Tutorial 4

Android App Development using Android Studio

CS551 Advanced Software Engineering

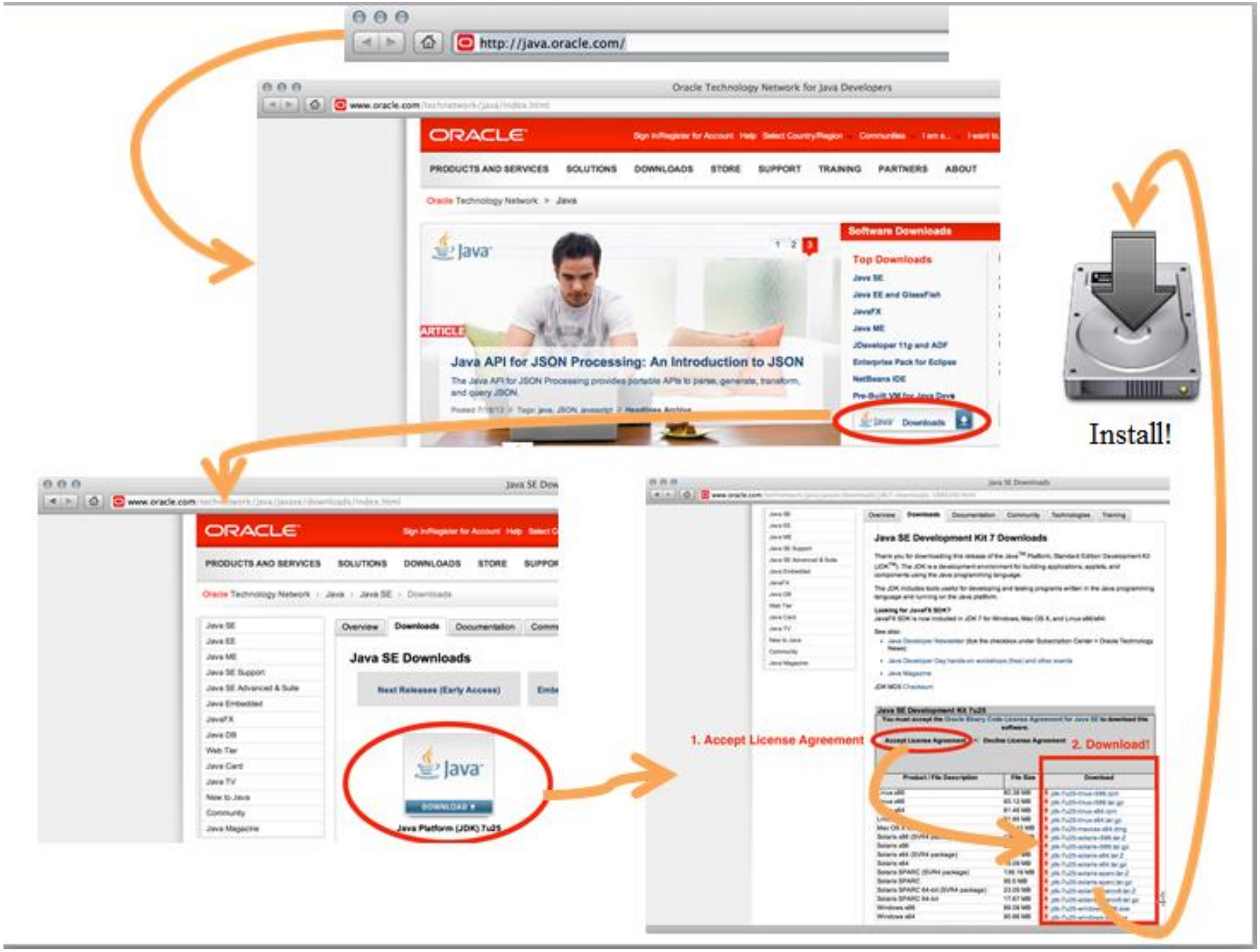
Topics

- Android Studio installation.
- Android App development using Android Studio

Android Studio Installation

Getting Started (1)

- Need to install Java Development Kit (JDK) to write Java (and Android) programs
  - **Do not** install Java Runtime Environment (JRE); JDK and JRE are different!
- Can download the JDK for your OS at http://java.oracle.com
- Alternatively, for OS X, Linux:
  - OS X:
    - Open `/Applications/Utilities/Terminal.app`
    - Type `javac` at command line, install Java at prompt
  - Linux:
    - Debian/Ubuntu: `sudo apt--get install java--package`, download the JDK `<jdk>.tar.gz` file from Oracle, run `make--jpkg <jdk>.tar.gz`, then `sudo dpkg –i <resulting--deb--file>`
    - Fedora/OpenSuSE: download the JDK `.rpm` file from Oracle, install


http://java.oracle.com/
Oracle Technology Network for Java Developers
www.oracle.com
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PRODUCTS AND SERVICES
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PARTNERS
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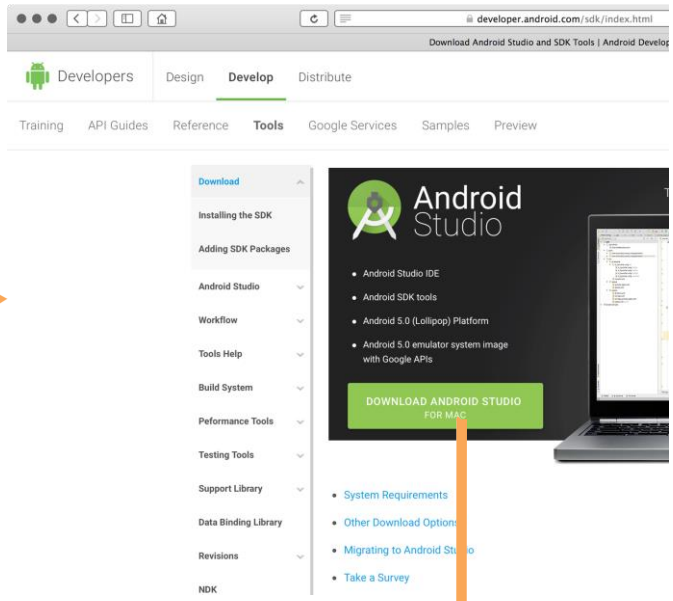
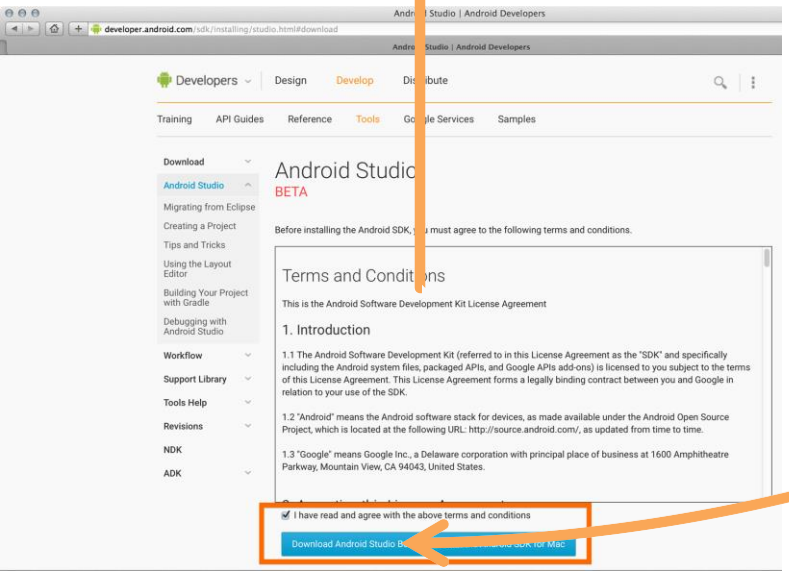
Java SE
Java EE and GlassFish
JavaFX
Java ME
JDeveloper 11g and ADF
Enterprise Pack for Eclipse
NetBeans IDE
ARTICLE
Java API for JSON Processing: An Introduction to JSON
The Java API for JSON Processing provides portable APIs to parse, generate, transform, and query JSON.
Java Downloads
Install!
Java SE Downloads
Next Releases (Early Access)
Java Platform (JDK) 7u25
Java SE Development Kit 7 Downloads
1. Accept License Agreement
2. Download!

