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Final Project: A new way to rent dogs

1 Introduction to Android Mobile Application Structure

In recent time, the “phone is no longer a communication tool, but also an essential part of people’s communication and daily life,” which allowed for an increased amount of Android mobile applications. As Android mobile applications increased, their capabilities have as well. Android mobile applications have been developed to store, secure, and access information. These capabilities help structure my research, Rent-A-Dog. In order to achieve this, the application consist of programming languages written in Java, XML, and MySQL; however, other languages may be used by importing them through the Android library. Through these programming languages, we are able to develop Android mobile applications that are further underlying structure that allows for the application to be fully functional.

1.1 The Linux Kernel

One of the underlying structures of an Android application is the Linux kernel. To further specify, "the kernel system service provided by Android inner layer is based on Linux 2.6 kernel" [2]. Through the Linux 2.6 kernel, memory addressing, protocols, drivers, interrupts, and other operating system commands are handled. By allowing the Linux kernel to handle these functions, it "makes it possible for a large number of **OEMs** (Original Equipment Manufacturers, such as phone manufactures) to port it on their devices and allow application developers to write applications" [2]. This structure has been utilized by developers to adjust the Linux kernel

structure in order for their mobile application to run more efficiently on handling information and security.

1.2 Android's Library and Runtime

The second part of an Android system architecture is its libraries and Android runtime. Through this layer, there is "an important link connecting between application framework and Linux kernel" [2]. It is here that the library layer allows for the functionalities that programmers call in their code for their applications. It is here that the libraries are developed in C or C++ to provide most functions for the mobile applications, along with the Dalvik virtual machines, which is a "register virtual machine and makes some specific improvements for mobile devices" [3]. With the Dalvik virtual machine, Android application allows for a consistent and portable runtime which are "designed for embedded environments" [3]. This structure, the layer provides powerful and functional designs to a programmer; they are provided with data structures, file access, network access and more.

1.3 Android's Application Framework

The third layer of an Android system is its application's framework. The framework consists of the developer's ability to "access all the API framework of the core program" [3]. By having the frame work, a user has the ability to reuse libraries and components from other APIs to their use. However, the layer enforces Android security and provides management to the owners. As well, according to the Research on Development of Android Applications, the Android application framework includes, "a rich and extensible set of Views that can be used to build an

application with beautiful user interface and an activity manager that manages the life cycle of application to access data from other applications" [3]. Having these features in the framework layer allows developers to produce more efficient functions to their mobile application by using the built-in interfaces and APIs. Thus, the framework provides these developers powerful functionalities to design their custom applications.

1.4 Android's Application Layer

Lastly, in an Android system architecture, there is the application layer. At this layer, an Android device specifies the set of applications that are to be run. To programmers, they use four different types of application components to communicate with the Android system. These four components: activity, service, content providers, and broadcast receivers, each have their own purpose and are used by the developer in different ways.

1.4.1 Four Components for Application Layer

For an activity, it is a representative user interface of a page on the android device. The developer specifies one of the activates as the main activity, which signals the Android system to start the application. It is here, where the developer uses Java and XML programming languages to perform functionalities as the user performs actions. The next component is its service; here the Android service runs in the background, without any interface, and starts new threads or **intents**, an abstract description of an operation to be performed. These services help link the activity interface with the Linux Kernel by using some functions in the Android library. Another component is the content provider, which is important to store information about the

mobile application. The last component to the application layer is the broadcast receivers. This is where “broadcast receivers are in charge of the reception of system wide broadcast and take response aiming at the information that a broadcast transmitted” [4]. By having such a component in the application layer, this allows the user to manage the hardware through software broadcasts. An example, given by the Research on Development of Android Applications, was to broadcast an announcement that the screen has turned off. These broadcast may be useful for developers creating mobile applications that want to manage the broadcast and notifications of devices. Through these components, it allows the developer to have access to more functionalities in Android application.

2 Android’s Database Structure

As precisely described, one of the components in the application layer consisted of being a content provider, which allows users to store or access important data from the mobile application. By using a database platform that is supported by Android devices, a developer is able to efficiently store and access the important information. Firebase, “a real-time database platform that supports syncing database across multiple connected devices at the same time,” [6] contributes to programmers by accessing theses requests for data. In order for Firebase to do so, it implements AngularJS framework that helps connect all devices to the same information. As a developer, this is important when programming a mobile application that stores information because they would want devices to be compatible with each other. Therefore, by providing the programmer with a database platform, this helps store and access information of the mobile application much more efficiently.

Through the Android System architecture and Firebase database structure, a programmer is provided efficient and full functional components to create an Android mobile application. Through the Linux Kernel, library and runtime calls, application framework, and the application itself, a developer is able to manage a mobile application such as Rent-A-Dog.

References

[1] "Research and Development of Mobile Application for Android Platform." Web. 17 May 2016.

[2] "A Look Inside the Android Kernel with Automated Code Testing." Web. 17 May 2016.

[3] "Research on Development of Android Applications." Web. 17 May 2016.

[4] "DEVEVELOPING GEOLOCATION CHAT BASE APPLICATION WITH IONIC FRAMEWORK." Web. 17 May 2016.