DevCom

Android assignment

Research

1)

a) Android is an open source and Linux-based **Operating System** for mobile devices such as smartphones and tablet computers. Android was developed by the Open Handset Alliance, led by Google, and other companies.

Android offers a unified approach to application development for mobile devices which means developers need only develop for Android, and their applications should be able to run on different devices powered by Android.

The first beta version of the Android Software Development Kit (SDK) was released by Google in 2007 where as the first commercial version, Android 1.0, was released in September 2008.

On June 27, 2012, at the Google I/O conference, Google announced the next Android version, 4.1 **Jelly Bean**. Jelly Bean is an incremental update, with the primary aim of improving the user interface, both in terms of functionality and performance.

Android Applications

Once developed, Android applications can be packaged easily and sold out either through a store such as **Google Play**, **SlideME**, **Opera Mobile Store**, **Mobango**, **F-droid** and the **Amazon Appstore**.

Android powers hundreds of millions of mobile devices in more than 190 countries around the world. It's the largest installed base of any mobile platform and growing fast. Every day more than 1 million new Android devices are activated worldwide.

Android Apps

A mobile software application developed for use on devices powered by Google's Android platform. Android apps are available in the Google Play Store (formerly known as the Android Market), in the Amazon Appstore and on various Android App-focused sites, and the apps can run on Android smartphones, tablets, Google TV and other devices.

b)Android apps can be written using Kotlin, **Java**, and C++ languages using the Android software development kit (SDK), while using other languages is also possible.Also Corona is a software development kit that can be used for developing Android apps using Lua.

c) 1)**Java**. **Java** is the official language for **Android App Development** and consequently, it is the most used language as well.

2)Kotlin. Kotlin is a cross-platform programming language that may be used as an alternative to **Java** for **Android App Development**.

3)C++ .C++ can be used for Android App Development using the Android Native Development Kit(NDK). However, an app cannot be created totally using C++ and the NDK is used to

implement parts of the app in C++ native code. This helps in using C++ code libraries for the app as required.

4)C#

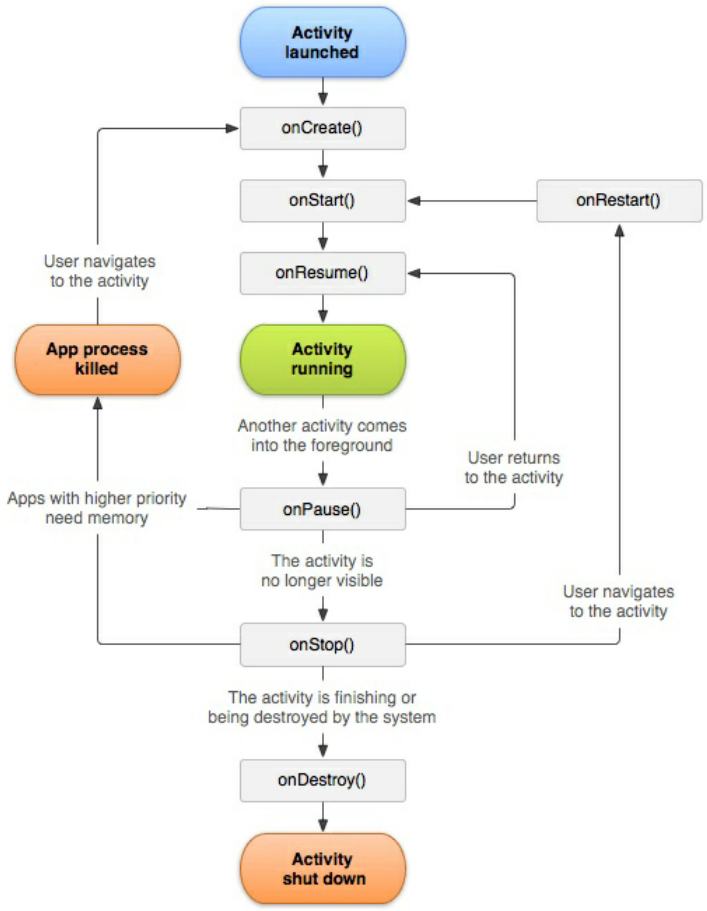
5)Python.

Insti app uses the java language .

d)An activity is the single screen in android. It is like window or frame of Java.
By the help of activity, you can place all your UI components or widgets in a single screen.The 7 lifecycle method of Activity describes how activity will behave at different states.