Getting Started (2)

- After installing JDK, download Android SDK from http://developer.android.com
- Simplest: download and install Android Studio bundle (including Android SDK) for your OS
- Alternatives:
  - Download/install Android Developer Tools from this site (based on Eclipse)
  - Install Android SDK tools by themselves, then install ADT for Eclipse separately (from this site)
- We'll use Android Studio with SDK included (easy)

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

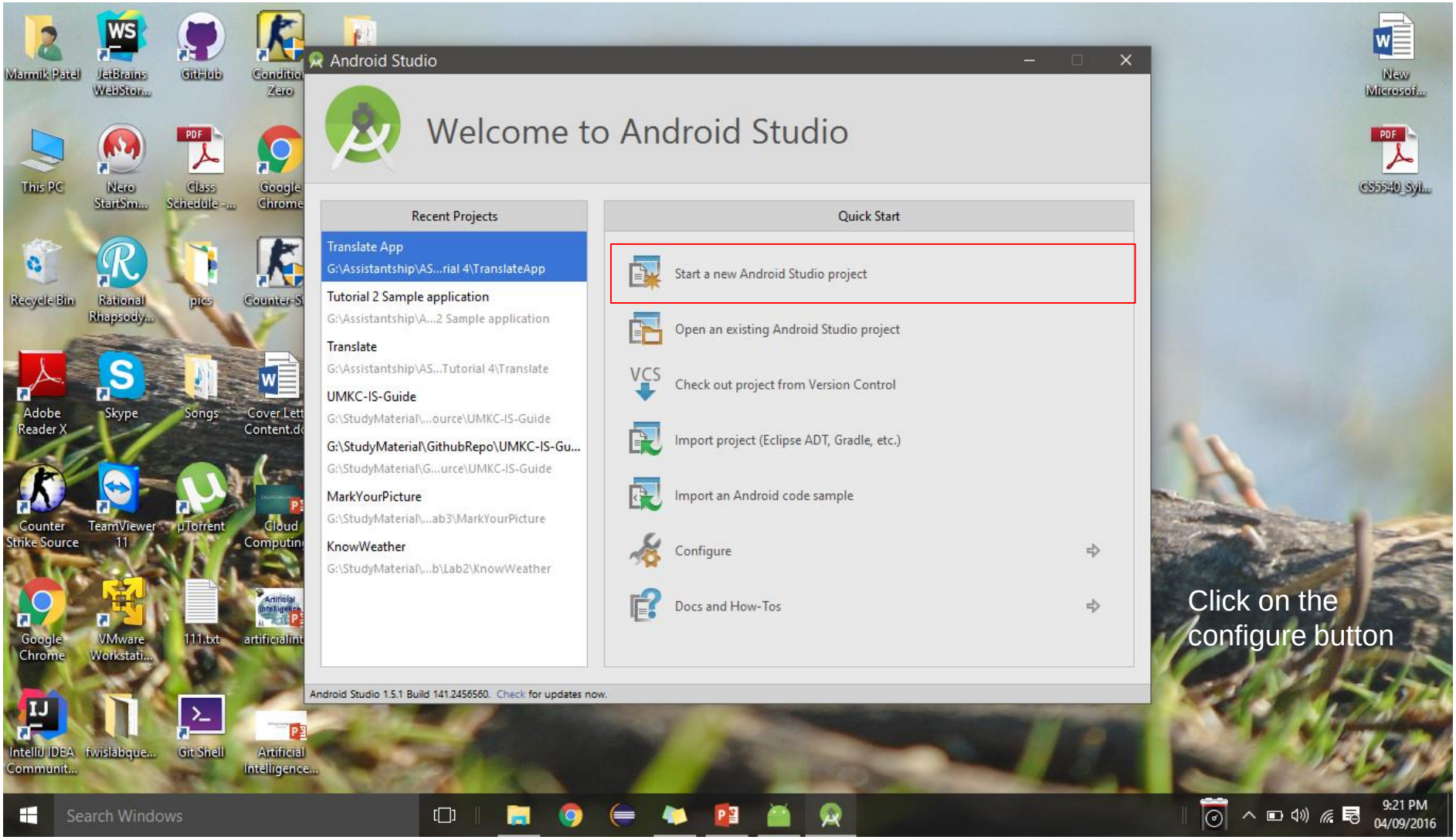




Install!

