BOOK REPLACEMENT USING ANDROID SYSTEM

By

HTET WAI YAN

Dissertation submitted in partial fulfillment of

the requirement for the

Bachelor of Technology (Hons)

(Information & Communication Technology)

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CERTIFICATION OF APPROVAL

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A project dissertation submitted to the

Information Technology Programme

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Approved by,

_____

Project Supervisor

UNIVERSITI TEKNOLOGI PETRONAS

TRONOH, PERAK

JAN 2013

CERTIFICATION OF ORIGINALITY

This is to certify that I am responsible for the work submitted in this project, that the original work is my own except as specified in the references and acknowledgements, and that the original work contained herein have not been undertaken or done by unspecified sources or persons.

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HTET WAI YAN

ABSTRACT

The popularity of mobile applications has continued to rise, as their usage has become increasingly widespread across mobile phone users. Mobile applications were originally offered for general productivity and information retrieval, including email, calendar, contacts, stock market and weather information. Public demand and the availability of developer tools drove rapid expansion into other categories, such as games, communication, entertainment, lifestyle, health and fitness, education, etc... However, The usability of an application is not reliable enough to replace the lifestyle of a person. For example, although there is some function to write on a tablet (if installed application), it still cannot completely use as a book as it has some limitation on usability features. The certain amount of researches has been done in order to define stronger problem statements and clearer objectives. The application developed for this project has simpler and more efficient interaction, and greater effectiveness in writing on the smart devices.

ACKNOLEDGEMENT

I would like to take this opportunity to express my utmost gratitude to the individual that have taken the time and effort to assist me in completing the project. First and foremost, my utmost gratitude goes to my supervisor, Mr. Lukman Bin AB Rahim. Without his guidance and patience, I would not be succeeded to complete the project. A warmth thankful to the Final Year Project Coordinator, for providing me with all the initial information required to begin the project. Last but not least, thanks to all individuals that has helped me in any way, but whose name is not mentioned here.

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CHAPTER 1
INTRODUCTION

1.1 Background of Study

The Android OS is the name of the Linux based operating system owned by Google and supported by the Open Handset Alliance, a group of more than 30 mobile and technology companies working to open up the mobile handset environment. Android is used as an operating system for devices such as smart phones and tablets. Google bought the original developer of the software, Android Inc., in 2005. Android is also open source, which means developers can customize the OS for different phones and applications. This is why different phones may have different looking graphical interfaces and features even though they are running the same OS. Android is a freely downloadable open source software stack for mobile devices that includes an operating system, middleware and key applications based on Linux and Java. The android development kit supports many of the standard packages used by Jetty (web server).

Android devices using Android OS conquers Smartphone market day after day. According to a recent survey, more than half of people shopping for new phones chose Smartphones. And, the majority of those Smartphones purchased in the past three months ran the Android operating system. The track of mobile consumer buying habits shows that 43 percent of all Smartphone owners had an Android device, but that 56 percent of people who had bought phones in the past three months had selected the Android OS.

There are many, many android applications at the Google Play android market. Besides, there are lots of handwritten android applications such as Evernote.apk, Freenote.apk, Handrite.apk and many more. The weakness of those so-called note-taking applications is that they don't support note-taking of the actual handwritten variety. It is because discreetly jotting down shorthand during a critical client meeting trumps pounding away on an uncomfortable virtual keyboard every time.

1.2 Problem Statement

The use of mobile phone and devices is increasing day after day. Almost 70 percent of Generation Y wants to buy and owns a mobile device because they love exploring applications installed on the devices. There are thousands of applications grouped in every category. Many applications are developed for educational purposes. But, most of them are not more than just an ordinary application and cannot be fully reliable in educational areas. For example, there are many applications able to write on the screen of the devices. However, they cannot really take over the place of paper and pencil. It is because of the inaccurate writing which causes bad handwriting as users have to use their fingers to write while the fingers have a wide area of interaction with the surface. This is the first problem of why they cannot replace paper and pencil. Another problem is that the alignment of the text (writing) is difficult to maintain in a straight line in most of the handwritten applications. Another problem is there are too many rarely used and unused functions which make application complicated and quite messy. This project is to find the ways and solve these problems.

1.3 Objectives and Scope of Study

The objectives of the project are:

- To develop an application which helps users to write, draw and do everything like they do on the paper.
- To develop an application with more enhanced usability features, functions and simple interaction.
- To overcome the limitations of the existing handwrite application.

The scope of the study will be on creating an application which will only operate on android OS platform. This application mainly focuses to use for Tablet PC and the application is designed for common use for users who want to write notes quickly on their tablet using a digital pen. This application can be useful to people, especially who are in business and educational environment. Besides, the study will also focus on usability features in architecture in order to enhance the usability of the existing handwrite applications. In the term of coding for development will be using Android Programming Language, which is enhanced from the Java Programming Language

and it should be no problem to do the coding since Java is in the category of high level programming language.

1.4 Relevancy and feasibility of the project

RealBook Pro application have no doubt will be useful to the people who prefer to write freely rather than typing in visual keyboard. Besides, it will be different from the other hand write applications because of its simple feature which will make users feel comfortable as same as writing on a paper and can avoid missing valuable information while interacting with the application self. This application will certainly solve this problem.

This project will be divided into two phases. The first phase will be focusing more on data gathering, literature review, technical learning and research. This phase will be completed in 14 weeks. The second phase will be focusing on the development, testing, implementation and final documentation. The second phase is estimated to be completed in 14 weeks. Hence, the total of project duration is 28 weeks and this should be enough to complete this project.

