University of Anbar
College of Computer Science and Information Technology
Computer Science Department

Mobile Application Programming

Lab One

Third Stage

First Course 2023 - 2024

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Mobile Operating Systems

- A mobile OS is an operating system for smartphones, tablets, PDAs, or other mobile devices.
- Mobile OSs combine features of a personal computer OS with other features useful for mobile or handheld use; usually including, and most of the following considered essential in modern mobile systems;
    - touchscreen, cellular, Bluetooth, Wi-Fi, GPS mobile navigation, camera, video camera, speech recognition, voice recorder, music player, etc.

Some Current software platforms

- Android (based on the Linux Kernel) is from Google Inc.
- Cyanogen Mod and Cyanogen OS are based on the open source Android Open Source Project(AOSP).
- Fire OS is an operating system launched by Amazon based on Google's AOSP.
- iOS (previously known as iPhone OS) is from Apple Inc.
- Windows Phone (Soon to be Windows 10 Mobile) is from Microsoft.
- BlackBerry 10 (based on the QNX OS) is from BlackBerry.
- Firefox OS is from Mozilla.

Introduction to Android

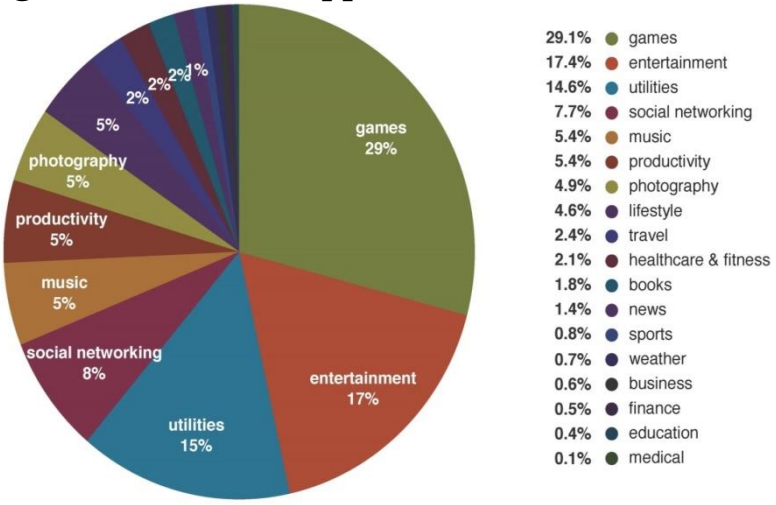
- Android is an OS based on Linux with a Java programming interface. It is a comprehensive open source platform designed for mobile devices.
    - Features of Android
- Beautiful UI, Connectivity, Storage, Media support, Messaging, Web browser, Multi-touch, Multi-tasking, Resizable widgets, Multi-Language, GCM, Wi-Fi Direct, Android Beam
    - Android Applications
- Android applications are usually developed in the Java language using the Android Software Development Kit.
- Once developed, Android applications can be packaged easily and sold out either through a store such as Google Play, SlideME, Opera Mobile Store, Mobango and the Amazon Appstore.

Introduction to Android

History of Android

- The code names of android ranges from A to L currently, such as Aestro, Blender, etc…

Categories of Android applications



Requirements for Android

OS

- Android application development on either of the following operating systems:
  - Microsoft Windows.
  - Mac OS X 10.5.8 or later version with Intel chip.

Tools

- All the required tools to develop Android applications are freely available and can be downloaded from the Web. Following is the list of software's you will need before you start your Android application programming.

1. Java JDK5 or later version
2. Android Studio

Download Android Studio

From:
https://developer.android.com/studio?gclid=Cj0KCQiAxc6PBhCEARIsAH8Hff3QD7BSRczvsFzm0ZGjM4V1-wBmmUpKfZeL_9B1iVrkYmW-SUvyqk0aApANEALw_wcB&gclsrc=aw.ds

System Requirements for Windows

- Microsoft® Windows® 7/8/10 (64-bit)
- 4 GB RAM minimum, 8 GB RAM recommended
- 2 GB of available disk space minimum,
- 4 GB Recommended (500 MB for IDE + 1.5 GB for Android SDK and emulator system image)
- 1280 x 800 minimum screen resolution