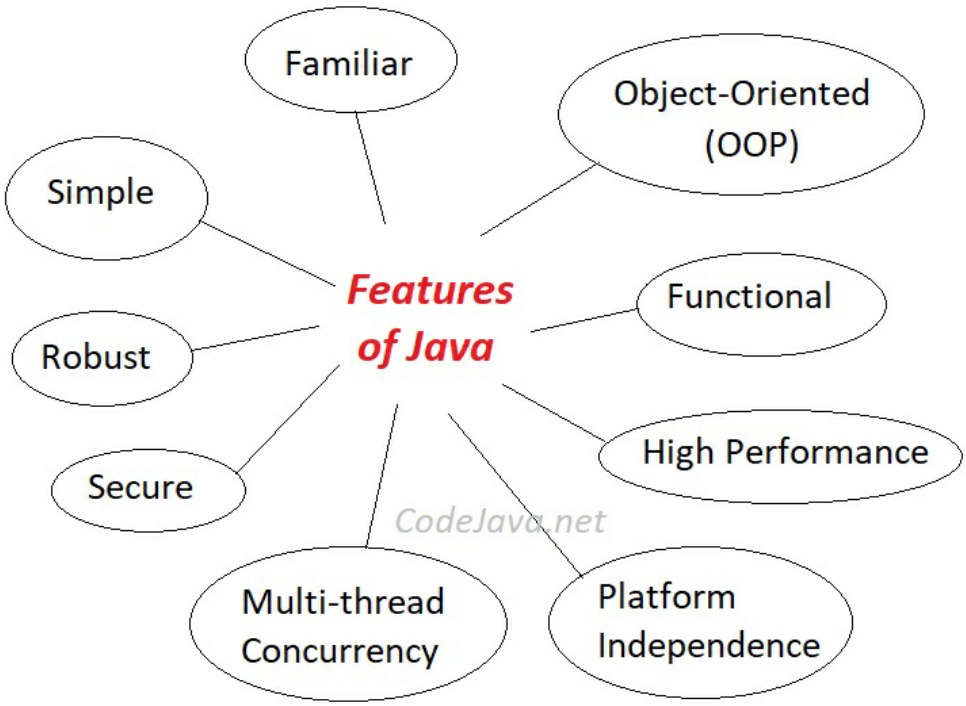
7 lifecycle methods of android activity.

Method Description
onCreate - called when activity is first created.
onStart - called when activity is becoming visible to the user.
onResume - called when activity will start interacting with the user.
onPause - called when activity is not visible to the user.
onStop - called when activity is no longer visible to the user.
onRestart - called after your activity is stopped, prior to start.
onDestroy - called before the activity is destroyed.



e)1)TextView
2) EditText
3) Buttons
4) Checkbox
5) Progressbar
6) Spinners

f) Java:



Similarity to C++ :
1)Both C++ and Java supports Object Oriented Programming.

2)They have similar syntax:

C++ Syntax:

#include& lt; iostream & gt;

using namespace std;

int main()

```
{
   cout& lt;
   <
   "
   Hello World"
   ;
   return 0;
}
```

Java Syntax:

```
public class first {
   public static void main(String[] args)
   {
      // prints Hello World
      System.out.println(" Hello World ");
   }
}
```

3)Comments Syntax are identical:

Both the single and multiple line comments are written as //…. and /* …. */ respectively.

C++:

```
#include <iostream>
using namespace std;
```

```
int main()
{ // main() is where program execution begins
   int a = 5, b = 10, sum;
   sum = a + b;

   /* This will add the values of a and b
and will display the output stored in sum */

   cout << sum;
   return 0;
}
```

Java:

```
public class GFG {

   public static void main(String[] args)
   { // main() is where program execution begins

      int a = 5, b = 10, sum;
      sum = a + b;

      /* This will add the values of a and b
and will display the output stored in sum */
```

```
        System.out.println(sum);
    }
}
```

4)The loops (like while, for etc.) and conditional statements (like if-else, switch etc.) are similar:

C++:

```
#include <iostream>
using namespace std;

int main()
{
    int a = 5, b = 10;
    if (a > b)
        cout << a;

    else
        cout << b;
    return 0;
}
```

Output: 10

Java:

```
public class firstjava {
```

```
    public static void main(String[] args)

    {

        // to display the greater number



        int a = 5, b = 10;

        if (a > b)

            System.out.println(a);



        else

            System.out.println(b);

    }

}
```

Output: 10

5) Both have same arithmetic and relational operators. Arithmetic operators such as **+, -, *, /** Relational operators such as **>,**

6) Execution of both the C++ and Java programs starts from the main function:
It is the entry point of the execution of the program. However, the function declaration is different, but the name is same.