CHAPTER 2
LITERATURE REVIEW

2.1 Android Fundamental

Many authors described Android application development fundamentals, which include setting up an Android development environment on the machine, AndroidManifest.xml file, Activities, Intents, and XML layouts. Jackson (2011) outlines "three major components of an Android development environment: Java, Eclipse, Android" and provides instructions on how to download and install necessary files to establish this environment. Felker (2011) does not explicitly state the components but rather points out that Java JDK, Android SDK, Eclipse IDE, and Android ADT needs to be installed and configured on a machine. The steps provided by these two authors are standard. They appear in many books written for Android development and are also presented on the official Android website ("Installing the SDK", n.d.). Ableson, King, and Sen (2011) present "four primary components of Android applications": Activity, Service, BroadcastReceiver, and ContentProvider. It is noted that "a particular Android application might not contain all of these elements, but will have at least one of these elements" (Ableson, King, and Sen, 2011). Since Activity "displays a UI (user interface) and responds to system and user initiated events" (Ableson, King, and Sen, 2011), it is used very frequently in Android applications. These Activities are declared in AndroidManifest.xml file, which provides "the foundation for any Android application" (Murphy, 2010). Activities present their views through XML layouts and "communicate" with each other through Intents. Clear understanding of these concepts and Java programming language is a prerequisite to start implementing the development techniques used in Android applications.

2.2 Usability In Software Architecture

Over the years the software engineering community has increasingly realized the important role software architecture plays in fulfilling the quality requirements of a system. Software engineers should consider usability as qualities attribute in their architectural designs. Usability determines how effectively and comfortably an end-user can achieve the goals that gave rise to an interactive system. It is an important attribute to consider during all phases of software design, but especially during architectural design because of the expense involved in adding usability aspects after users have tested the system. Companies have been adding more features and functionalities to their products to attract users, which is making the products more complicated. If consumers don't find a product usable, it may be abandoned. Usability plays a big factor in the competitiveness of products.

Brian Shackle (1990) defines 'usability' in terms of effectiveness, learnability, flexibility and attitude. Nielsen (1993) noted that 'usability' applies to all aspects of a system with which a human might interact, including installation and maintenance procedures. Usability is related to other software quality attributes such as correctness, reliability, maintainability, and understandability.

The set of attributes most commonly cited amongst authors in the usability field are:

- Learnability - how quickly and easily users can begin to do productive work with a system that is new to them, combined with the ease of remembering the way a system must be operated.
- Efficiency of use - the number of tasks per unit time that the user can perform using the system.
- Reliability in use – this attribute refers to the error rate in using the system and the time it takes to recover from errors.
- Satisfaction - the subjective opinions of users using the system. These attributes can be measured directly by observing and interviewing users of the final system.

CHAPTER 3
METHODOLOGY

3.1 Research Methodology

This project will be based on Rapid Application Development Model (RAD) because it has much faster development and higher quality result than the traditional software development life cycle. The time limitation of this project which is about 8 months only is the main reason of choosing this model. In this process, minimum planning is required and the development is achieved by using the component based construction approach. The lack of extensive research and pre-planning allows the software to be written very fast and make it easier to change the requirements if needed. Figure 1 below show each phase of the project RAD model.
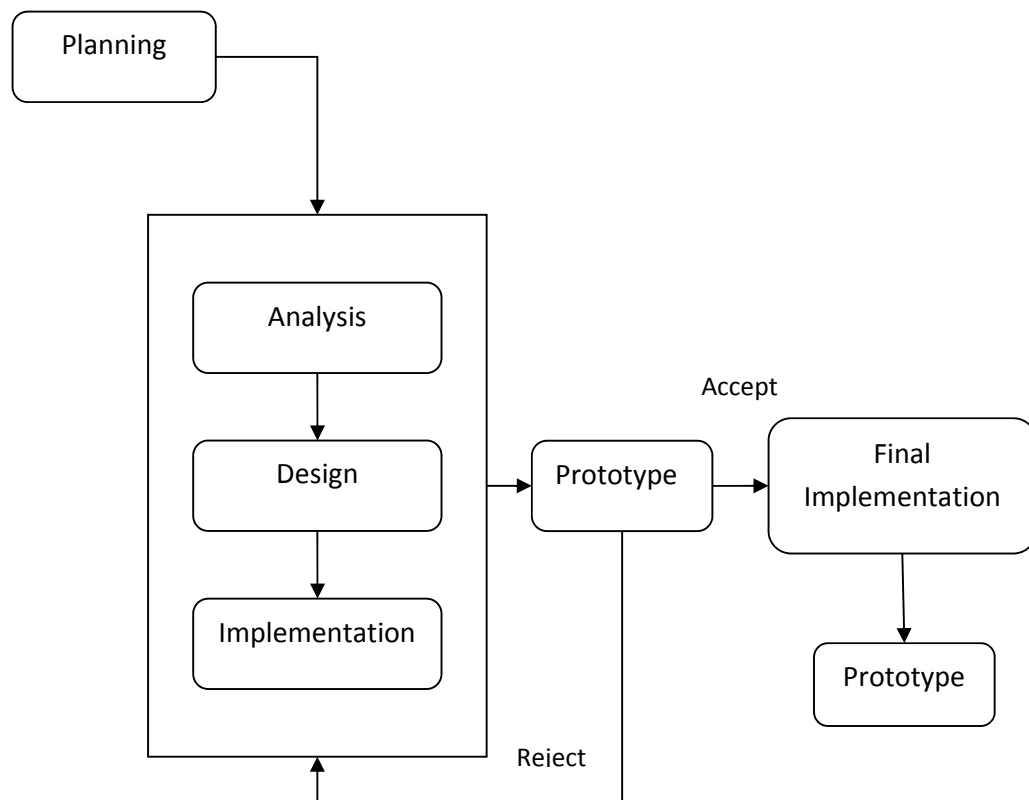

