DESIGN AND DEVELOP ANDROID APPLICATION OF FLUID KINEMATICS

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ABSTRACT

This thesis would be about a Smart Phone Application on the Android platform that will open a new gateway for students to learn Fluid Mechanics in the most accessible way. The objective of this thesis is to design and developed an android application of Fluid Kinematics EBook and calculator. The application is been design and develop using MIT AppInventor. One of the core subjects for mechanical engineering student is Fluid Mechanics and one of the subtopic in the fluid mechanics is fluid kinematics. This application is just covered the studies based on diploma mechanical students. The application contain of introduction, notes, video, question examples, answers, manual solution, and calculator to solve the example question. The survey has been done after the application has been tested. The survey is done to 50 students and 20 lecturers in mechanical engineering faculty. The improvement has been made based on the recommendations from the respondent. The results of testing the application discussed in the thesis. Finally, in conclusion the objective designing and develop the application was reached.

ABSTRAK

Tesis ini tentang aplikasi Telefon Pintar pada platform Android yang akan membuka pintu masuk baru bagi pelajar untuk belajar Mekanik Bendalir dalam cara yang paling mudah. Objektif tesis ini adalah untuk mereka bentuk dan membangunkan aplikasi android Kinematik Bendalir EBook dan kalkulator. Aplikasi ini direka bentuk dan dibangunkan menggunakan MIT AppInventor. Salah satu mata pelajaran teras bagi pelajar kejuruteraan mekanikal adalah Mekanik Bendalir dan salah satu subtopik dalam mekanik bendalir adalah kinematik bendalir. Aplikasi ini hanya meliputi kajian berdasarkan pelajar diploma mekanikal. Aplikasi ini mengandungi pengenalan, nota, video, contoh soalan, jawapan, penyelesaian manual, dan kalkulator untuk menyelesaikan soalan contoh. Kaji selidik itu telah dilakukan selepas aplikasi itu telah diuji. Kaji selidik itu dilakukan kepada 50 pelajar dan 20 pensyarah di fakulti kejuruteraan mekanikal. Penambahbaikan telah dibuat berdasarkan cadangan daripada responden. Keputusan ujian permohonan dibincangkan dalam tesis. Akhirnya, kesimpulan dibuat objektif merekabentuk dan membangunkan aplikasi telah dicapai.

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UMP Universiti Malaysia Pahang
FKM Fakulti Kejuruteraan Mekanikal

CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

This chapter is discussed about the project background, problem statement, the objectives of the project and project scope. It also consists of project flow that has been conducted and Gantt chart of the project which explains the overall procedure and the time taken to complete the project.

1.2 Project Background

These days, the use of smart phones has seen steady and rapid increase over time and space. Nowadays, any decisions to buy a smart phone are motivated by knowledge that a good smart phone can allow us to accomplish more than we thought we could, whether professional or personal and remain mobile.

We already knew that almost everyone now already have hand phone and over half of 18 to 44-year-olds had a smart phone, but now it looks like smart phones are solidly entrenched over feature phones. The latest survey found that 45 percent of people who use mobile phones have smart phones, and that 60 percent of people who bought a device in the last three months use a smart phone rather than a feature phone.

This is because people these days are more creative for making things easier by putting tones of different things in a one small gadget. Since smart phone users are literally increasing, I think my application can be used by the students so that they can study anywhere and anytime without carry a whole library of hundred books and worry about the weight.

1.3 Problem Statement

Like other university in Malaysia, students in Universiti Malaysia Pahang faces the common problem of carry a heavy book to class. Having to carry these books is also tiring and it is an annoyance to the students. Some are very expensive and some are in a very limited stock. Students may have to order it and this might take a few weeks to get their hands on the books. As for old reference books, the text on those old paperbacks is just too small and plus sometimes it can also be dull already. Students nowadays have much more interest in gadgets rather than books.

1.4 Objective

The main objective of the study is :

- To design an android application of Fluid Kinematics
- To develop an android application using Google apps inventor.

1.5 Scope

In order to achieve the objectives, the following scope of work is planned out of study:

- Can be used by diploma mechanical engineering student in Malaysia
- Fluid kinematics topic
    - Equation of Continuity
    - Momentum Equilibrium
    - Bernoulli’s equations
- Application
    - Notes
    - Questions
    - Answers
    - Calculators

- Features
    - Button
    - Video
    - Label
    - Image
    - Screen Arrangement

1.6 Project Planning

Figure 1.1 is the flow chart of the whole Final Year Project. Before start this project, a meeting with the supervisor is done to understand about the project title given and manage the schedule of weekly meeting.