Installation

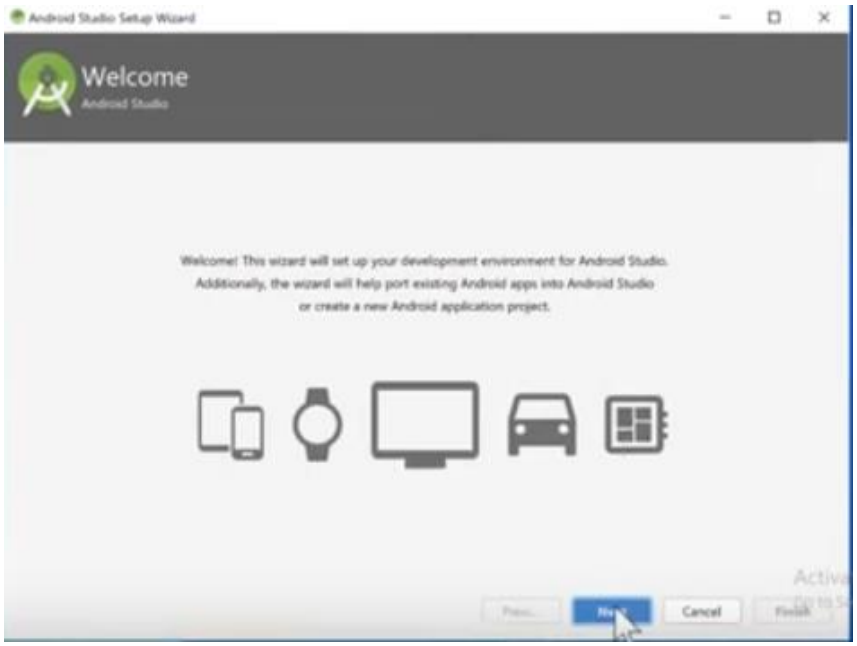
Java

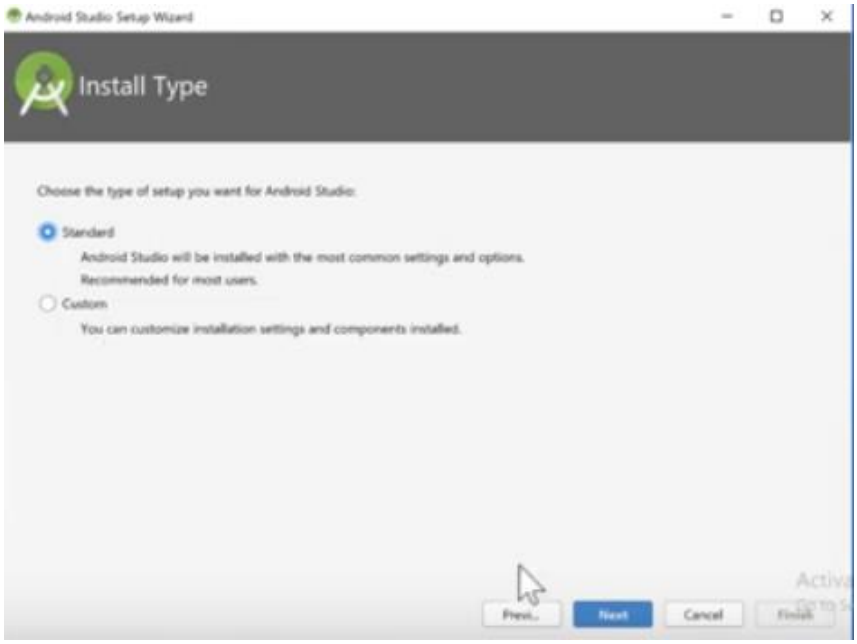
1. Visit https://www.oracle.com/java/technologies/javase/jdk11-archive-downloads.html
2. Install it.