Figure 1: Rapid Application Development Model

3.1.1 Analysis Phase

The research and data gathering process consists of finding reliable information related to project from the research papers and books, and data gathering has been done by interviewing the actual tablet users who experienced using handwritten application. The survey has been conducted to the targeted users who use the mobile devices (preferably Tablet) with Android OS. The purpose of this interview is to know what kind of difficulties that users face during using those applications to make it clearer on the limitations most of the applications have, and to know what kind of application users would expect as well. Moreover, the feedback of the users on existing applications can easily be retreated from the Google Play Store.

The interview section with specific chosen users has been done during the research period. The purpose of this interview is to get the feedback from the people who has experiences using this kind of applications. The interview result gives the valuable information regarding on users' experiences and satisfaction. The below Figure 3 shows the users' satisfaction on the current applications.
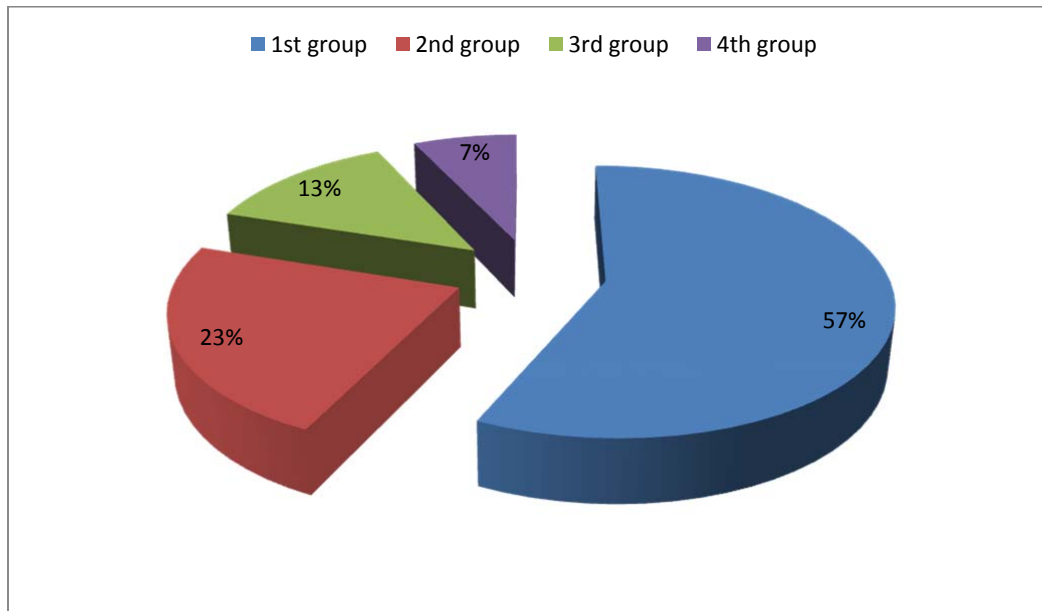

Figure 2. Result of the interview and feedback of uses from Play store

The interview made the greatest impact on the decision whether the new application with more effective features and functions should be developed or not because of the higher percentage of the user group who are not satisfied the current applications. After the interview, the group of users is divided into four groups. The 1st group, the highest percentage of all which is 57 %, is representing the group of users who don't satisfy using the current applications and they hoped some application to come out with better usable features. The 2nd group, the 2nd highest percentage of all which is 23%, mentioned that they feel disappointed because the application look fine in demonstration and not in use. Then, they completely uninstalled the applications. The 3rd group with 13% of the total, said that they don't use those kind of applications because they think that using paper and pencil is more easier and effective during lecture time. Only the 4th group with 7% of the total, think that using those kind of applications is fun and contribute their life style.

3.1.2 Design Phase

The system design process includes designing the Graphical User Interface (GUI) of the application and its appearance using the web based development tool called AppInventor. The system aims to be user friendly in such a way of effectiveness and ease of use to the users.