Android Virtual Device Creation

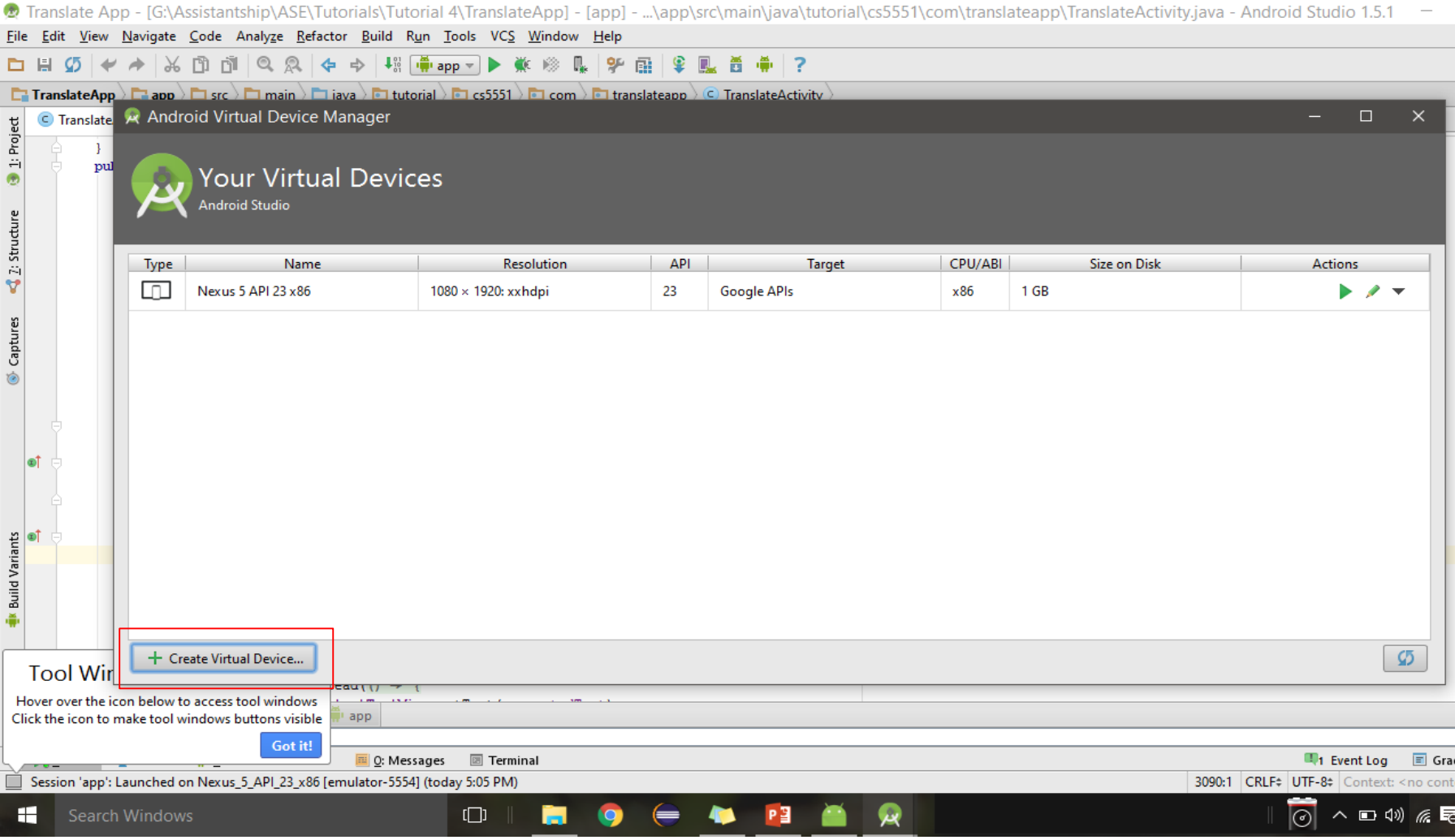
Open Android Studio



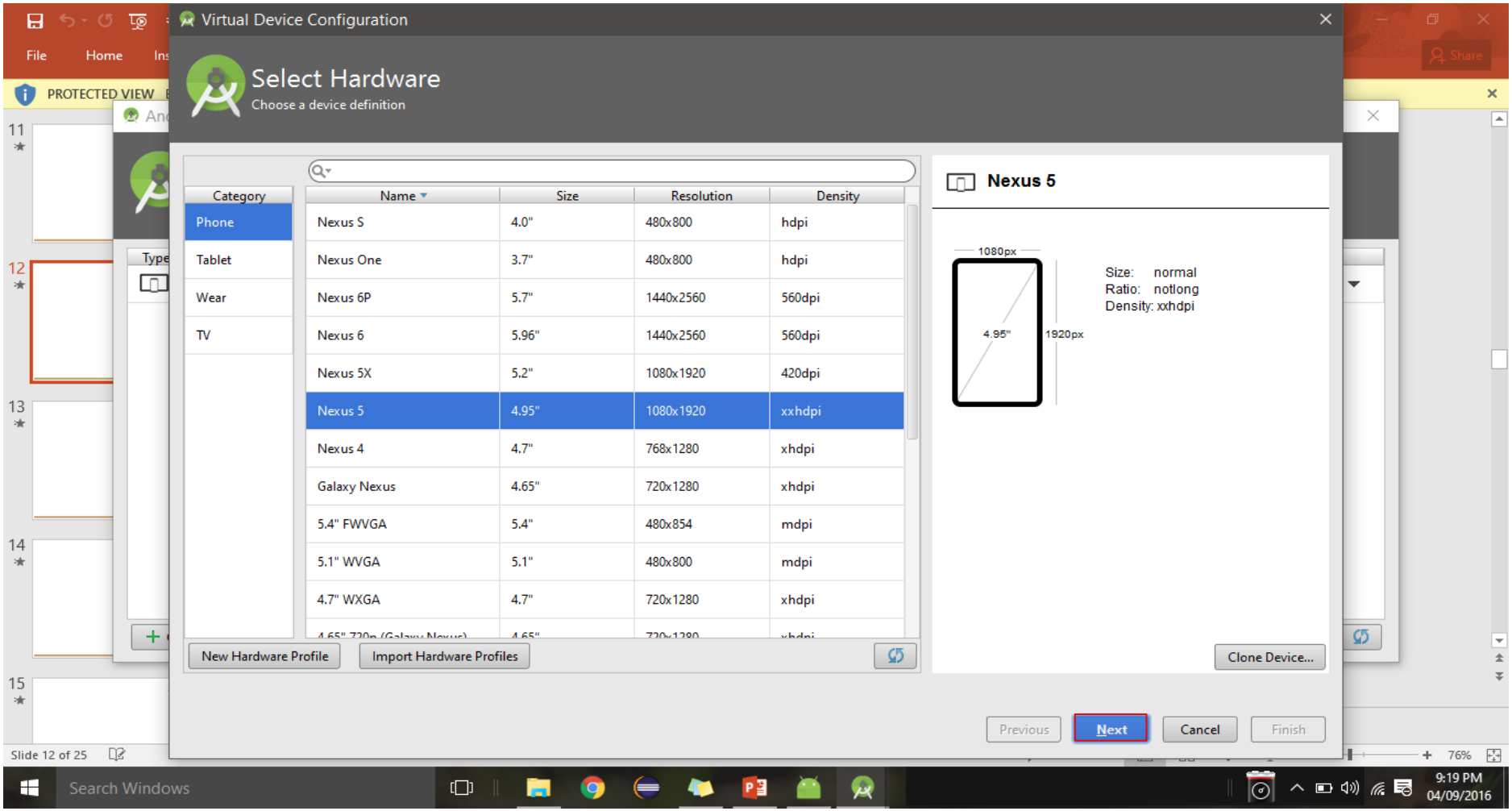
AVD Manager

- Open Android studio->Click Tools -> Android -> SDK Manager->AVD Manager
- Click on Create Virtual Device.
- Select a device that you intend to emulate and click Next.
- Select the OS that you want the device to run on. You need to download and install OS versions in case they are not there.
- Finally name your AVD and configure it. Click Finish.

