

## **TEACHING MOBILE APPLICATION DEVELOPMENT – MAKING PROGRAMMING EXCITING AGAIN**

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### **ABSTRACT**

Teaching programming is a challenge on to itself. The challenge can be seen from two perspectives; the teachers' point of view and the student point of view. Programming has always stricken fear to students. A lot of studies have been conducted on teaching programming and there have been recommendations by practitioners on how programming be taught. The objective of this paper is to share the author's experiences in teaching programming. The intended audience for this literature will be teachers / lecturers / instructors teaching programming in general and specifically mobile application development.

**Keywords:** *Mobile development, android, programming*

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## ***PENGAJARAN PEMBANGUNAN APLIKASI MUDAH ALIH – MENJADIKAN PENGATURCARAAN KEMBALI MENGUJAKAN***

Pengaturcaraan mengajar merupakan satu cabaran. Cabaran itu dapat dilihat dari dua perspektif; pandangan guru dan sudut pandang pelajar. Pengaturcaraan sering menjadi ketakutan kepada pelajar. Banyak kajian telah dijalankan ke atas pengaturcaraan mengajar dan wujudnya cadangan oleh para pengamal mengenai bagaimana pengaturcaraan diajar. Objektif kajian ini adalah untuk berkongsi pengalaman oleh pengamal-pengamal dalam pengajaran pengaturcaraan. Audien yang dimaksudkan untuk sorotan literatur ini ialah guru / pensyarah / pengajar yang mengajar pengaturcaraan secara umum dan khususnya dalam pembangunan aplikasi mudah alih.

**Kata Kunci:** *Pembangunan mudah alih, android, pengaturcaraan*

### **INTRODUCTION**

Malaysians are avid users of technology. They embrace the smartphones with gusto. The Malaysian Insider (2016) reported that Malaysia is ranked among the top five in the world to adopt smartphones. Based on this report, there are huge potential for generating incomes by developing apps in Malaysia alone. Base on this reason, Polytechnic students in Malaysia are required to register and pass the mobile apps development course in their final semester. It falls under the compulsory elective course for both Diploma in Programming and Diploma in Networking. The course for mobile development is assigned the code FP533 and its official course name is Mobile Application Development. Students who are taking the course expected to acquire basic skills in developing mobile applications for Android devices. With this ability, the students are able to build and in which they can sell their apps on Google Play Store. It is also a precursor to entrepreneurial spirit of students to open the possibility of obtaining a salaried job is becoming much more challenging in 2016.

### **PROGRAMMING MOBILE APPS**

The students who take IT/CS courses face the challenges to learn the programming subject. Some of them are, however, fear and lack to practice the programming. Programming has become too complicated with no discernible tangible results. Learning programming is an issue to most students regardless of geographical

location (Simon and Cornforth, 2013). Developing apps will give a sense of tangibility for students learning programming. This will be a motivation for students to experience the joy and the determination in mastering programming. In an article written by Belland et al. (2014) quotes Vygotsky (1962) that stated “The only good kind of instruction is that which marches ahead of development and leads it”.

## **DEVICE CHOICE – ANDROID OR IOS**

There are a lot of choices for mobile devices to choose from in the market. Some of the names available in the market for the last ten years are Android, Blackberry RIM, Apple IOS and Windows Mobile. However, the forerunners of the mobile device are Android and Apple IOS (IDC, 2016). Devices such as Blackberry RIM and Windows Mobile are taking a backseat towards the market share. They are playing catch-up with Google (Android) and Apple (IOS).

Since there are a couple of devices to choose from, the next question on deciding which platform should the students learn, falls onto what type of device the students have at hand. Ideally, when it comes to mobile devices, Apple is the first company to introduce phones that appeals to the consumers. However, the price of an iPhone is prohibitive. Furthermore, to develop an IOS app requires the possession of brand name specific hardware. In this case, Apple product such as Apple Macintosh hardware as the main developing tool. Admittedly, being brand specific reduces issues such as compatibility and performance.

## **MOTIVATION FOR MOBILE APPLICATION DEVELOPMENT**

Mobile application development has become an interesting venture for most developers. Android itself is loosely based on the philosophy of open source. Looking into the architecture of Android itself, one will find that, most of it is from open source. Thus, the cost of learning to develop an Android app is significantly reduced. The requirements for developing Android apps are:

- a) Java Development Kit - this is the backbone of Android control. Java is basically the controller for Android functionality. It is Java language that will make an Android apps function as it is supposed to function.
- b) Android Studio - is the IDE for developing Android apps. The earlier IDEs for Android apps is Android Development Toolkit (ADT) which is a spinoff from Eclipse. Before ADT was the de facto IDE for Android apps, Eclipse was the primary IDE. Developing using Eclipse was filled with issues and heartaches.
- c) Operating System - perhaps the plus for developing Android apps is that, it can be developed in all major operating systems, Apple MacOS, Microsoft Windows, and Linux OSes. Unlike IOS apps. Arguably, we can develop hybrid apps for both Android apps and / or Apple IOS, but the functionality will be reduced.

## WIREFRAMING – TAKING THE MVC APPROACH

There have been a lot of paradigms when it comes to programming over the years. The terms such as the Waterfall Model, Agile programming, and Extreme Programming are a few paradigms taken over the years. With the advent of the mobile devices, a new paradigm came into force, the Model-View-Controller (MVC) paradigm. To help the students to adopt the MVC paradigm, the application Balsamiq Mockups is integrated into the course. Balsamiq Mockups can be obtained from their website at <http://www.balsamiq.com>. The application is used as a wireframing tool for the students to solidify the idea of their apps.

