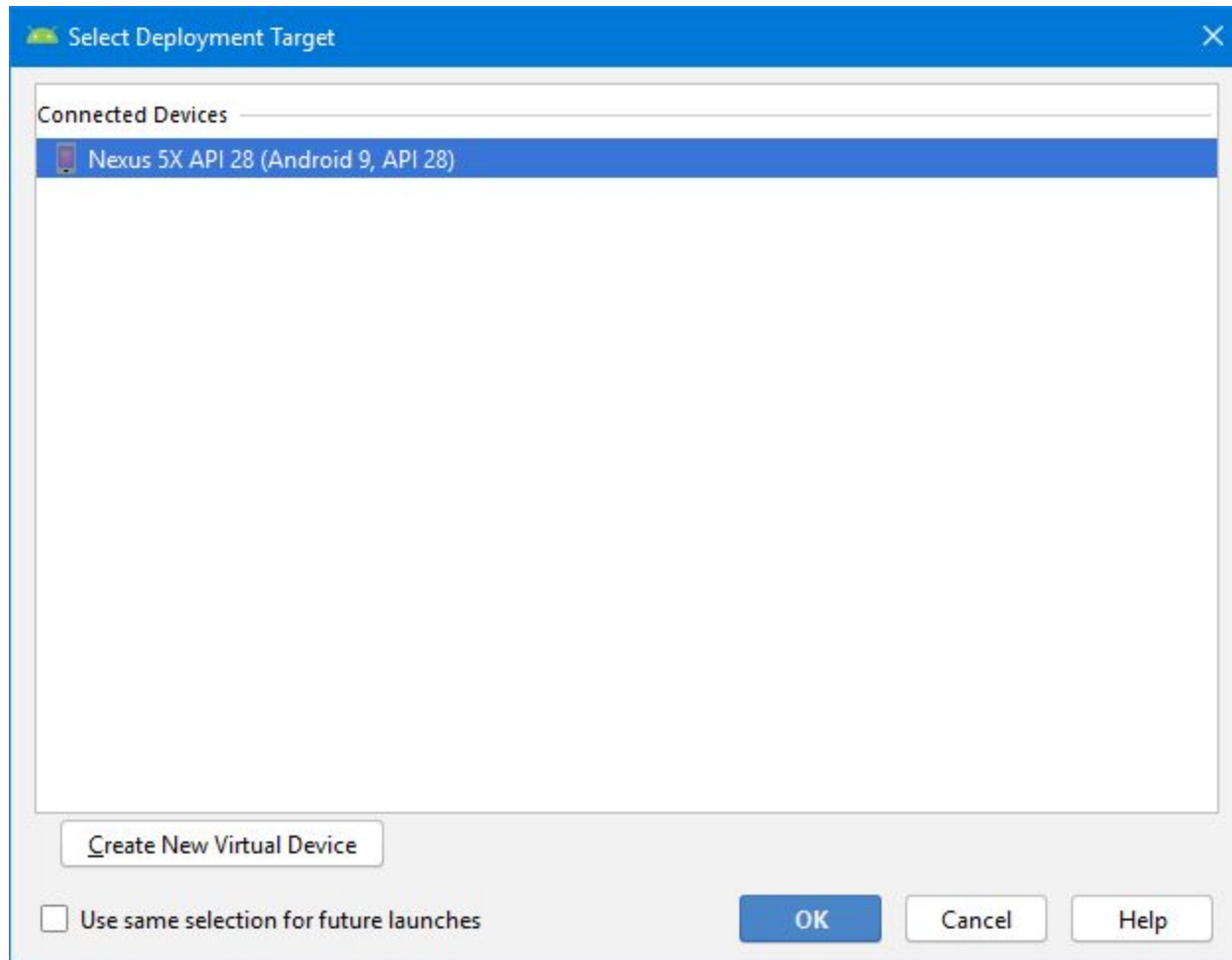
The bottom panel shows the `Build` output window. The build log indicates a successful sync and build process:

- ✓ **ShowNameNow**: synced successfully at 29.08.2019 21:53 (1 m 2 s 302 ms)
- ✓ Starting Gradle Daemon (10 s 15 ms)
- ✓ Run build E:\AndroidProjects\ShowNameNow (38 s 131 ms)
 - ✓ Load build (4 s 664 ms)
 - ✓ Configure build (29 s 48 ms)
 - ✓ Calculate task graph (771 ms)
 - ✓ Run tasks (3 s 122 ms)