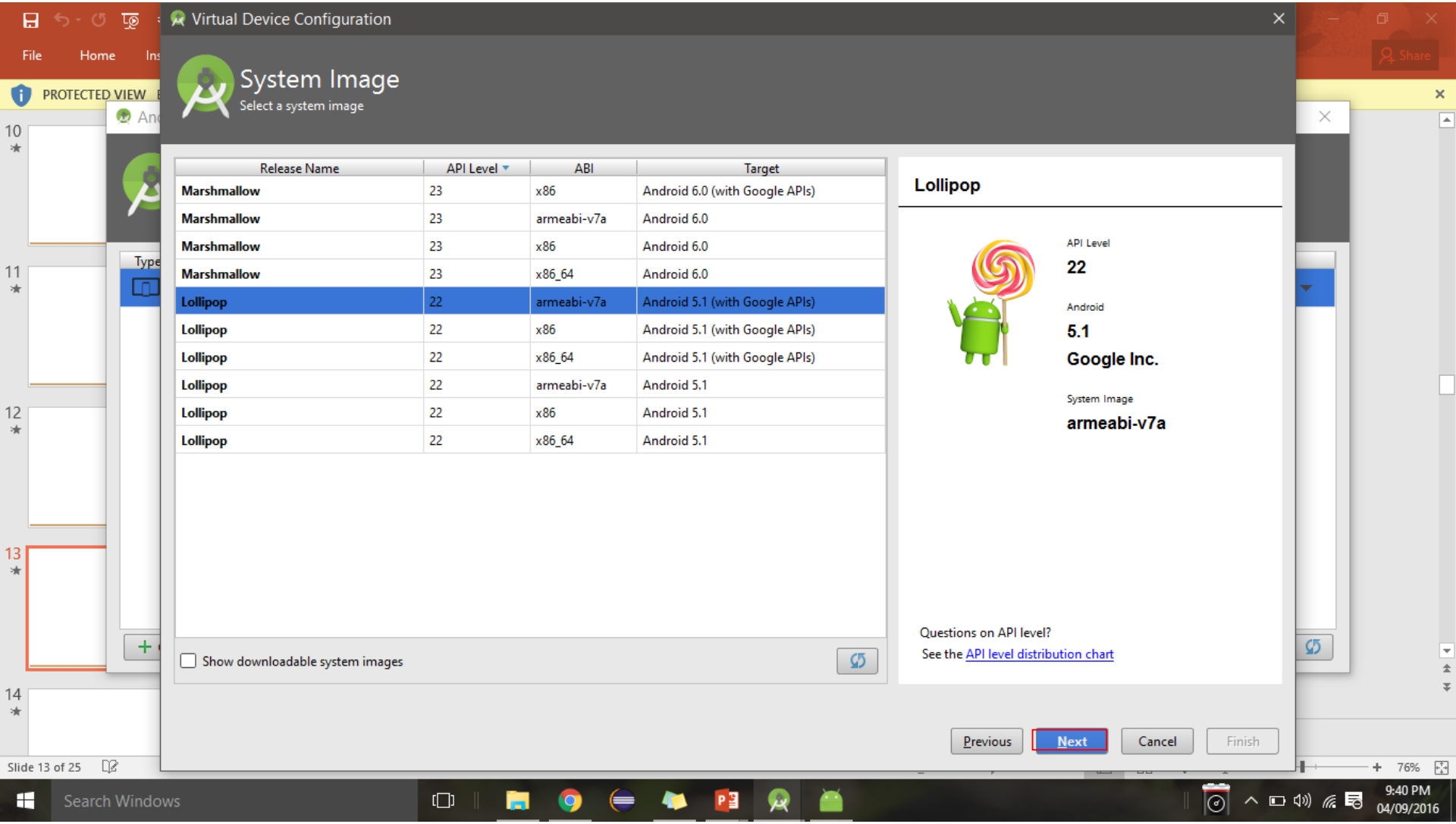
AVD Manager


Translate App - [G:\Assistantship\ASE\Tutorials\Tutorial 4\TranslateApp] - [app] - ...\app\src\main\java\tutorial\cs5551\com\translateapp\TranslateActivity.java - Android Studio 1.5.1
File Edit View Navigate Code Analyze Refactor Build Run Tools VCS Window Help
Android Virtual Device Manager
Your Virtual Devices
Android Studio
Type Name Resolution API Target CPU/ABI Size on Disk Actions
Nexus 5 API 23 x86 1080 × 1920: xxhdpi 23 Google APIs x86 1 GB
Create Virtual Device...
Tool Wi
Hover over the icon below to access tool windows
Click the icon to make tool windows buttons visible
Got it!
0: Messages Terminal 1 Event Log Gradle Console
Session 'app': Launched on Nexus_5_API_23_x86 [emulator-5554] (today 5:05 PM)
Search Windows
9:19 PM
04/09/2016

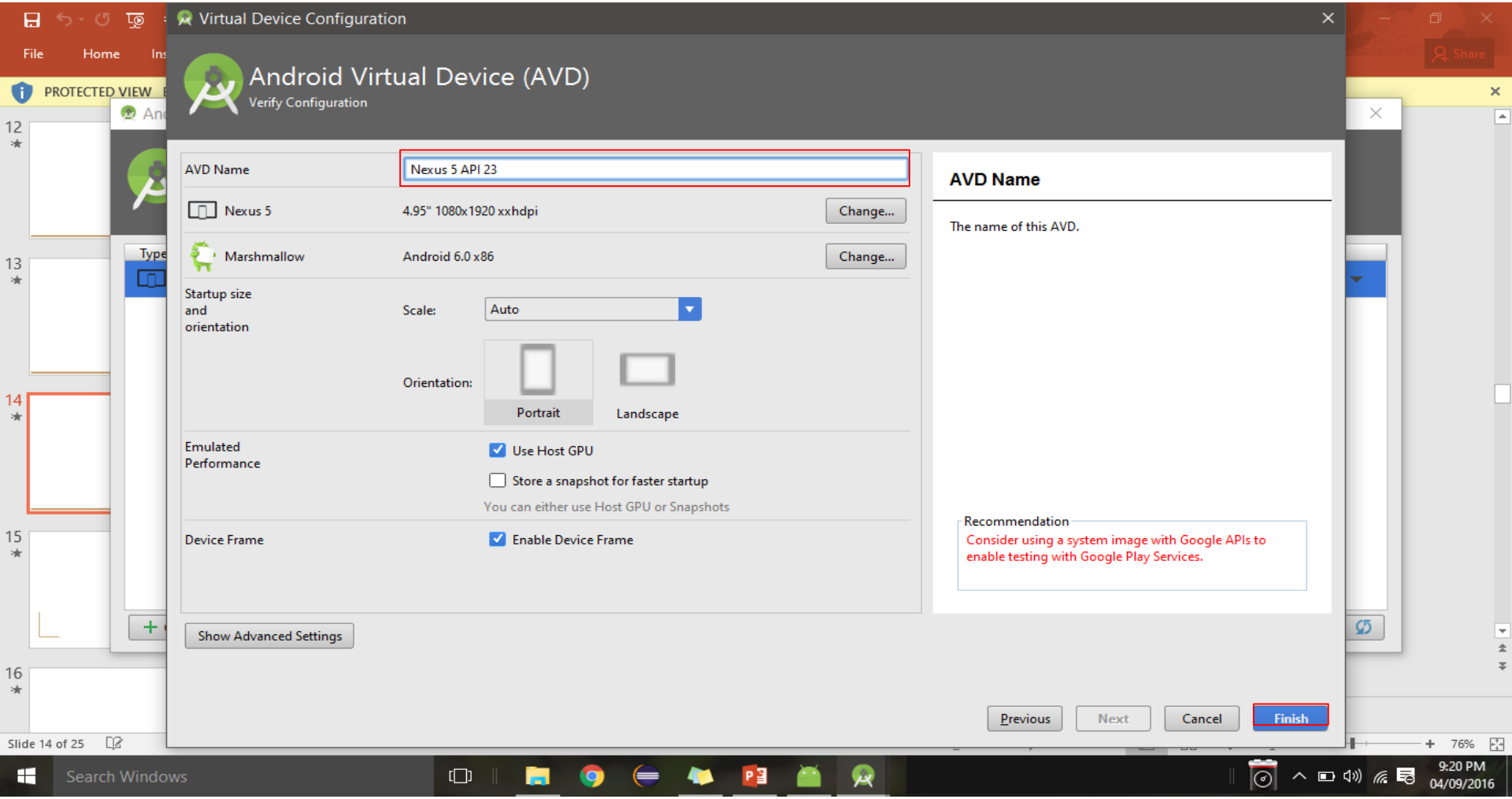
AVD Manager


Virtual Device Configuration
Select Hardware
Choose a device definition
Category
Phone
Tablet
Wear
TV
Name
Size
Resolution
Density
Nexus S 4.0" 480x800 hdpi
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 xxhdpi
Nexus 4 4.7" 768x1280 xhdpi
Galaxy Nexus 4.65" 720x1280 xhdpi
5.4" FWVGA 5.4" 480x854 mdpi
5.1" WVGA 5.1" 480x800 mdpi
4.7" WXGA 4.7" 720x1280 xhdpi
New Hardware Profile
Import Hardware Profiles
Nexus 5
1080px
4.95"
1920px
Size: normal
Ratio: notlong
Density: xxhdpi
Clone Device...
Previous
Next
Cancel
Finish
Slide 12 of 25
Search Windows
9:19 PM
04/09/2016