After explore the software that had been choose to used, the design concept are need to be sketch for the application that will be developed. The concept design then will be evaluate and final design will be select by the best scoring on the concept design.

Developing process starts with design the application in the Google Apps Inventor Designer, Block Editor and lastly downloads the application to the android real phone. The application will be test once the application has been installed in the phone.

The process will be proceeding with the survey to the students and lecturers to have recommendations and comments so that the application can be improve. Final touch up will be done before the presentation. A draft report would then be submitted to the supervisor to be point out the flaws. Corrections are done and the real final report is handed over as a completion of the final year project.

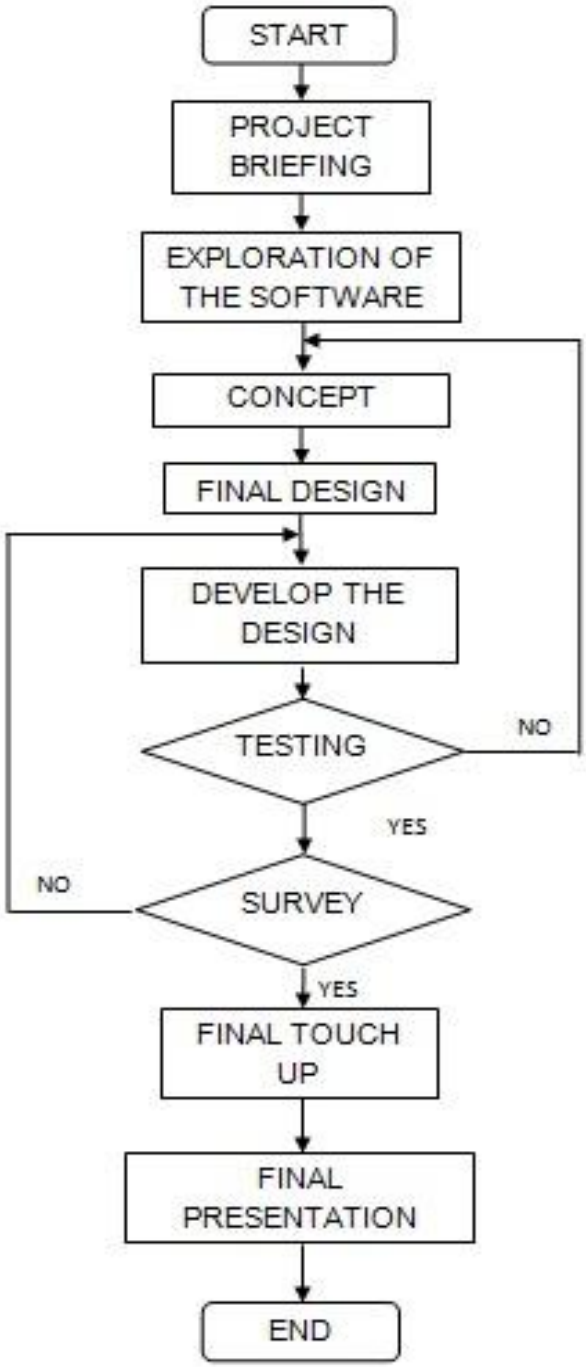


Figure 1.1: Project Flow Chart

Table 1.1 shows the Gantt chart of the project. The Gantt chart shows the planning and the actual progress of the final project. It will show the difference between the planning of the project and the actual progress of it thus allowing a comparison to be made by this difference progress.

As shown in the Gantt chart, the time used for explore the software was longer than expected. This was because the software is so complicated and do not have any experience using the software.

The time used for final design also was longer than planning. This was because the earlier design was so simple and not interesting. So the design need to look more interesting and takes time to design it.

The developing process seems faster than expected. This is because of exploration on the software and tutorial that has been done before. Plus the internet connection is quite good during developing process.

The testing process just takes a week. The application seems run smoothly and just small problems occur.

Other than that, the application improvement takes time until the final week. It was due to the idea comes in last minute. Plus this is the last touch up so the application should look perfect.

