Application for Learning Basic Stock Investment

by

Arina Larasati Susijo

17743

Dissertation submitted in partial fulfillment of

the requirements for the

Bachelor of Technology (Hons)

(Business Information Systems)

May 2015

Universiti Teknologi PETRONAS

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31750 Tronoh

Perak Darul Ridzuan

A. CERTIFICATION OF APPROVAL

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Approved by,

_____

(Assoc. Prof. Dr. Baharum B Baharudin)

UNIVERSITI TEKNOLOGI PETRONAS
TRONOH, PERAK
May 2015

B. CERTIFICATION OF ORIGINALITY

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.

_____

ARINA LARASATI SUSIJO

C. ABSTRACT

Popularity of stock investment has been increasing to earn additional income nowadays. This brings along the educational issues for people, as well as UTP students, who interested to stock investment since they do not have investment class to introduce them about how to trade in stock investment and no reliable stock learning application found. This issue can be addressed by developing this project. The objective of this project is to build an application for learning basic stock investment from mobile devices where the people can learn anywhere and anytime. With scope of study is among financial management students in UTP.

The methodology that is used is waterfall model. Some steps from planning, analysis, development, and implementation are sequentially developed. It will begin with choosing the source of material that will be acquired from chosen websites and books. After choosing best features from the resources and confirm with expert, contents of mobile application will be developed. The contents of learning in this application are divided into several levels to ease them understand stock investment better. After finishing all levels, simulation and additional material to be learned, such as additional reading material and videos, are provided in the application.

At the end of this project, prototype and user acceptance testing are conducted. The application prototype that runs in android platform will be the findings of this project. The application's home, level's page, lesson page, and quiz page will be shown in this report. On the other hand, user acceptance testing is also conducted. The result of this testing is 93% of the users said that this application is help them to understand basic stock investment. It is concluded that the objective of this project is achieved. For future recommendation, the application should be developed for intermediate and advance level with broader users, under android and iOS platform.

D. ACKNOWLEDGMENT

Assalamualaikum wr.wb., First of all, I would like to thank to Allah S.W.T. for giving me strength and wisdom to complete Final Year Project (FYP). Then, thanks to Universiti Teknologi PETRONAS for giving me this tremendous opportunity to learn many things in this university. Then, I would like to express my gratitude to following people because they have helped me a lot during this completion of this Final Year Project.

I would like to express my appreciation to my supervisor, Assoc. Prof. Dr. Baharum B Baharudin, who has supervised me and guided me throughout my final year project with patience. I really appreciate him because he still offered his valuable time to assist me although he has a tight schedule. It has been a great opportunity to be trusted during this Final Year Project.

Besides that, I thank to my family who have already give me full support during these days and always remind me to never give up. Without their support, I am sure I would not make it until the end.

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CHAPTER 1

INTRODUCTION

1.1.   Background of Study

Earn money as much as possible is the main expectation and goal of majority people in the world. Abundant savings in the future and financial freedom during retirement seems to be a temptation to be pursued. Besides earn money by working full time in a company, people think to start their own business or investing money in stock market. Investment is a popular way to earn additional income nowadays. People are able to put their money into several types of instrument such as bank deposit, bonds and stocks. Given determined risk, investor is expected to receive some return.

Bank deposit gives very little amount of additional interest but the risk of losing money is very little, Bond gives more return but at the same time gives more risk as compare to bank deposit, Meanwhile stock is the type of investment that gives more return among others but have higher risk.

According to Kiyosaki (2000) in his book, titled Cash Flow Quadrant, the people who allocate their income into stock investment will have power to make money works for them. Claiming ownership as well as corporation's asset and earning in the shape of dividend are an advantage of investing into stock. The investors are expected to buy stock with the lowest price of the stock, and sell it when the stock reaches the most expensive price. Currently, there are thousands companies that sell their ownership in stock market, and each of the company has its own risk and return. In addition, stock investment also acts as a economic situation pointer of a country.

According to the latest data in 2013 from The Federal Reserve Survey of Consumer Finance in United States, 49 % of US citizen own stock or mutual funds. In this country, the distance between wealthy citizens and the rest could be measured by stock ownership. However, this

perspective is less adopted by eastern people because they are not familiar with this kind of schema. The reason is because less encouragement and medium to learn stock for the first time learner. In Malaysia, fundamental stock only been taught in management class, and it becomes an obstacle for people to learn stock investment. Although technology-based learning could be a solution, but it is found that application to learn stock knowledge using current technology being less implemented.

Study in effective learning has introduced some techniques that help people regulate their learning such as electronic learning (e-learning) and mobile learning (m-learning). The advantage m-learning over e-learning is about the accessibility. M-learning is emphasizing the mobility of learners to study anytime and anywhere. Moreover, M-learning is very convenient since the maximization of mobile device is being used as a medium (Shuler, 2009).

Therefore, this project will propose problem solving for obstacles mentioned in above. The development of mobile application for learning stock for first time learner will be built. This mobile application will implement attractive interface that conform level of user experience. Attractiveness means that the user interest keep sustain to use this mobile application, also they will enjoy to learn stock investment until the end of the level.