AVD Manager

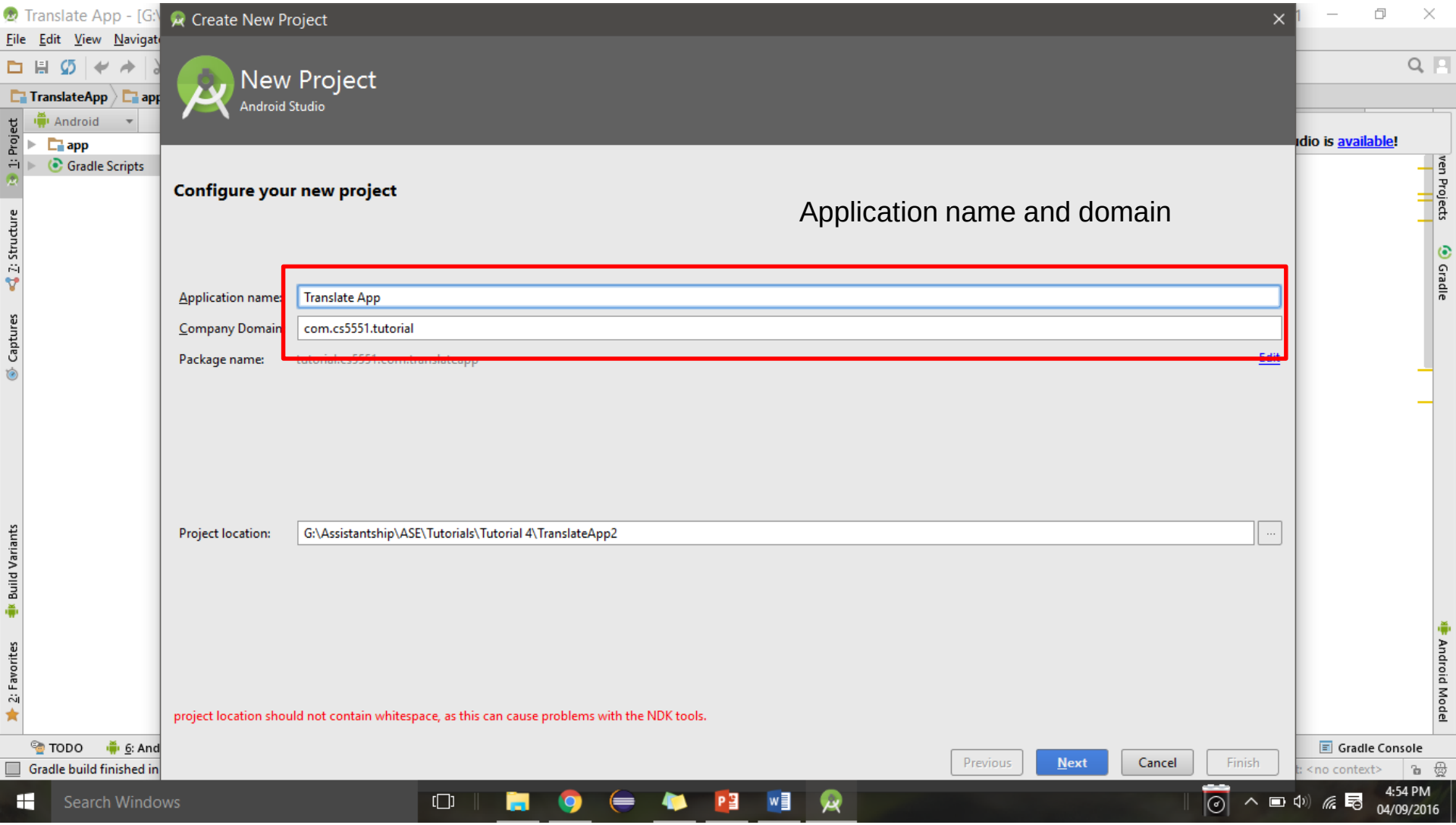

Virtual Device Configuration
System Image
Select a system image
Release Name
API Level
ABI
Target
Marshmallow 23 x86 Android 6.0 (with Google APIs)
Marshmallow 23 armeabi-v7a Android 6.0
Marshmallow 23 x86 Android 6.0
Marshmallow 23 x86_64 Android 6.0
Lollipop 22 armeabi-v7a Android 5.1 (with Google APIs)
Lollipop 22 x86 Android 5.1 (with Google APIs)
Lollipop 22 x86_64 Android 5.1 (with Google APIs)
Lollipop 22 armeabi-v7a Android 5.1
Lollipop 22 x86 Android 5.1
Lollipop 22 x86_64 Android 5.1
Show downloadable system images
Lollipop
API Level
22
Android
5.1
Google Inc.
System Image
armeabi-v7a
Questions on API level?
See the API level distribution chart
Previous
Next
Cancel
Finish

