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ASSIGNMENT - 1

(Q1) What is Android? Explain different features of Android.

→ * Android is a mobile operating sytem that is based on a modified version of Linux.

* Features of Android :

› Free & Open Source : Android is an open source platform. Neither developers nor handset manufacturers have to pay license to develop for the platform.

› Familiar and Inexpensive Development Tools : The Android SDK and tools are freely available. Developers can download the Android SDK from the Android website after agreeing to the Android SDK license agreement.

› Enabling Development of powerful applications : On the Android platform, all Android applications use the same libraries, there is no distinction between Native and Third-party applications.

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⇒ No Costly Obstacles to Publication : In Android, developers can write & publish any kind of application they want.

⇒ A Free Market for Applications : Google developed the Android Market, a generic Android Application store, where developer can come with their own delivery & payment mechanism.

(Q2) State the importance of Dalvik Virtual Machine.

→ * Android uses the Dalvik virtual machine with just-in-time compilation to run Dalvik bytecode, which is usually translated from Java bytecode.

* It was strictly developed for mobile devices. While developing Dalvik Virtual Machine Dan Bornstein and his team realize the constraints specific to mobile environment which is not going to change in future at least, like battery life, processing power & many more.

* Dalvik has been written so that a device can run multiple VMs efficiently. The Dalvik VM executes files in the Dalvik Executable (.dex) format which is optimised for minimal memory footprint.

* Android programs are compiled into .dex files, which are in turn zipped into a single .apk file on the device. .dex files can be created by automatically translating compiled applications written in Java programming language.

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(Q3) Define OHA.

→ * The Open Handset Alliance (OHA) was formed in November 2007, which is a group of more than 50 Technology companies including handset manufacturers, chips manufacturers, software developers & service providers that introduced Android, an open source mobile phone operating system.

* The open Handset Alliance aims to develop open standards for mobile devices, promote innovation in mobile phones & provide a better experience for consumers at a lower cost.

(Q4) Explain framework of Android OS with diagram.

→ * The Android OS framework consists of 5 sections arranged in four layers.

* The Android OS can be referred to as a software stack of different layers, where each layer is a group of several program components.

* Each layer in the architecture provides different services to the layer just above it.

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(Q5) Explain libraries & Android runtime environment.

→ * LIBRARIES :

⁘ This layer enables the device to handle different types of data

⁘ Some of the important native libraries includes :

→ Surface Manager : It is used for compositing window manager with off-screen buffering

→ Media framework : Media framework provides different media codecs allowing the recording & playback of different media formats.

→ SQLite : SQLite is the database engine used in android for data storage purposes.

→ Webkit : It is the browser engine used to display HTML content.

→ OpenGL : Used to render 2D or 3D graphics content to the screen.

* ANDROID RUN TIME :

⁘ Android Runtime consists of Dalvik Virtual & Core Java libraries.

•> It is the engine the powers your applications & along with the libraries, forms the basis for the application framework.

(Q6) Write full form of OHA & AVD.

→ OHA : Open Handset Alliance

AVD : Android Virtual Device.

(Q7) List and explain components of Android SDK

→ * The Android APIs : The core of the SDK is the Android API libraries that enable developers to create an application. These are the same libraries used at Google to create native Android applications.

* Development Tools : The SDK includes several development tools that let you compile & debug your applications, so you can turn Android source code into executable Android applications.

* The Android Virtual Device Manager & Emulator : The Android Emulator is a fully interactive Android device emulator featuring several alternative skins. The emulator runs within an Android Virtual Device that simulates the

device hardware configuration. Using the emulator you can see how your applications will look & behave on a real Android device.

* **Full Documentation**: The SDK includes extensive code-level reference information detailing exactly what's included in each package & class & how to use them. In addition to the code documentation, Android's reference documentation explains how to get started & gives detailed explanations of the fundamentals behind Android development.

* **Sample Code**: The Android SDK includes a selection of sample applications that demonstrate some of the possibilities available with Android, as well as simple program that highlight how to use individual API features.