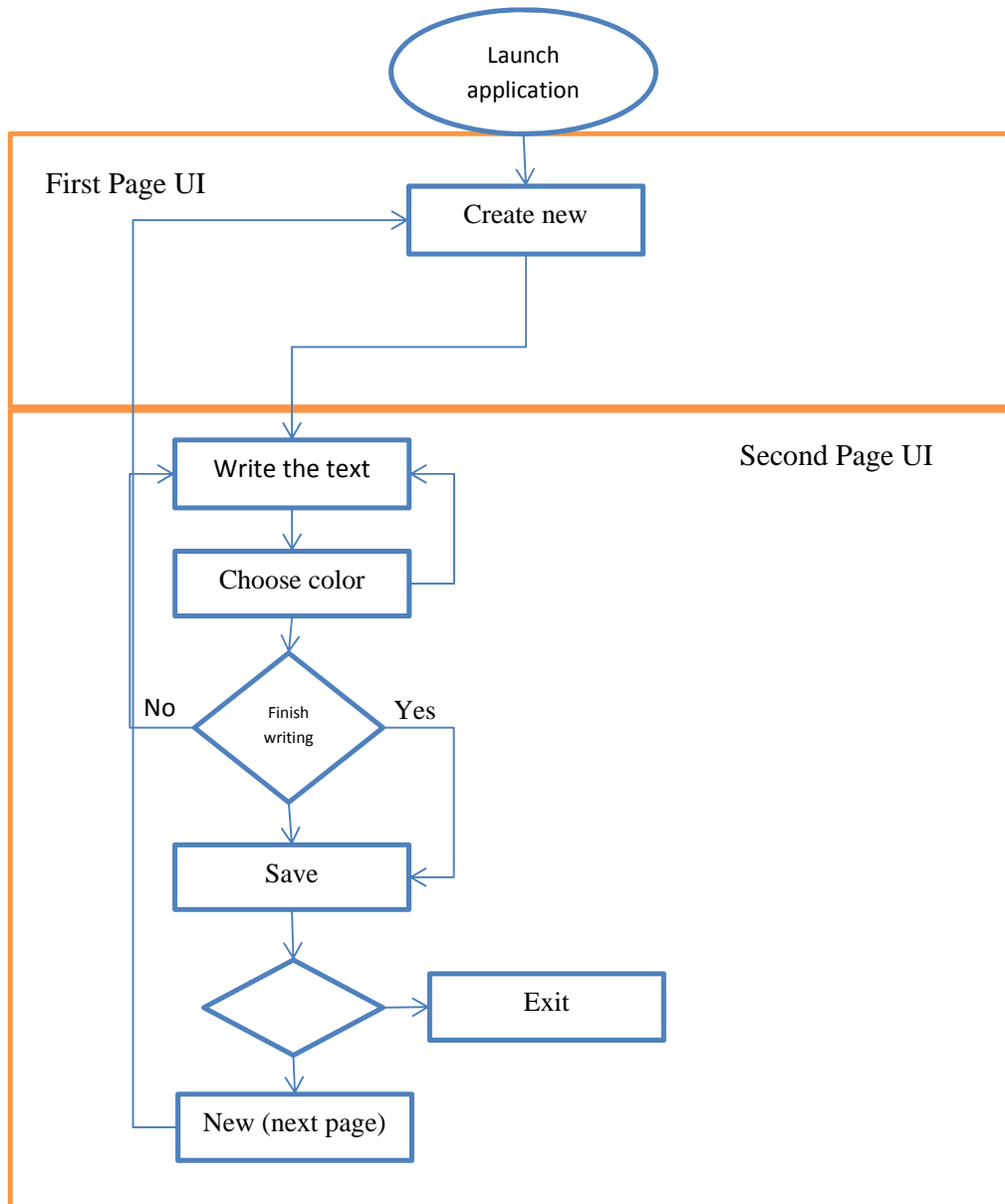Figure 2 shows the flow of the ReplaceBookPro application.

Figure 3: The ReplaceBookPro application flow

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The interaction design would be with the minimum of buttons and be simple. The flow of the application starts with the main screen which has only one button such as "New" and background image. "New" button is to create new canvas on which users can draw the writing. Figure 4 below is the print screen of the application main screen.
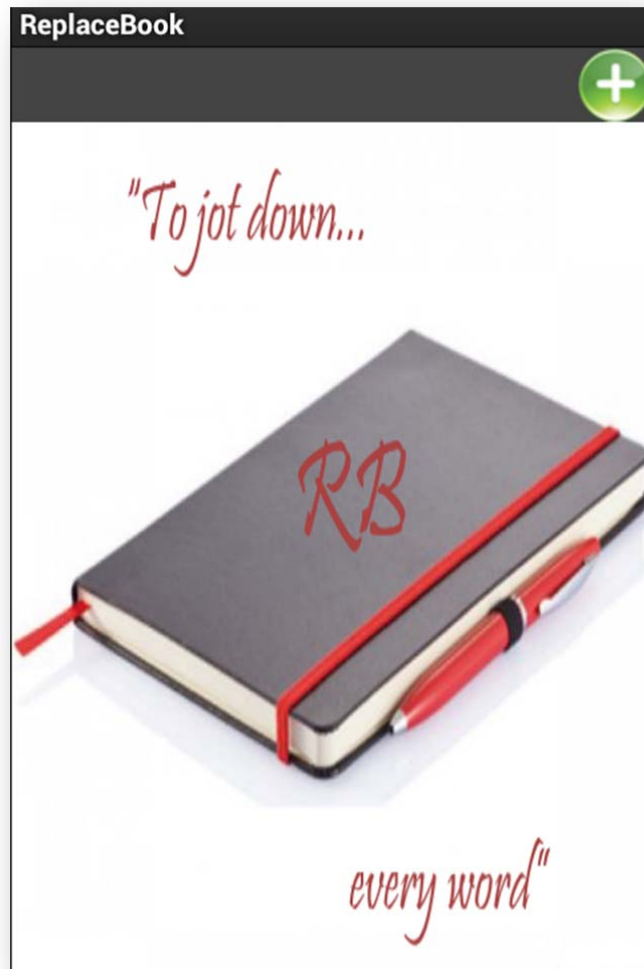