Table 1.1 : Gantt Chart

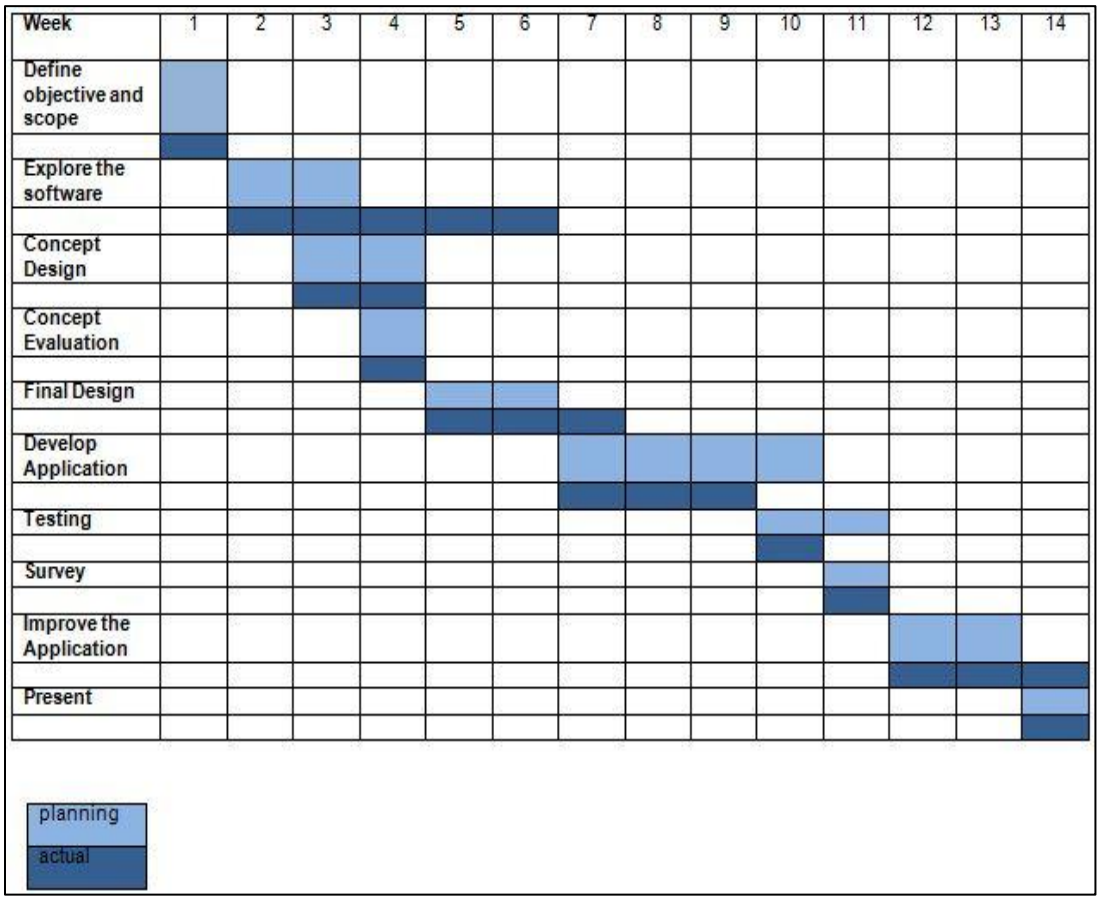
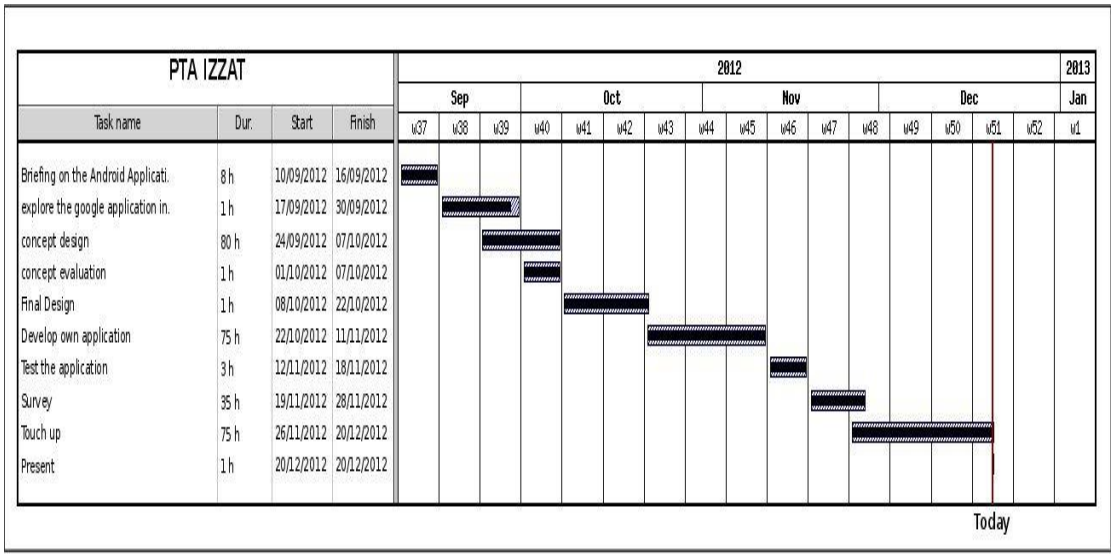