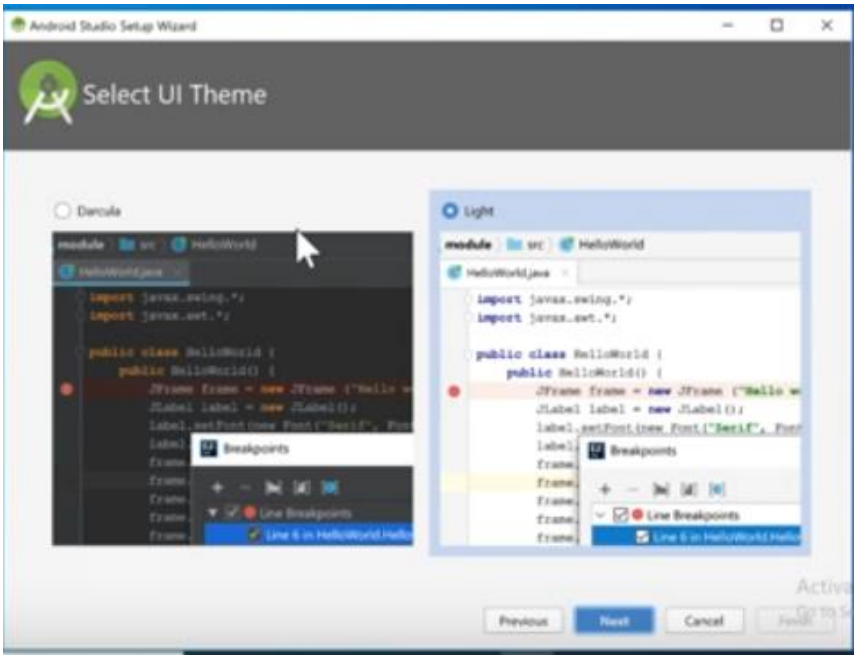
Android Studio

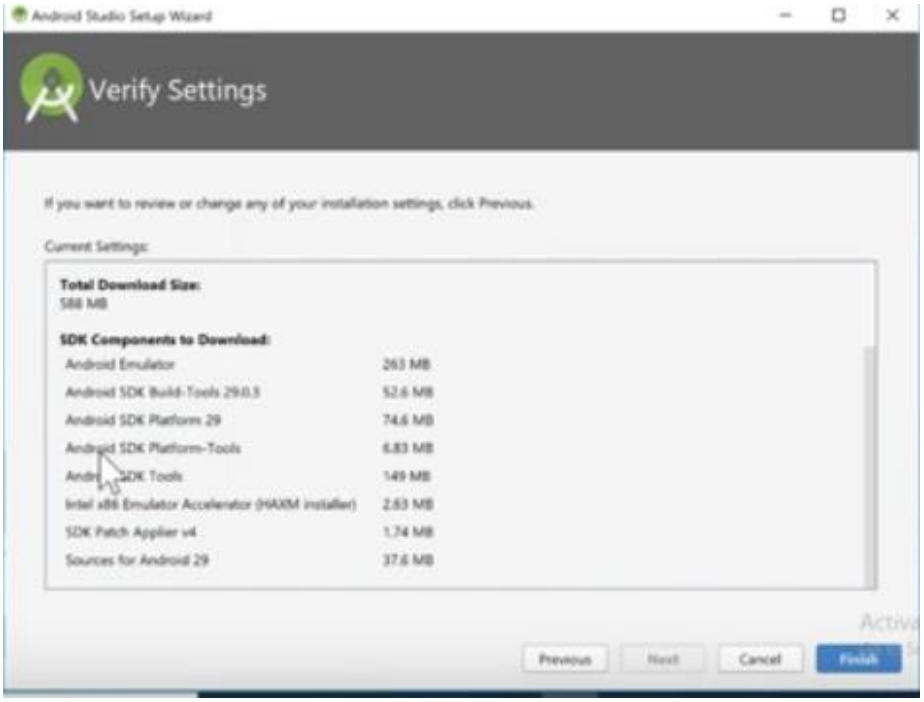
3. Visit https: https://developer.android.com/studio?gclid=Cj0KCQiAxc6PBhCEARIsAH8Hff3QD7BSRczvsFzm0ZGjM4V1-wBmmUpKfZeL_9B1iVrkYmW-SUvyqk0aApANEALw_wcB&gclsrc=aw.ds
4. click the button *Download Android Studio*.
5. Accept terms, and click *Download*.
6. Run executable file of setup.
7. Follow the setup wizard to install Android Studio and any necessary SDK tools.