Figure 4: Main screen of the application

On the second screen, there will be blank canvas, 1 text field for naming the document 3 buttons at the top of the screen and 3 colour buttons at the bottom of the screen. The task of the second screen is to be able to name, draw, choose colors and save. Th detail development process of both screens is shown with the screen shoots

in Appendix section. The Figure 5 below shown how the second screen will look like and work.
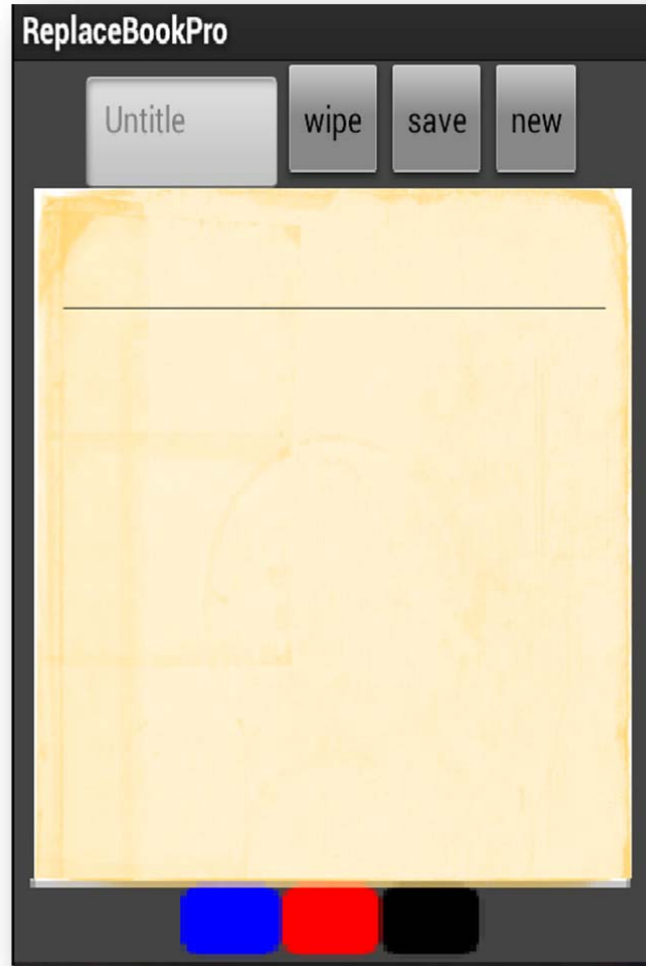

Figure 5: The canvas layout

Android powers millions of phones, tablets, and other devices in a wide variety of screen sizes and form factors. By taking advantage of Android's flexible layout system, we can create apps that gracefully scale from large tablets to smaller phones.

3.1.3 Implementation Phase

Initially, ECLIPSE IDE had been choosen as a main development tool for this project. However, the knowledge and skills to be acquired to master the ECLIPSE IDE seem to take more time than as it is expected. Therefore, AppInventor, web base development tool is chosen as a main development tool instead.

Creating an App Inventor app begins with the browser, where you design how the app will look like. Then, like fitting together puzzle pieces, your app's behaviors are set. All the while, through a live connection between computer and phone, the phone can also be used as an emulator and the application appears on your phone even when the application is in development state.

Many different types of apps can be build with App Inventor. Moreover, there are many tutorials provided in the AppInventor website.

To use App Inventor, you do not need to be a professional developer. This is because instead of writing code, you visually design the way the app looks and use the blocks to specify the app's behavior. The following diagram will illustrate how the AppInventor works.
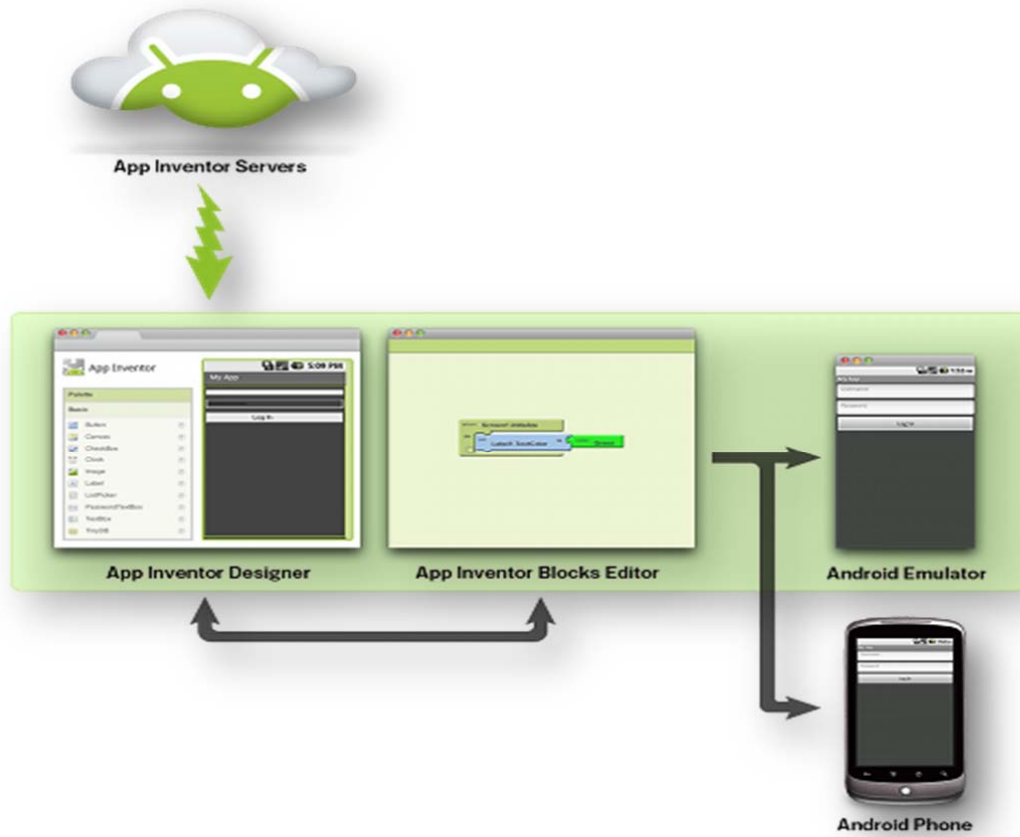
Figure 6: AppInventor application development process