AVD Manager

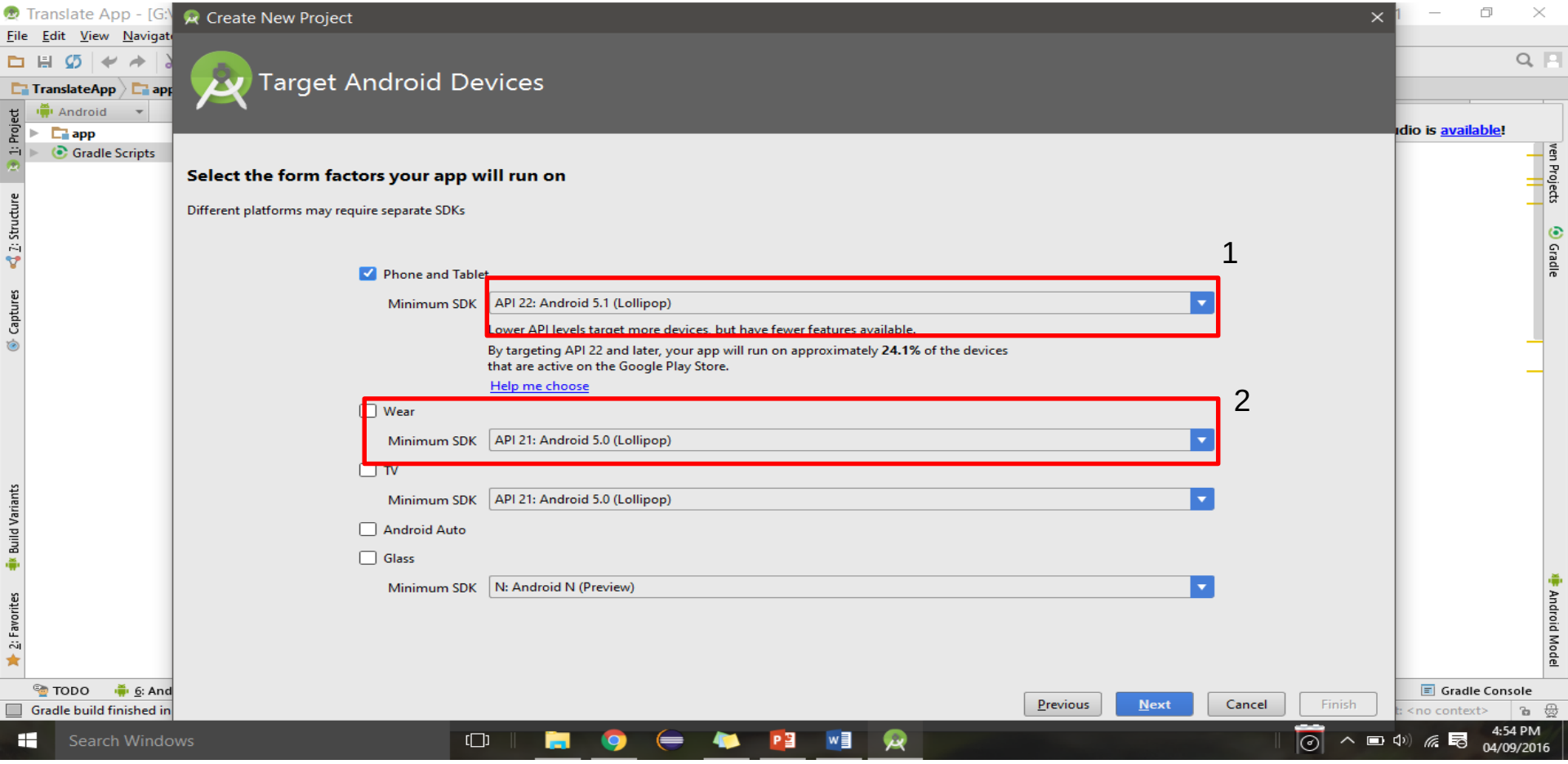

Virtual Device Configuration
Android Virtual Device (AVD)
Verify Configuration
AVD Name
Nexus 5 API 23
Nexus 5
4.95" 1080x1920 xxhdpi
Change...
Marshmallow
Android 6.0 x86
Change...
Startup size and orientation
Scale:
Auto
Orientation:
Portrait
Landscape
Emulated Performance
Use Host GPU
Store a snapshot for faster startup
You can either use Host GPU or Snapshots
Device Frame
Enable Device Frame
Show Advanced Settings
AVD Name
The name of this AVD.
Recommendation
Consider using a system image with Google APIs to enable testing with Google Play Services.
Previous
Next
Cancel
Finish

Android App development

Creating a new Android application

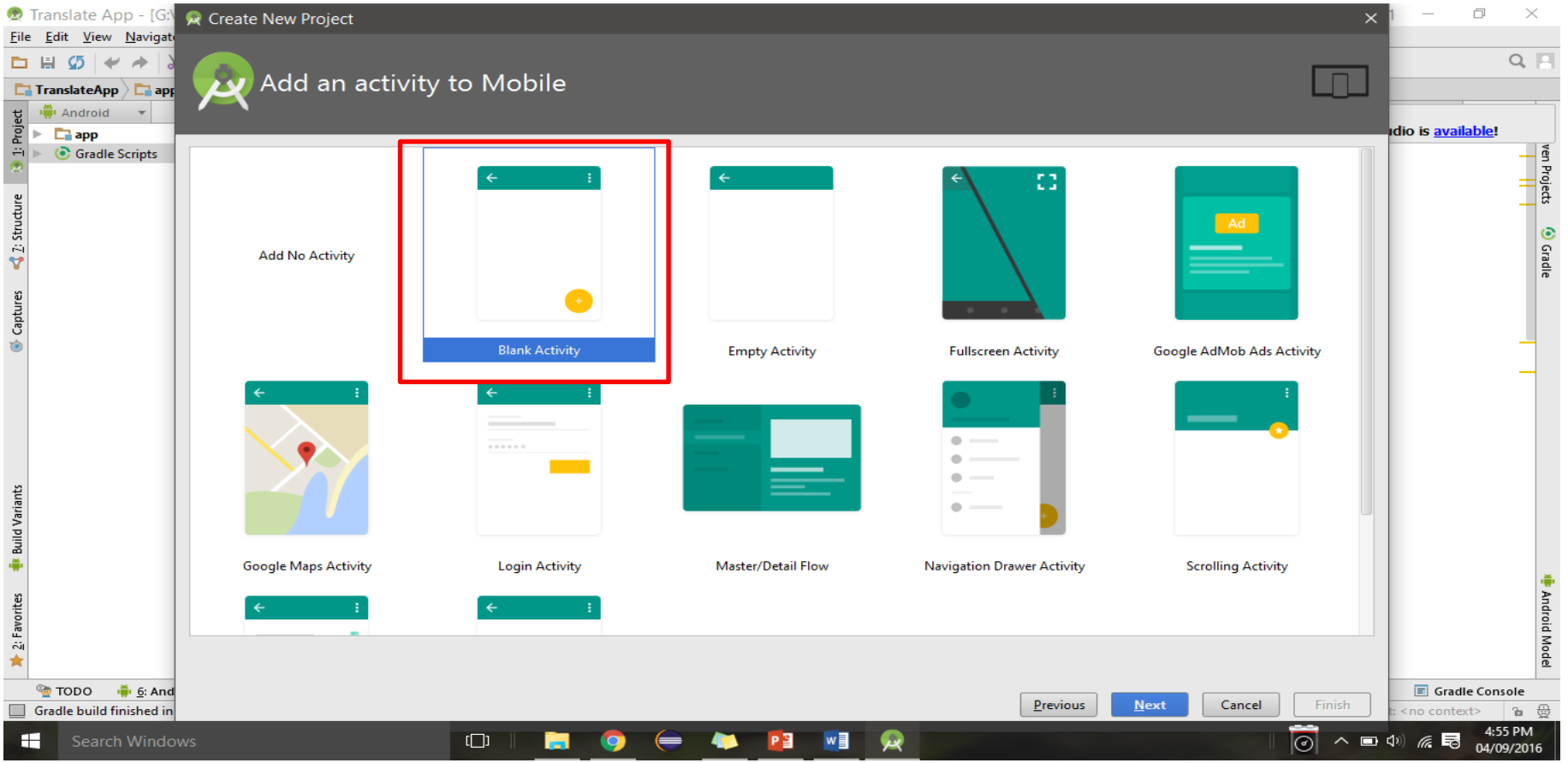


Selecting the SDK and type of device to deploy the application



1. The minimum SDK version that you want your app to run on. It is better to prefer a version that is stable and new
2. In case you want your app to deployed on smart watches and other wearable device.