* **Online Support**: Android has rapidly generated a vibrant developer community. The Google Groups at http://developer.android.com/resources/community-groups.html are active forums of Android developers with regular input from the Android engineering & developer relations ~~team~~ teams at Google.

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(Q3) What is AVD? List the steps to create AVD.

→ * An AVD is an emulator instance that enables you to model an actual device.

* Each AVD consists of a hardware profile; a mapping to a system image; as well as emulated storage, such as a secure digit (SD) card.

* Steps to create AVD:

→ STEP 1: Select Window → Android Virtual Device Manager

→ STEP 2: In the Android Virtual Device Manager dialog, click the New... button to create a new AVD.

→ STEP 3: In the create new Android Virtual Device (AVD) dialog, enter the items. Click the OK button when you are done.

→ STEP 4: Once your AVD has been created, it is time to test it. Select the AVD that you want to test & click the Start... button.

→ STEP 5: The Launch Options dialog will appear. If you have a small monitor, it is recommended that you check the "Scale display to real size" option so that you can set the emulator to a smaller size. Click the Launch button to start the emulator.

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(Q9) List & explain different components of Android project framework.

→ * View : Views are UI elements that form the basic building blocks of a user interface. Views are hierarchical & they know how to draw themselves. View is a super class for all the widget in Android.

* Activity : An activity is a user interface concept. An activity usually represents a single screen in your application. It generally contains one or more views.

* Intent : An intent generically defines an "intention" to do some work. Intents encapsulate several concepts, so the best approach to understanding them is to see examples of their use.
You can use intents to perform the following tasks, for instance :
- Broadcast a message
- Start a service
- Launch an activity.

* Content Provider : Data sharing among mobile applications on a device is common. Therefore, android defines a standard mechanism for applications to share data without exposing the underlying storage, structure, and implementation.

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* **Service** : Background processes that can potentially run for a long time. Android defines two types of services: local services & remote services. Local services are components that are only accessible by the application.

* **AndroidManifest.xml** : AndroidManifest.xml is a setting file for android Project, defines the contents & behaviour of your application.

Q10) Write a program code of android application to display "Hello World".

→ → **STEP-1** : Using Eclipse, create a new project by selecting File → New → Android Application Project.

→ **STEP-2** : In New Android Application dialog, enter Application Name as Hello World & click on Next Button.

→ **STEP-3** : In New Android Application (Configure project) dialog, click on Next Button.

→ **STEP-4** : In New Android Application dialog, you can specify your own launching icon by providing path of image in Image File after making click on Browse Button, along with that you can also specify Foreground scaling, shape & Background color of the application icon. After selecting appropriate setting click on Next button.

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→ STEP-5 : In New Android Application (Create Activity) dialog, select Blank Activity & click on Next Button.

→ STEP-6 : In New Android Application (Blank Activity) dialog, enter Activity Name as MainActivity & click on Finish Button.

→ STEP-7 : The Eclipse IDE should now looks The layout file activity_main.xml defines the user Interface (UI) of your application. The default view is the Graphical Layout view, which lays out the activity graphically. To modify the UI by hand, click the activity_main.xml tab. It will show you following code :

```
<Relativelayout xmlns:android="http://schemas.android.com/
                                apk/res/android"
xmlns:tools="http://schemas.android.com/tools"
android:layout_width="match_parent"
android:layout_height="match_parent">
<TextView
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:text="@string/hello_world" />
</Relativelayout>
```

It is The *string.xml ? located in the res/values folder :

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```
<?xml version="1.0" encoding="utf-8"?>
<resources>
<string name="app_name">App1</string>
<string name="action_settings">Settings</string>
<string name="hello_world">Hello world!</string>
</resources>
```

You will also find another file MainActivity.java file in src directory, inside com.example.helloworld package, where you will write the code of your application.

```
package com.example.helloworld;
import android.support.v7.app.ActionBarActivity;
import android.os.Bundle;
public class MainActivity extends ActionBarActivity
{
  @Override
  protected void onCreate(Bundle savedInstanceState)
  {
  super.onCreate(savedInstanceState);
  setContentView(R.layout.activity_main)
  }
}.
```

To run this application press ctrl + F11.