3.2 Project Activities

The first phase of the project is data gathering and research which consists of 14 week period. The following table 1 shows the activities of the first phase of the project and Table 2 shows the activities will be done during the second phase of the project.

Activity/Weeks	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Submission of Proposal			■												
Submission of Extended Proposal						■									
Data gathering					■	■	■	■							
Survey & Interview									■	■	■	■	■		
Proposal Defense (viva)													■		
Submission of Interim Report														■	

Table 1: Gantt chart of FYP 1

Activity/Weeks	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
System Design	■	■													
Development		■	■	■	■	■	■	■	■	■	■				
Progress Report Submission				■											
Pre-SEDX									■						
Dissertation												■			
Oral Presentation/Viva													■		
Final Dissertation															■

Table 2: Gantt chart of FYP 2

3.3 Tools Required

Tools required is divided into two aspects which are the tools for research and tools for application development. For the application development part, there is one web based tool has been added which is AppInventor in order to design the interface of the application. The reason of using this tool is because of its ease of use.

3.3.1   Research

    i.   Internet
   ii.   Laptop
  iii.   Printer
  iv.   Google Docs
   v.   Journal / Emerald Insight
  vi.   Google Play

3.3.2 Application Development

    i.   AppInventor
   ii.   Photoshop CS4
  iii.   Android Devices (tablet / mobile phone)

CHAPTER 4
RESULT & DISCUSSION

The foremost objective of the project is to provide a simpler interface and effectiveness of the application and ease of use. Moreover, the application should help users to write, draw and do everything like they do on the paper. AppInventor assistance in developing the model is much helpful and easy to use. However, due to time constraints and other considering factors, the application was not able to finish developing some other parts such as nicer look and building a database. Even though, those main objectives are achieved successfully and they are provided in following screen shots.

4.1 Screen Shots

The following images are working interface of the application in different writing styles. Although the screen shots cannot show the interaction of the buttons such as wipe, they show most of the interaction between users and application.
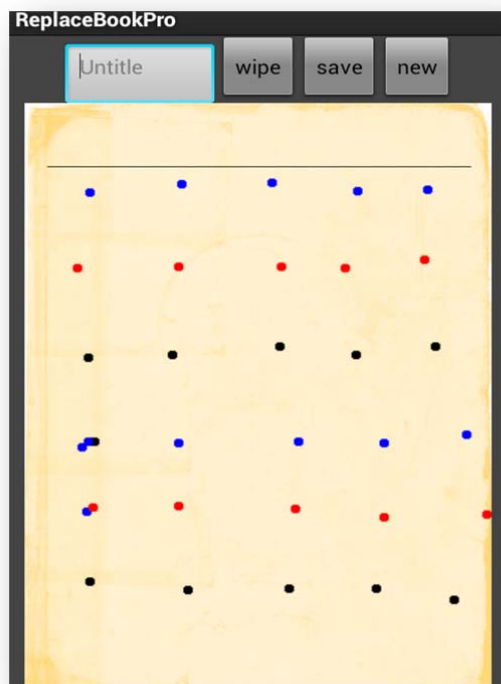