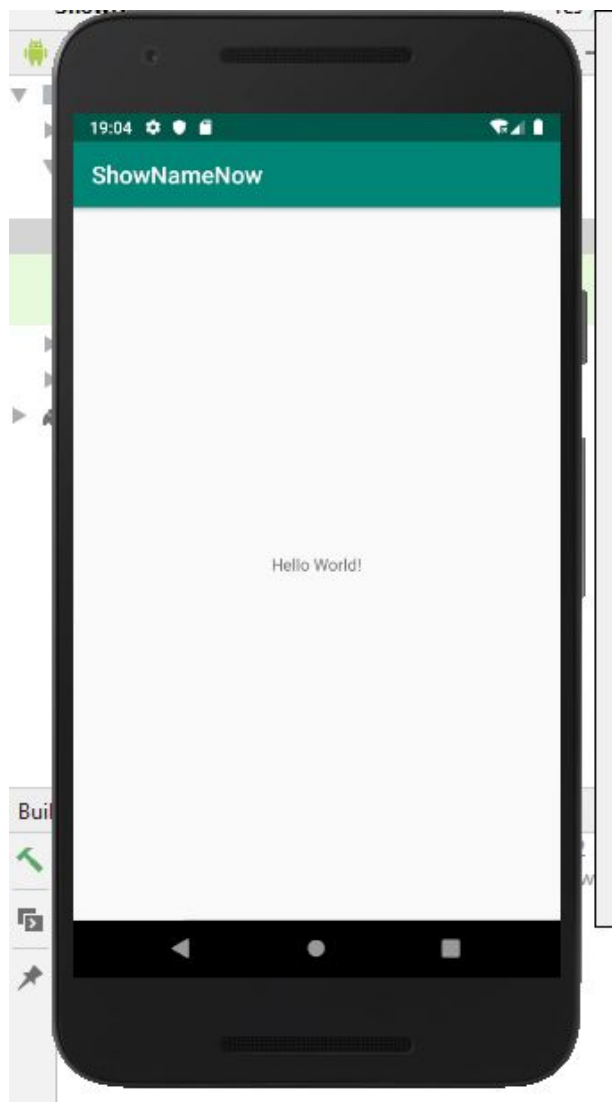
A Windows activation watermark is visible in the bottom right corner, stating: "Активация Windows. Чтобы активировать Windows, перейдите в раздел 'Параметры'."

The status bar at the bottom indicates: "Power save mode is on: Code insight and background tasks are disabled. // Do Not Show Again // Disable Power Save Mode (4 minutes ago)".