Selecting the type of activity for the application



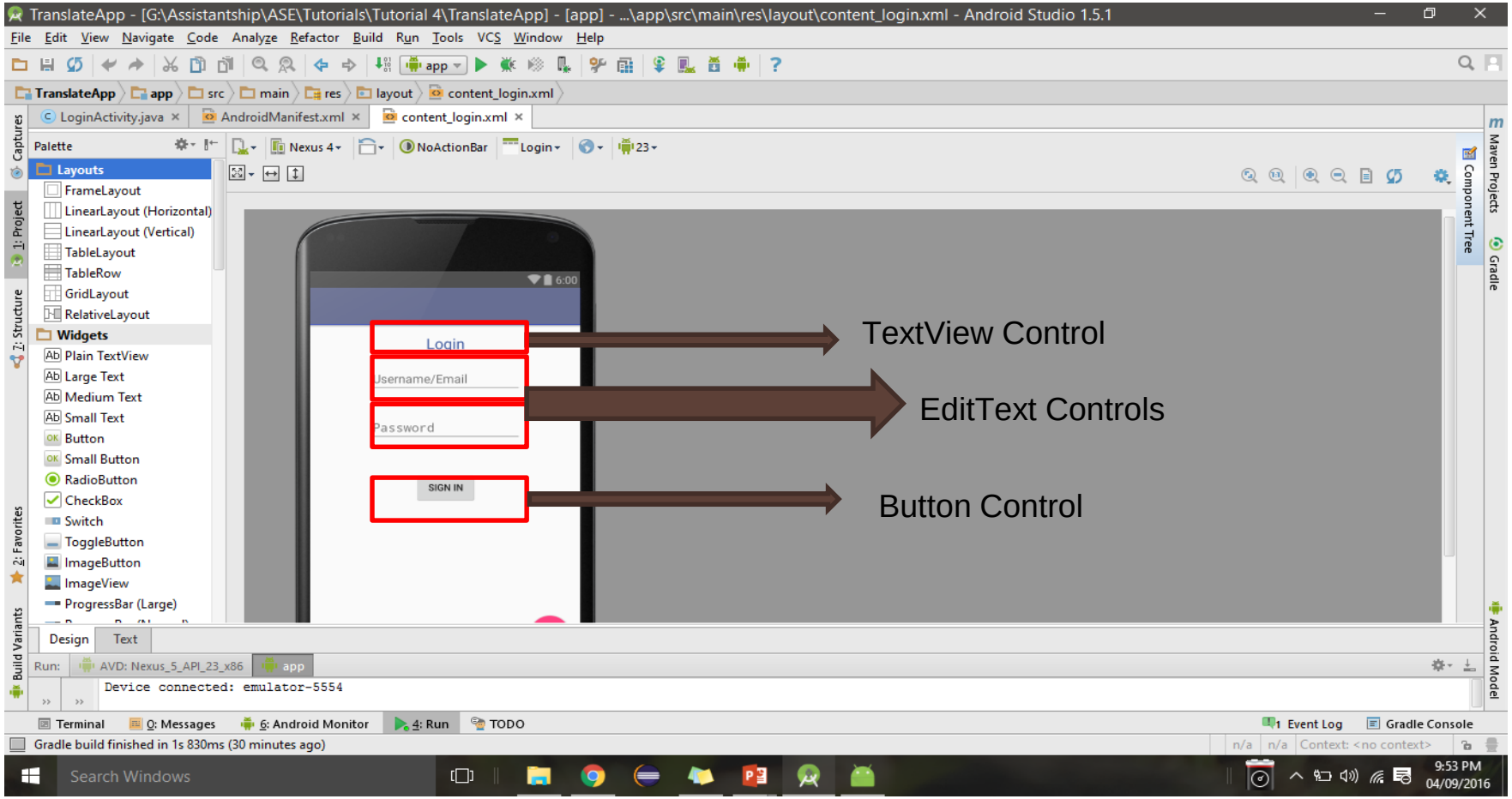
You can choose from various templates available to start off the application. It is better to choose a Blank activity as you could add and manage the controls as you need.

Android Manifest

- Do not forget to add internet permission in AndroidManifest.xml file to enable internet access in device/emulator

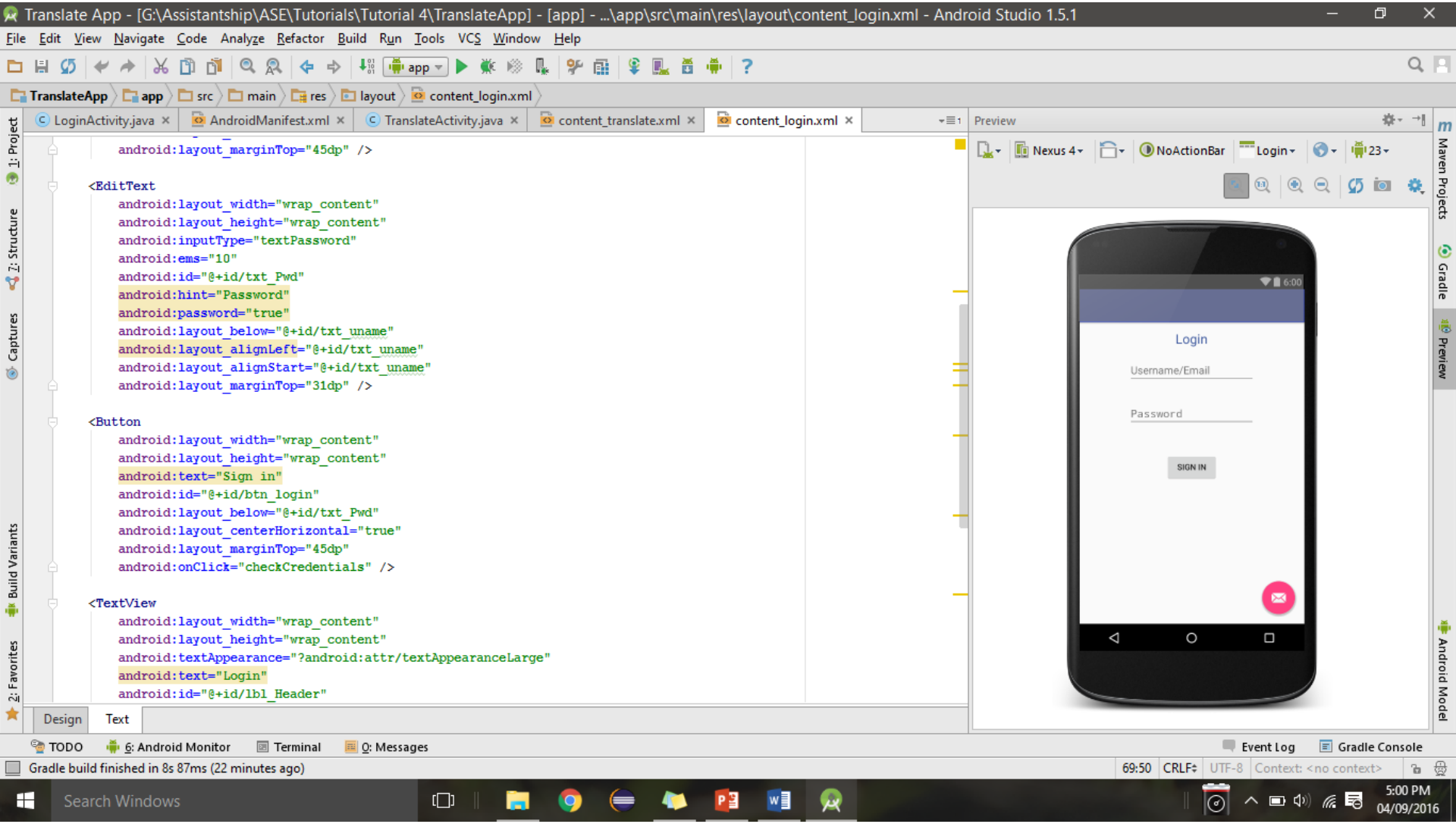
```
<?xml version="1.0" encoding="utf-8"?>
<manifest xmlns:android="http://schemas.android.com/apk/res/android"
    package="tutorial.cs5551.com.translateapp">
    <uses-permission android:name="android.permission.INTERNET"/>
    <application
        android:allowBackup="true"
        android:icon="@mipmap/ic_launcher"
        android:label="Translate App"
        android:supportsRtl="true"
        android:theme="@style/AppTheme">
        <activity
            android:name=".LoginActivity"
```