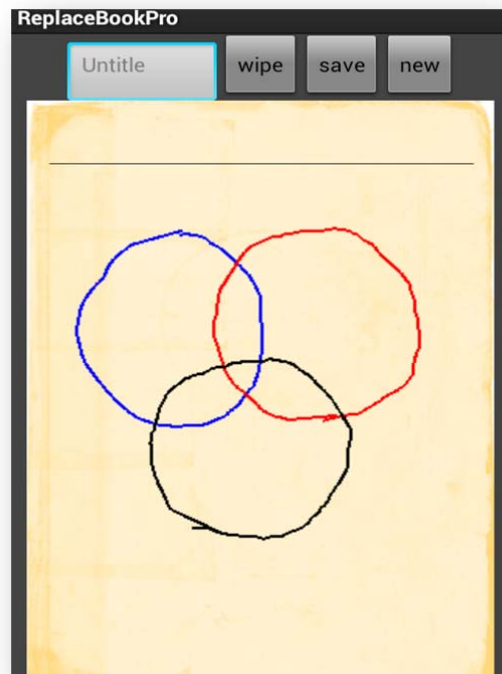Figure 7: Dots on canvas

Figure 8: Lines on canvas
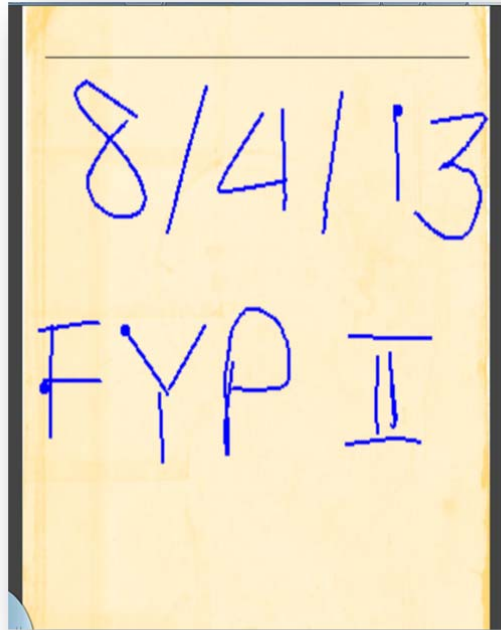

Figure 9: Circle on canvas

Figure 10: Texts on canvas

CHAPTER 5
CONCLUSION AND RECOMMENDATION

5.1 Conclusion

In conclusion, the application fulfill the main objects which are ease of use, simplicity and can write like an actual book. It might be time consuming and need lots of working hours to develop a complete model, the results are satisfactory. Moreover, this project will hope to persuade developers to use simplicity as their advantages. Another important aspect of this project is also for the writer to expose himself to the studies of Android Application Development Environment, Programming language and as well as familiarize with the available software related to Android Programming. Finally, it is hoped that the result of this project would be valuable to both university and students.
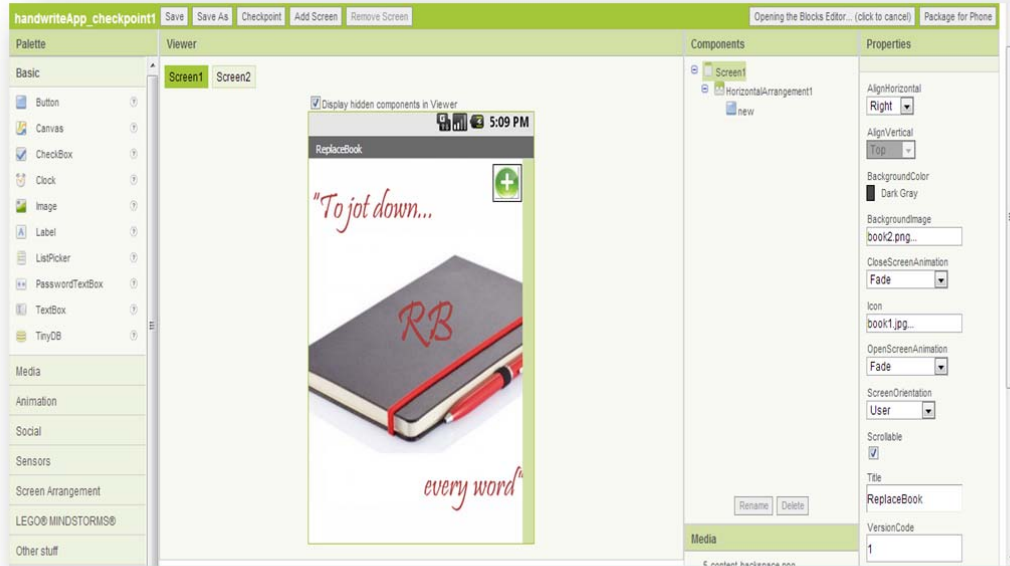
5.2 Recommendation

Most part of the application has been done in this state except the database part and the related buttons' behaviours connecting with it. Until now, the application is raw. The interface design have to improve in order to get nicer and more attractive home screen. This application's development was solely done using AppInventor web base development tool which has some limitations on interface design and behavior of the buttons. Eclipse IDE will be the best tool for developing android applications if the developer will have good programming knowledge, skill and enough time. Last, but not least, it will be very thoughtful step ahead of other universities by providing students with related training course during their FYP I period.

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    http://www.ibm.com/developerworks/opensource/library/os-android-devel/