Select virtual device



Результат работы программы



Исходный код программы

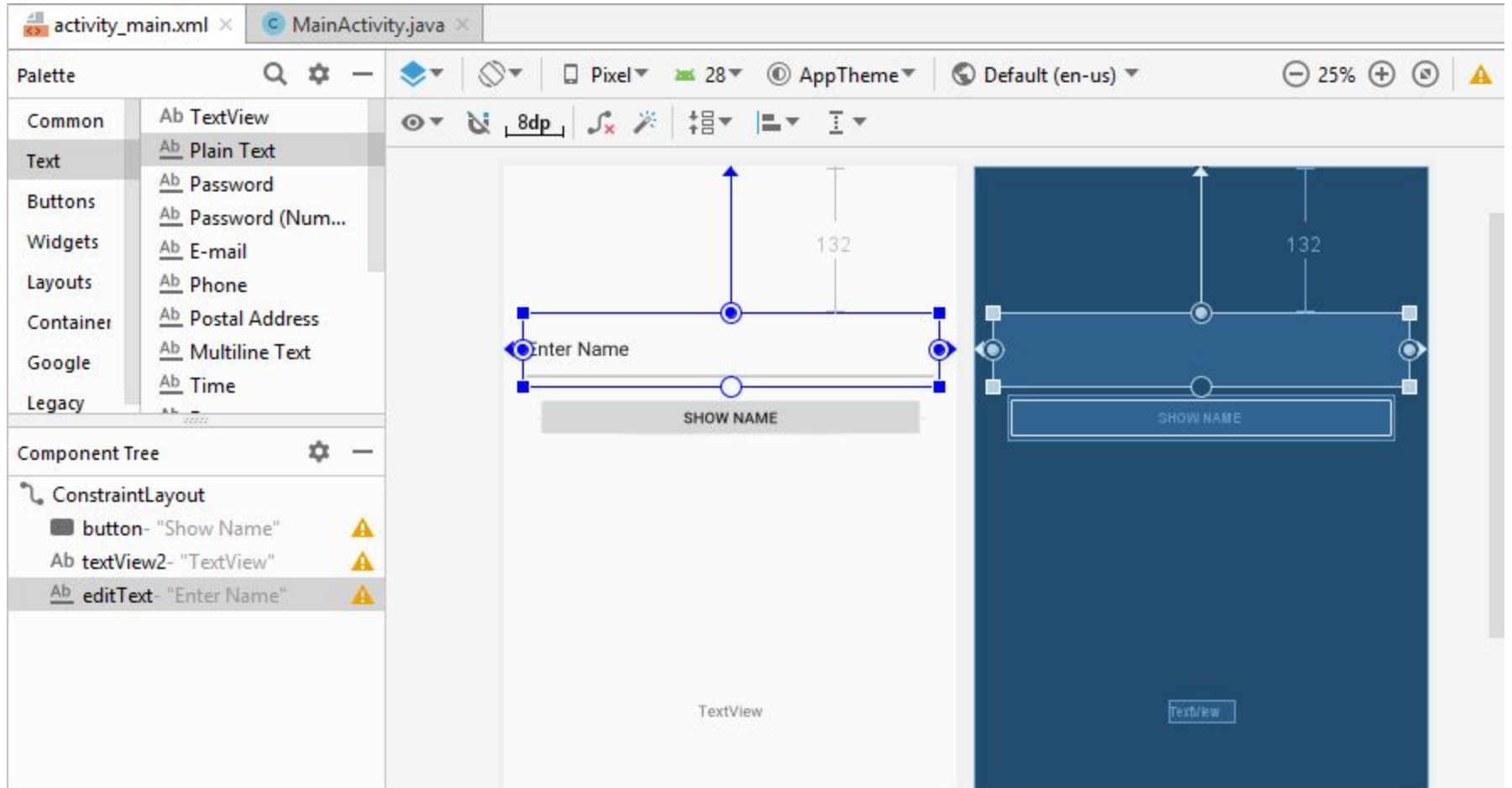
```
activity_main.xml x MainActivity.java x
1 package com.example.shownamenow;
2
3 import android.support.v7.app.AppCompatActivity;
4 import android.os.Bundle;
5 import android.widget.Button;
6 import android.widget.TextView;
7
8 public class MainActivity extends AppCompatActivity {
9     private Button myButton;
10    private TextView showText;
11
12    @Override
13    protected void onCreate(Bundle savedInstanceState) {
14        super.onCreate(savedInstanceState);
15        setContentView(R.layout.activity_main);
16
17        myButton = findViewById(R.id.button);
18        showText = findViewById(R.id.textView2);
19        showText.setText("Hello I am here");
20    }
21 }
22
```

Исходный код программы

```
myButton.setOnClickListener(new View.OnClickListener() {  
    @Override  
    public void onClick(View v) {  
    }  
});
```

```
myButton.setOnClickListener(new View.OnClickListener() {  
    @Override  
    public void onClick(View v) {  
        showText.setText("Hello I am here");  
    }  
});  
showText = findViewById(R.id.textView2);
```

Вид программы



Вид программы

The screenshot displays the Android Studio interface. The main editor shows the `MainActivity.java` file with the following code:

```
10 public class MainActivity extends AppCompatActivity {
11     private Button myButton;
12     private TextView showText;
13     private EditText enterName;
14
15
16     @Override
17     protected void onCreate(Bundle savedInstanceState) {
18         super.onCreate(savedInstanceState);
19         setContentView(R.layout.activity_main);
20
21         myButton = findViewById(R.id.button);
22         enterName = findViewById(R.id.editText);
23         myButton.setOnClickListener((v) -> {
24
25             String name = enterName.getText().toString();
26
27             showText.setText("Hello " + name);
28         });
29         showText = findViewById(R.id.textView2);
30
31
32
33
34 }
```

The Build Output window at the bottom shows the following logs:

Build	Build Output	Sync	Event Log
✓	Build: completed successfully at 31.08.2019 14:26		14:25 Executing tasks: [:app:assembleDebug]
✓	Run build E:\AndroidProjects\ShowNameNow		14:26 Gradle build finished in 5 s 141 ms
✓	Load build	5 ms	
✓	Configure build	503 ms	
✓	Calculate task graph	96 ms	
✓	Run tasks	3 s 989 ms	

At the bottom of the screen, there is a status bar with the text: "Instant Run applied code changes and restarted the app. Field Added. // (Don't show again) (a minute ago)". On the right side, there is a Windows activation watermark and a notification for IDE and Plugin Updates.