Balsamiq Mockups (Figure 1) has a very smooth learning curve. Students can install and immediately start using with little supervision. It removes the need for the students to “draw” a mobile device by themselves. Consequently, using the mockups, the student can just drag and drop a wireframe of the mobile device.

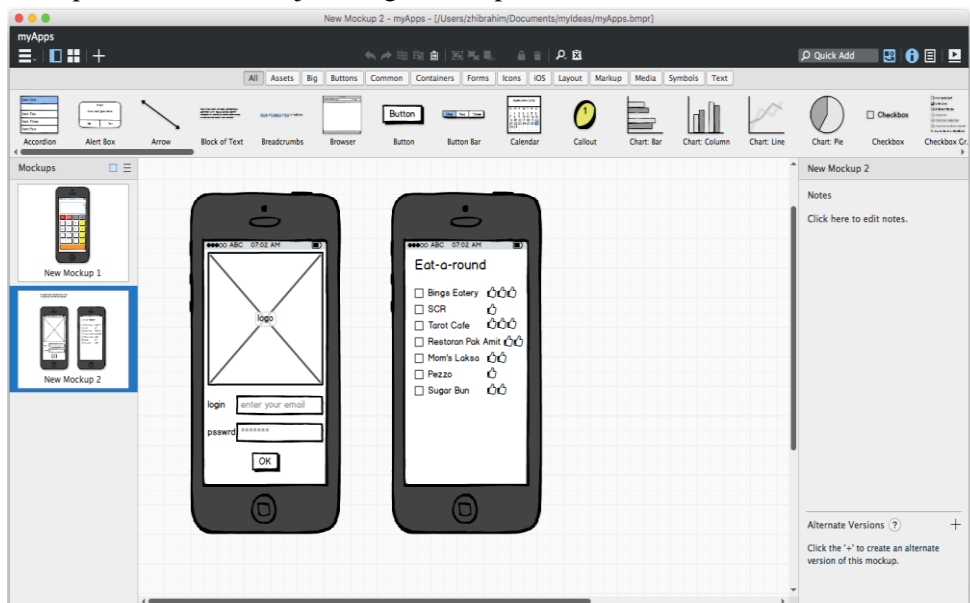


Figure 1: The Balsamiq Mockups Interface

## MOVING TO ANDROID STUDIO

After solidifying their ideas, the students will move towards developing their apps in Android Studio. There are a few approaches in developing apps:

- a) The Native Approach - The base approach of apps development. Using this approach, apps developed will be able to run on the mobile device natively. The apps developed as a native can be executed without the need for an internet access.

- b) The Web Approach - This approach requires an access to the internet for it to be able to work. It may be executed with the help of a web browser. Without an internet access, the apps will not be able to function as required.
- c) The Hybrid Approach - This is a combination of the two previous approaches. It can be executed without the need for an internet access. However, for certain modules to function, internet connectivity is required.

For the course, it has been decided that, the native approach will be used. In this case, the students will be at an advantage because in the previous semester to the current semester, the students have taken the course DFC3013 - Object Oriented Programming, where the language used is Java. Thus, it is hoped that the students are able to pick up programming, by virtue of familiarity, rather smoothly with developing apps.

## **AVDS TO MOBILE DEVICES**

The next approach developing Android apps is to run the apps in an Android device. There are two ways to run the apps. First, by using an Android Virtual Device (AVD) as shown in Figure 2. However, since AVD is resource intensive, then it will take some times before the AVD is running. Second, by testing the app in actual device to check whether they can be running or not. This can be done after doing several steps to the physical device. The developer will open the setting of the Android device to enable the options for unknown sources installation of apps.

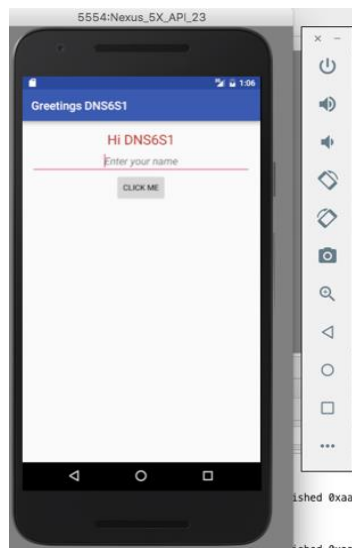


Figure 2: Android Virtual Device

Testing an app on an actual device will give the students a “real” sense of how the apps they develop will run. This will solidify their whole experience in developing apps altogether. It is a much better approach rather than just using AVDs or Bluestacks.

## **DISCUSSION AND CONCLUSION**

By developing apps or a full blown software application, the students’ needs to be able to explain their ideas to their colleagues or their peer. They must also be able to convey their ideas to their immediate superior. If the students are able to explain their ideas to others, it will help them in solidifying their ideas. There are several steps to make the students be able to convey their as follows:

- a) students converse about apps - before designing and developing their apps, students should research the current trends for apps available in the market. By browsing the app store, students will have general ideas of what apps they want to develop. Furthermore, they would have a general idea, how to design their apps GUI. The students then need to talk what their apps are going to be.
- b) students visualize their apps - this step involves the students sketching their apps on a piece of paper. Students can also use wire framing tools such as the one explains previously above i.e. using Balsamiq. Using Balsamiq can help the students in their documentation.
- c) students develop their apps - when the students are able to visualise their apps, they can design and develop their apps using Android Studio.

Programming is a very dry subject. There is a danger for students who took programming courses becoming disillusioned while learning programming. Thus, it is vital for the students to be able to see the product of programming. Learning mobile apps development will help the students being able to enjoy the product of their programming skill. With one small success will lead to other subsequent successes. It is a relatively superficial sense of accomplishment; however, it will get the students to be excited about programming.

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