Table 1.2 shows the Dot Project of the project. The Dot Project shows the actual progress of the final project. The Dot project is same as a gantt chart but the date shows is more accurate for the actual progress.

The dot project is an online application that can upload or download file that is relate to the project. So that it will make the work easier because the file can be share. The progress in the dot project is same as in the gantt chart.

Table 1.2 : Dot Project



1.7 Thesis Organization

Chapter 1 would explain about problem identifications, objectives, scopes, flow chart and gantt chart. This chapter planned the direction of my final year project.

Chapter 2 will go through the literature review of the android application. This chapter will discuss about the reviewing study about the android application for Fluid Mechanics.

Chapter 3 will explain about the development process of the selected design, design concept and selection of the project. This chapter will discuss more about the concepts that have came out with and the selection of project to be developed.

Chapter 4 would go detail on the final product that has been developed. The developed product would be explained part by part and the testing of it would also be shown. Discussion of the project would also be done in this chapter.

Chapter 5 is the conclusion of the project. This chapter would conclude the project and give some recommendation on future similar projects.

CHAPTER 2

INTRODUCTION

2.1 Introduction

In this chapter, literature review would be done, which include the fluid mechanics android available in the market, how they work and android installation that can be done by android real phone. The title design and developing of an android requires an amount of good understanding on the knowledge of the development. The information or literature reviews obtained are essentially valuable to assist in the developing of this final year project. In this case, it is more to understanding the concept of application itself. Android application available in the market would be compared and produce a new idea.

2.2 Android Application

Android application is a mobile software application powered by Google's Android platform. Android smart phones, tablets, Google TV and other devices is the gadget to run the application that are available in the Google Play store.

2.3 Android Application Available In the Market

The android application in the market commonly can be download at Google Play. There have paid and free application to be download by android smart phones.

2.3.1 Fluid Mechanics Basics

Fluid Mechanics Basics contains a large selection of Fluid Mechanics laws, equations, tables and reference material that Engineers may find useful during their work. This application contains 100 of equations and tables. The rating of this application is 2.5 stars and has been updated on January 10, 2011. The current version of this application is 1.0 and requires android version is 1.5 and above. The size of this application is only 198 kilobyte. The price of this application is $1.91 and can be downloads at Google Play or by scan the barcode.

Figure 2.1: Fluid Mechanics Basics icon

Figure 2.1 shows the application of fluid mechanics basics icon and application can be download at Google Play.

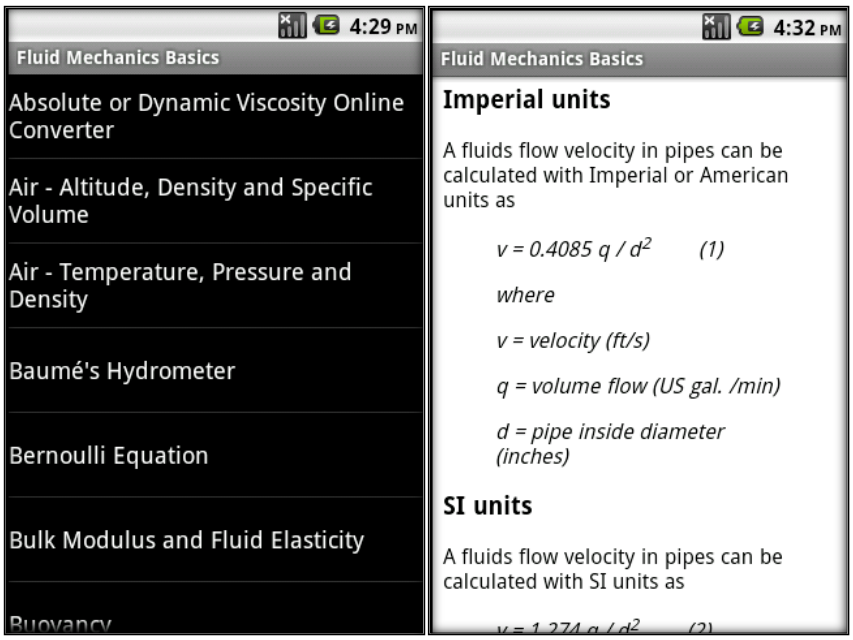


Figure 2.2: Fluid Mechanics Basics screen shot

Figure 2.2 shows the application of fluid mechanics basics screen shot. This is the example screen contains in this application.