C++:

```
#include& lt; iostream & gt;

using namespace std;



int main()

{ // main() is where program execution begins
```

```
    cout& lt;

    <

    "

    Hello World"

    ;

    return 0;

}
```

Java:

```
public class GFG {

    public static void main(String[] args)

    {

        // main() is where program execution begins

        System.out.println(" Hello World ");

    }

}
```

7) They have same primitive data types:
These include datatypes like int, float, char, double etc. with some differences like the Boolean data type is called boolean in Java but it is called bool in C++.

8) Many of their keywords are same:
Example:break, continue, char, double, new, public, private, return, static etc.

9) Both have multi threading support:
Both allow executing multiple threads(sub-processes) simultaneously to achieve multitasking.

Kotlin :
1 – **Kotlin** is Open-Source.

2 – **Kotlin** Supports Full Java Interoperability.

3 – **Kotlin** Comes With Lazy-Loading **Feature**.

4 – Data Classes in **Kotlin**.

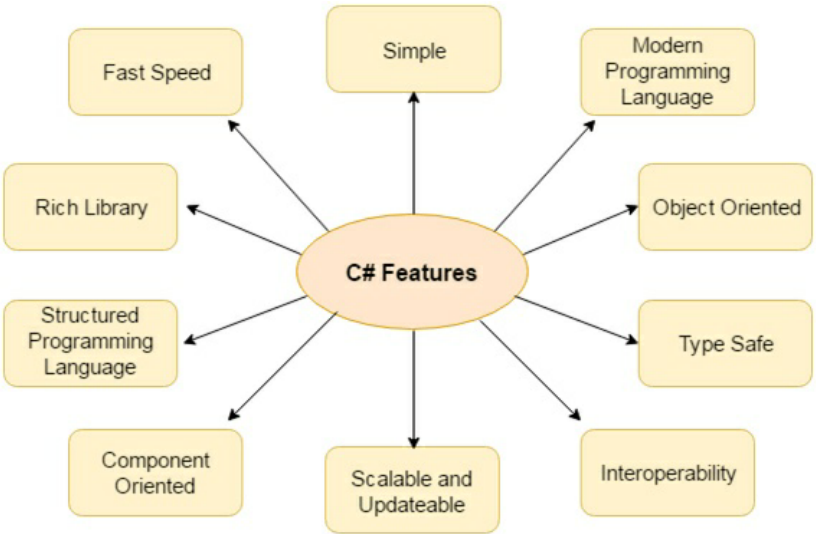
5 – Collection Filtering.

6 – Extension Functions.

Similarity to c++ :
Kotlin is a new programming language from JetBrains. It first appeared in 2011 when JetBrains unveiled their project named “Kotlin”. Kotlin is an Open-Source Language.

Basically like Java, C and C++ – Kotlin is also “statically typed programming language”. Statically typed programming languages are those languages in which variables need not be defined before they are used. This means that static typing has to do with the explicit declaration or initialization of variables before they are employed.
Like in Java, C and C++, the entry point to a Kotlin program is a function named “main”.

C# :



Similarity to c++:

C# is a C-based language, so it makes the two syntaxes similar. The developer uses brackets to segment coding structures, and the C-style object-oriented code that includes dependencies and libraries are very similar. If the coder is familiar with Java or C++, it’s very easy to move on to C#. However, moving from C# to C++ is likely more difficult for a C# developer because it’s a much more low-level language. C# handles much of the overhead that must be considered in a C++ program. This is just one reason C++ is considered a more difficult language to learn in the development world.

Because C# was developed to compete against Java, it’s much more similar to the Java language, but it still has similarities with C++ which include:

Object-oriented: Although the syntax is slightly different, the concept of classes, inheritance and polymorphism.

Compiled languages: Unlike Java which is an interpreted language, both C# and C++ are compiled languages. This means that before an application is launched on a PC or the server, the code must be converted to binaries. An executable EXE file is an example of a compiled file that could be written in C++ or C#.

Python :
Python provides lots of features that are listed below.

1) Easy to Learn and Use

Python is easy to learn and use. It is developer-friendly and high level programming language.

2) Expressive Language

Python language is more expressive means that it is more understandable and readable.

3) Interpreted Language

Python is an interpreted language i.e. interpreter executes the code line by line at a time. This makes debugging easy and thus suitable for beginners.

4) Cross-platform Language

Python can run equally on different platforms such as Windows, Linux, Unix and Macintosh etc. So, we can say that Python is a portable language.

5) Free and Open Source

Python language is freely available at offical web address.The source-code is also available. Therefore it is open source.

6) Object-Oriented Language

Python supports object oriented language and concepts of classes and objects come into existence.