Controls in the application provided in tutorial



Explore the other controls present in the SDK in your lab exercises.

activity_sample.xml



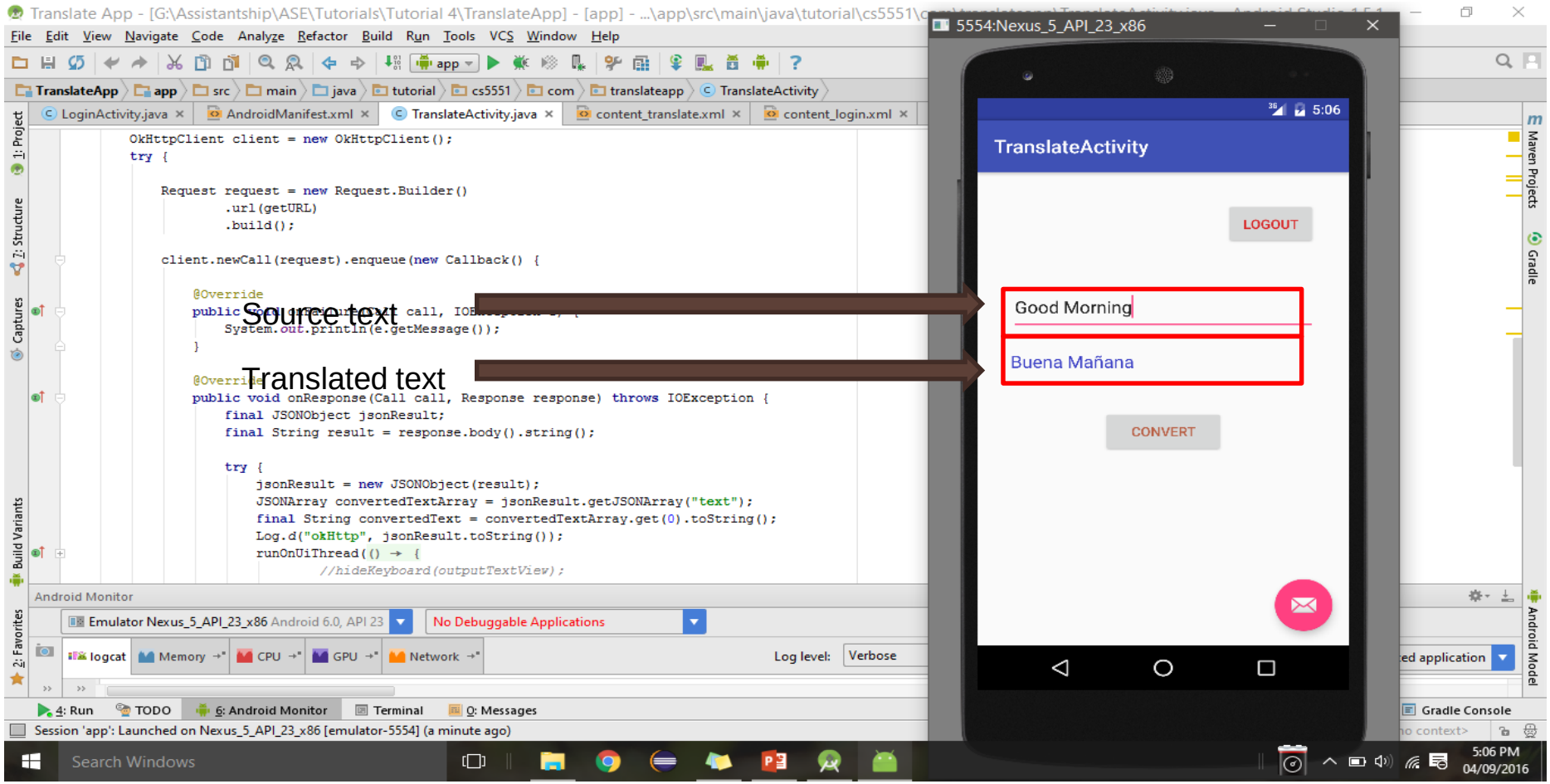
Code for login……

```
    }
    public void checkCredentials(View v)
    {
        EditText usernameCtrl = (EditText)findViewById(R.id.txt_uname);
        EditText passwordCtrl = (EditText) findViewById(R.id.txt_Pwd);
        TextView errorText = (TextView)findViewById(R.id.lbl_Error);
        String userName = usernameCtrl.getText().toString();
        String password = passwordCtrl.getText().toString();

        boolean validationFlag = false;
        //Verify if the username and password are not empty.
        if(!userName.isEmpty() && !password.isEmpty()) {
            if(userName.equals("Admin") && password.equals("Admin")) {
                validationFlag = true;

            }
        }
        if(!validationFlag)
        {
            errorText.setVisibility(View.VISIBLE);
        }
        else
        {
            //This code redirects the from login page to the home page.
            Intent redirect = new Intent(LoginActivity.this, TranslateActivity.class);
            startActivity(redirect);
        }

    }
}
```

Accessing the UI controls to get the username and password

Redirecting to the web service page on successful login.

Snapshot of the Translate activity for the tutorial application



Translate web service code...

```
    }
    public void translateText(View v) {
        TextView sourceTextView = (TextView) findViewById(R.id.txt_Email);

        sourceText = sourceTextView.getText().toString();
        String getURL = "https://translate.yandex.net/api/v1.5/tr.json/translate?" +
                "key=trnsl.1.1.20151023T145251Z.bf1ca7097253ff7e." +
                "c0b0a88bea31ba51f72504cc0cc42cf891ed90d2&text=" + sourceText +"&" +
                "lang=en-es&[format=plain]&[options=1]&[callback=set]";//The API service URL
        final String response1 = "";
        OkHttpClient client = new OkHttpClient();
        try {
            Request request = new Request.Builder()
                    .url(getURL)
                    .build();
            client.newCall(request).enqueue(new Callback() {
                @Override
                public void onFailure(Call call, IOException e) {
                    System.out.println(e.getMessage());
                }
                @Override
                public void onResponse(Call call, Response response) throws IOException {
                    final JSONObject jsonResult;
                    final String result = response.body().string();
                    try {
                        jsonResult = new JSONObject(result);
                        JSONArray convertedTextArray = jsonResult.getJSONArray("text");
                        final String convertedText = convertedTextArray.get(0).toString();
                        Log.d("okHttp", jsonResult.toString());
                        runOnUiThread(() -> {
                            outputTextView.setText(convertedText);
                        });
                    } catch (JSONException e) {
                        e.printStackTrace();
                    }
                }
            });
```

Accessing the UI controls

JSON web parsing of web service response

Populating the UI with the translated text