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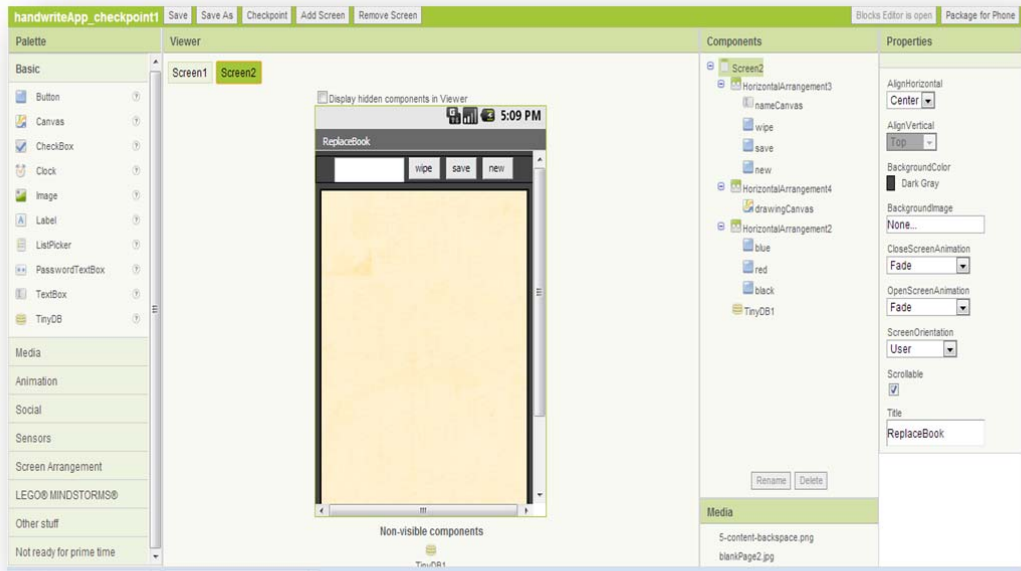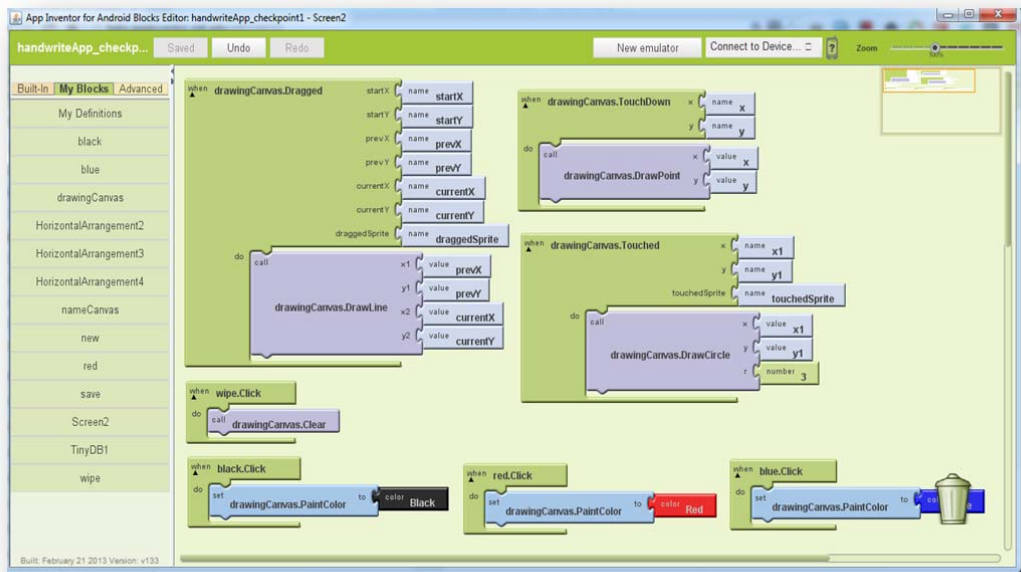   www.elsevier.com/locate/jss

APPENDICES

Appendix I: Main screen design development
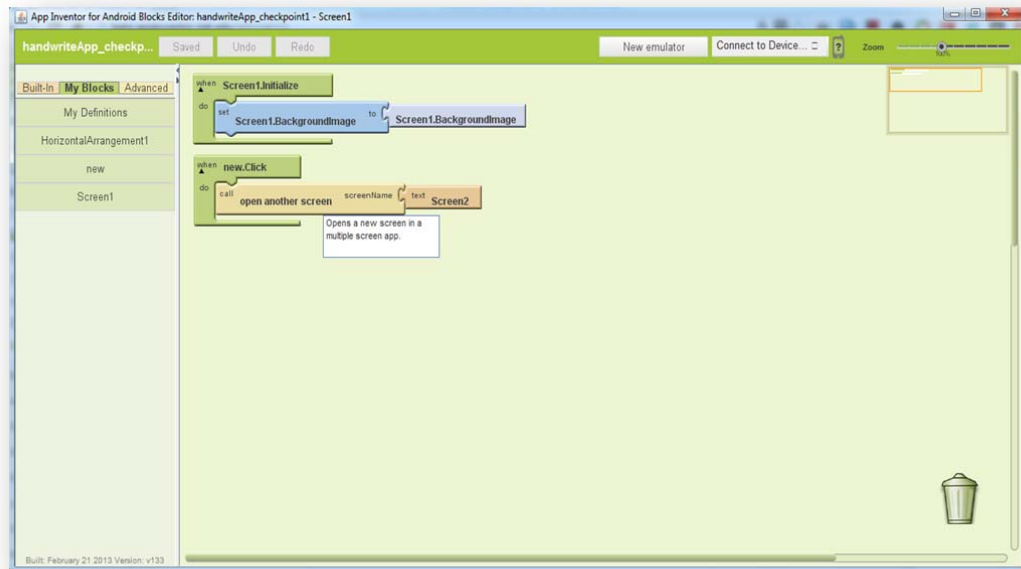
Appendix II: Main screen function development

Appendix III: Interaction screen design development

Appendix IV: Interaction screen function development

Appendix V: Application icon

Main Screen

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|#

Interaction Screen

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27

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```xml
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tName><StubParentGenus>read-write-
property</StubParentGenus><Block id="1435" genus-
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<Label>drawingCanvas.PaintColor</Label>
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id="1425" ></BlockConnector>
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<Label>Red</Label>
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con-block-id="1435" ></BlockConnector></Plug>
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<Label>black.Click</Label>
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```
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<Label>drawingCanvas.PaintColor</Label>
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init-type="poly" label="y" position-type="single" con-block-
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con-block-id="1480" ></BlockConnector>
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init-type="cmd" label="do" is-indented="yes" position-
type="single" con-block-id="1488" ></BlockConnector>
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</Block>
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```
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```xml
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```xml
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