7) Extensible

It implies that other languages such as C/C++ can be used to compile the code and thus it can be used further in our python code.

8) Large Standard Library

Python has a large and broad library and prvides rich set of module and functions for rapid application development.

9) GUI Programming Support

Graphical user interfaces can be developed using Python.

10) Integrated

It can be easily integrated with languages like C, C++, JAVA etc.

Similarity to c++ :
There are a lot of differences between C++ vs Python. The only similarity between these two is the general-purpose languages.

Task
1)
LinearLayout is a view group that aligns all children in a single direction, vertically or horizontally. You can specify the layout direction with the android:orientation attribute.
All children of a LinearLayout are stacked one after the other, so a vertical list will only have one child per row, no matter how wide they are, and a horizontal list will only be one row high (the height of the tallest child, plus padding). A LinearLayout respects margins between children and the gravity (right, center, or left alignment) of each child.

What Is A Relative Layout?

After linear layouts, which display controls in a single row or column, relative layouts are one of the more common types of layouts used by Android user interface designers. Much like other layouts, relative layouts can be defined within XML layout resources or programmatically in the application's Java code. The relative layout works much as its name implies: it organizes controls relative to one another, or to the parent control itself.
It means that child controls, such as ImageView, TextView ,and Button controls, can be placed above, below, to the left or right, of one another. Child controls can also be placed in relation to the parent (the relative layout container), including placement of controls aligned to the top, bottom, left or right edges of the layout.

Relative layout child control placement is defined using rules. These rules define how the controls within the relative layout are displayed.

RelativeLayout is a view group that displays child views in relative positions. The position of each view can be specified as relative to sibling elements (such as to the left-of or below another view) or in positions relative to the parent RelativeLayout area (such as aligned to the bottom, left or center).

RelativeLayout is a very powerful utility for designing a user interface because it can eliminate nested view groups and keep your layout hierarchy flat, which improves performance. If you find yourself using several nested LinearLayout groups, you may be able to replace them with a single RelativeLayout.

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A RelativeLayout is a very powerful utility for designing a user interface because it can eliminate nested view groups and keep your layout hierarchy flat, which improves performance. If you find yourself using several nested LinearLayout groups, you may be able to replace them with a single RelativeLayout.

Positioning Views

RelativeLayout lets child views specify their position relative to the parent view or to each other (specified by ID). So you can align two elements by right border, or make one below another, centered in the screen, centered left, and so on. By default, all child views are drawn at the top-left of the layout, so you must define the position of each view using the various layout properties available from RelativeLayout.LayoutParams.

Some of the many layout properties available to views in a RelativeLayout include:

android:layout_alignParentTopIf "true", makes the top edge of this view match the top edge of the parent.android:layout_centerVerticalIf "true", centers this child vertically within its parent.android:layout_belowPositions the top edge of this view below the view specified with a resource ID.android:layout_toRightOfPositions the left edge of this view to the right of the view specified with a resource ID.

These are just a few examples. All layout attributes are documented at RelativeLayout.LayoutParams.

The value for each layout property is either a boolean to enable a layout position relative to the parent RelativeLayout or an ID that references another view in the layout against which the view should be positioned.

2) Various features of the landing screen/dashboard of book-ed! :
Popular books
List of books near you
Books you may prefer (considering the past borrowings/landings and past searches)
Search books
Books you have lent
Books you own
Books you need to return
Your connections
Your groups
User name and logout button on top right corner
Current Credits
(Book sharing earns you credits which is taken into consideration when many users want the

same book at the same time but fewer copies are available)

3,4,5,6 : files attached

For 6th: I have made only the login page till now , although there is a bug in it as it is not logging in even on entering correct user name and password I.e. it is always going in the else loop. I will check into it soon . I am yet to design the second page which I have left it blank for the time being.

Backend assignment

Research

1)

a)When you enter a URL into a web browser

1)The browser looks up the IP address for the domain name via DNS

2)The browser sends a HTTP request to the server

3)The server sends back a HTTP response

4)The browser begins rendering the HTML

5)The browser sends requests for additional objects embedded in HTML (images, css, JavaScript) and repeats steps 3-5.

6)Once the page is loaded, the browser sends further async requests as needed.

When you type a url into your browser the first thing that happens is a Domain Name Server (DNS) matches that url to an IP address. Then the browser sends an HTTP request to the server and the server sends back an HTTP response. The browser begins rendering the HTML on the page while also requesting any additional resources such as CSS, JavaScript, images, etc. Each subsequent request completes a request/response cycle and is rendered in turn by the browser. Then once the page is loaded some sites will make further asynchronous requests.