2.3.2 Fluid Mechanics 1

Fluid Mechanics 1 contains many calculators from Fluid Mechanics including Bernoulli Theorem and Flow Velocity. The rating of this application is 3.8 stars and has been updated on October 30, 2010. The current version of this application is 1.3 and requires android version is 2.0 and above. The size of this application is only 293 kilobyte. The price of this application is $0.99 and can be downloads at Google Play or by scan the barcode.

Figure 2.3: Fluid Mechanics 1 download

Figure 2.3 shows the application of fluid mechanics 1 icon and application can be download at Google Play.

Figure 2.4: Fluid Mechanics 1 screen shot

Figure 2.4 shows the application of fluid mechanics 1 screen shot. This is the example screen contains in this application.

2.3.3 Fluid Mechanics

Fluid Mechanics can calculate the capacity, velocity, flow depth and percent flow for a circular pipe using Manning's equation. The rating of this application is 4.4 stars and has been updated on October 23, 2011. The current version of this application is 1.01.05 and requires android version is 2.1 and above. The size of this application is only 109 kilobyte. This application is free and can be downloads at Google Play.

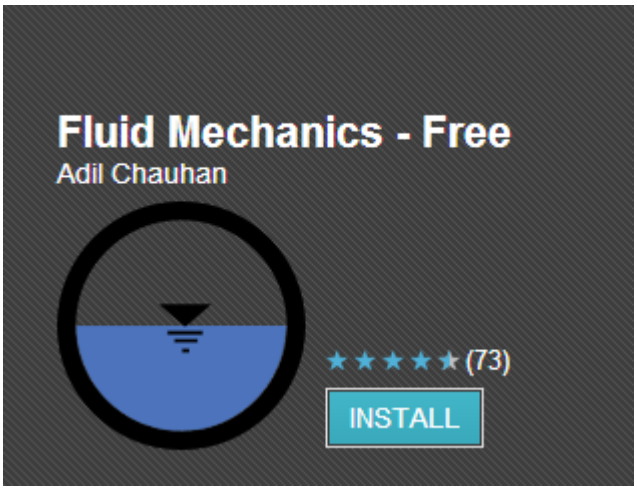


Figure 2.5: Fluid Mechanics download

Figure 2.5 shows the application of fluid mechanics icon and application can be download at Google Play.

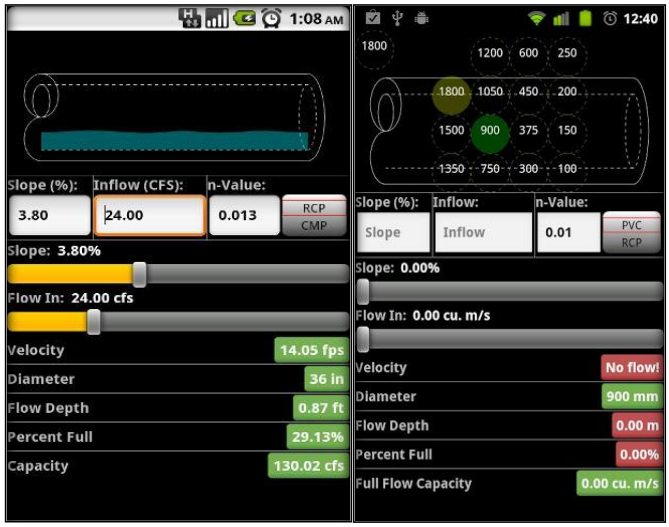


Figure 2.6: Fluid Mechanics screen shot

Figure 2.6 shows the application of fluid mechanics screen shot. This is the example screen contains in this application.

2.3.4 Fluid Mechanics Calculator

Fluid Mechanics calculator can easily and quickly calculate and have 97 calculators in this application. The rating of this application is 0.0 stars and has been updated on February 13, 2012. The current version of this application is 1.0 and requires android version is 1.5 and above. The size of this application is only 286 kilobyte. The price of this application is $3.18 and can be downloads at Google Play or by scan the barcode.

Figure 2.7: Fluid Mechanics Calculator download