8. On some Windows systems, the launcher script does not find where Java is installed. If you encounter this problem, you need to set an environment variable indicating the correct location.
9. Select Start menu > Computer > System Properties > Advanced System Properties. Then open Advanced tab > Environment Variables and add a new system variable JAVA_HOME that points to your JDK folder, for example C:\Program Files\Java\jdk1.7.0_45







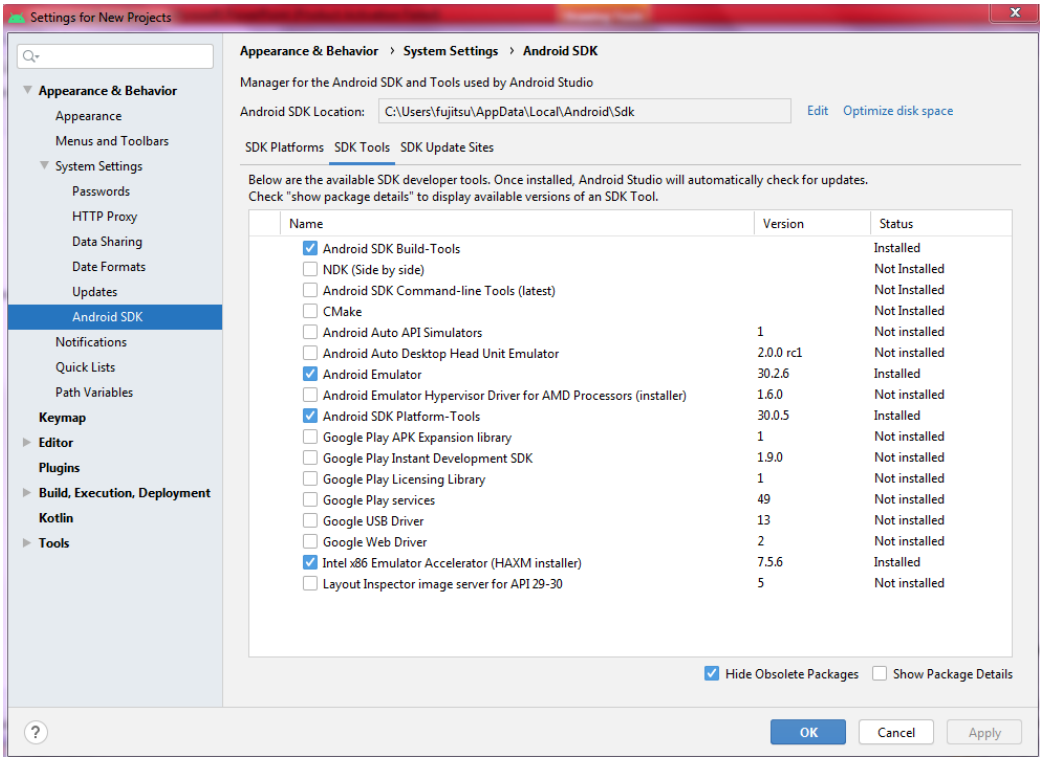


10. The individual tools and other SDK packages are saved outside the Android Studio application directory. If you need to access the tools directly, use a terminal to navigate to the location where they are installed. For example:
11. \Users\<user>\sdk\
12. Android Studio is now ready and loaded with the Android developer tools, but there are still a couple packages you should add to make your Android SDK complete.

Run

1. Run Android Studio as Administrator.

2. Before you create new project, click *Configure* from splash screen. Click *SDK Manager*.
3. Don't select all. In bottom, in *Extra* section, select *Intel x86 Emulator Accelerator*.
4. Click *Install* button.



Android Emulator

- The Android SDK includes a mobile device emulator — a virtual mobile device that runs on your computer. The emulator lets you develop and test Android applications without using a physical device.

Limitations

- No support for placing or receiving actual phone calls. You can simulate phone calls (placed and received) through the emulator console, however.
- No support for USB connections
- No support for device-attached headphones
- No support for determining network connected state
- No support for determining SD card insert/eject
- No support for Bluetooth

AVD Manager

- The AVD Manager provides a graphical user interface in which you can create and manage Android Virtual Devices (AVDs), which are required by the Android Emulator.

Android Studio

- Tools > Android > AVD Manager