Example

1. You type maps.google.com into the address bar of your browser.

2. The browser checks the cache for a DNS record to find the corresponding IP address of maps.google.com.

3. If the requested URL is not in the cache, ISP's DNS server initiates a DNS query to find the IP address of the server that hosts maps.google.com

4. The browser initiates a TCP connection with the server.

5. The browser sends an HTTP request to the webserver.

6. The server handles the request and sends back a response.

7. The server sends out an HTTP response.

8. The browser displays the HTML content (for HTML responses, which is the most common).

b) URLs are mapped to an IP address. The same URLs and IP addresses mapping are stored in DNS files / DNS server. The IP address is used for routing the packet requests made by web clients.

c) TCP: TCP (Transmission Control Protocol) is a standard that defines how to establish and maintain a network conversation through which application programs can exchange data. TCP works with the Internet Protocol (IP), which defines how computers send packets of data to each other. Together, TCP and IP are the basic rules defining the Internet.

UDP: UDP (User Datagram Protocol) is an alternative communications protocol to Transmission Control Protocol (TCP) used primarily for establishing low-latency and loss-tolerating connections between applications on the internet.

Both UDP and TCP run on top of the Internet Protocol (IP) and are sometimes referred to as UDP/IP or TCP/IP. But there are important differences between the two.

Where UDP enables process-to-process communication, TCP supports host-to-host communication. TCP sends individual packets and is considered a reliable transport medium; UDP sends messages, called datagrams, and is considered a best-effort mode of communications.

d)What does setting up a server even mean?

It generally just means to put the server online/make it ready for use.

What is a server?

A server is a computer that provides data to other computers. It may serve data to systems on a local area network (LAN) or a wide area network (WAN) over the Internet.

e) Once the browser receives the correct IP address, it will build a connection with the server that matches the IP address to transfer information. Browsers use internet protocols to build such connections. There are several different internet protocols that can be used, but TCP is the most common protocol used for many types of HTTP requests.

To transfer data packets between your computer(client) and the server, it is important to have a TCP connection established. This connection is established using a process called the TCP/IP three-way handshake. This is a three-step process where the client and the server exchange SYN(synchronize) and ACK(acknowledge) messages to establish a connection.

1. The client machine sends a SYN packet to the server over the internet, asking if it is open for new connections.

2. If the server has open ports that can accept and initiate new connections, it'll respond with an ACKnowledgment of the SYN packet using a SYN/ACK packet.

3. The client will receive the SYN/ACK packet from the server and will acknowledge it by sending an ACK packet.

Then a TCP connection is established for data transmission!

The browser sends an http request to the webserver.

The server handles the request and sends back a response.

The server contains a webserver (i.e., Apache, IIS) that receives the request from the browser and passes it to a request handler to read and generate a response. The request handler is a program (written in ASP.NET, PHP, Ruby, etc.) that reads the request, its' headers, and cookies to check what is being requested and also update the information on the server if needed. Then it will assemble a response in a particular format (JSON, XML, HTML).

The server sends out an http response.

The server response contains the web page you requested as well as the status code, compression type (Content-Encoding), how to cache the page (Cache-Control), any cookies to set, privacy information, etc.

f) Start windows IIS if it is not already installed or Install a simple web server like AnalogX SimpleServer:WWW , xampp i.e. setup a server. Then copy the .html file we created in the web server's folder. Then share the local IP address to the friend and he can view the html page on his laptop.

In short, this requires running your computer as a server. If you want to run a computer as a server, install a server program on it and forward the appropriate port in your router to that computer's IP address. Now it's a server. Then copy the .html file we created in the web server's folder. Then share the local IP address to the friend and he can view the html page on his laptop.

Think

1) I have designed the database schema(attatched) in MySQL Workbench and used entity relationship(ER) diagrams to show the relationship between books, users and other entities.

2)To introduce the feature that the books are searchable by the author , author column needs to be indexed for faster search in EER diagram.

a) We will download the reference data in the local cache. Fetch all the books of that author and then match the book.

b) I tried to install django but it's not working on my laptop so I used the Workbench and created .SQL file.

3) I have included preference table in the database schema.

a) Factors : show books according to

1) preference given by user.

2) Book types of previous borrowing

More weightage is given to a type which has occurred maximum times.

3) preferred authors.

4) approaching insti events like books related cultural events , exams (considering subjects he is interested in,has undertaken)

We can create a formula considering the above preferences and their weightage which decreases as the sr . no . increases.

We need to make additional tables in the database schema for considering some of above things.

b) We will order the preferred books organizing first the book having maximum preferred book types by user.

The books will be sorted as per the highest preferences and relevance criteria as computed.