1.2.   Problem Statement

The main problem associated is only certain people willing to learn about stock because the myth that stock investment is a gambling. This reason is used by majority people to stay away from stock investment because the false mindset that stock investment is only be trading medium and they lose sight that stocks is a symbol of company's ownership. And if unstable market occurs, they potentially lose billion dollars only within seconds. The possibility why people lose their money during trading in stock market could be they lack of knowledge on measuring risk before they buy stock. Main differences between gambling and investing in stock should be clearly understood in order to successfully trade in stock. Gambling apply no risk calculation before make decision. This is an opposite of stock investment whereby the investor should assess current market condition, company performance, and calculate total risk before buy certain company's stock.

Limitation on formal class for learning stock investment has forced people to find alternative option to learn. Find applications in their mobile devices, such as mobile phone and tablet, usually be done because of its convenience. The difficulties finding right application that effectively facilitates them to perceive the basic concept stock investment in play store remain to be an issue. Despite of current application that has already offered are not suitable for people especially those who are classified as first time learner because those applications do not include the basic terms and theories. Most of current applications directly embarked on the trading phase which is a bit advance. This problem has negatively impacted the first time learner because once they lack of understanding basic concept, the interest to learn stock more will decrease. Thus, a study which used attractive component application could remedy the situation.

1.3.   Objectives

- To design and develop mobile application as a tool that help people to understand basic stock investment and ready to trade in stock market.

1.4.   Scope of Study

The scope of study this project is to build mobile application for learning basic stock investment for beginner learner which is financial students in UTP. This application is developed based on several levels with different type of difficulties. The aim is to teach UTP students step by step from the easiest material until the most difficult one. At the same time, the application should be able to attract and sustain their attention to use this application.

As reference to arrangement of levels mentioned before, each level has different learning objective such as understanding basic stock investment and to learn basic risk and return. At the last learning objective, the target user is expected to understand basic knowledge and ready to play in stock market. The interface must be two ways communication. In which the application provides learning section, and at the end of learning section, there are set of questions to be answered to confirm that users have already achieved certain learning objective.

Interview with expert will also be done to gather the requirement, strengthen the development, and support the argument.

CHAPTER 2
LITERATURE REVIEW

2.1. Investment

Investment is an activity in which the investors will put their asset into funds with two kinds of expectation which are market appreciation and dividend. Investor will expect a reward in the form of return. The returns that usually be considered by investor are income and growth. Income is a return in the shape of periodic interest earning, whereby growth are the rising of the value from its purchasing price.

Smart, Gitman, and Joehnk (2014) stated that when the person decide to invest, they tend to choose an organization that is able to become a bridge between them and the market in order to conduct investment. Organizations' competition to attract investor to be potential customer is very competitive. The organizations keep improving their product by offering a variety of attributes based on risk preferences. The most popular instruments traded in investment are securities and properties. Securities show a financial claim on the resource of the company. It consists of stocks and bonds, whereas properties relate to land, buildings, gold and other collectibles. The chosen investment of investors should depend on their willingness to take risk, resources, and goals.

According to Bursa Malaysia (2015) securities is a type of instrument tradable of investors' asset in bonds and stocks represent in a certificate or electronic quotation from issuer. The most attractive type of investment is trading in securities because it is expected to provide higher return than any other instruments.

In any investment, the investor is not only concerned on return, but also risk associated with their investment.

According to The Federal Industry Regulatory Authority (2015) risk could be classified into two major categories, systematic and unsystematic risk. Systematic is known as a market

risk and is affected by the economy of a country. Business will perform better if country has a stable economy condition. Systematic risk is controlled by country's market situation, whereby unsystematic risk is related to company performance. Unsystematic risk could be minimized by diversifying stock chosen in the portfolio.

Categories	Risk Involve	Definition
Systematic Risk	Interest-Rate Risk	The value decreases because of changing of interest rate
	Inflation Risk	Increase because reduce on purchasing power of goods and services.
	Currency Risk	Occurs because world currency
	Sociopolitical Risk	Factors of instability politic will affect investment market
Unsystematic Risk	Business Risk	Current performance business of company
	Financial Risk	Risk of the company not capable to obtain additional capital

Table 1: Differences between Systematic Risk and Unsystematic Risk

2.2. Stock Investment

Kee and Mun (2000) explained stocks grant an opportunity to the holders to own a stake of a company without being involved in the management. When investors buy stocks, they expect the management of that particular company will grow the business. Returns provided are capital gains and dividend. Major reason why people invest in stock is because of capital gains, in which the price of stocks sell higher than the price when they bought it. Historically, they generated much higher return than any other instruments such as bank deposits and bonds.

Shares are being issued through several medium. When company issue shares publicly for the first time, Initial Public Offering (IPO) is the medium how the company promotes to people to subscribe their shares. IPO is normally underwritten by a bank which acts as

intermediaries. The company select underwriter, commercial bank or investment bank, who offers investing in certain number of shares.

According to Investopedia (2015) there are two main types of stock: Preferred stock and common stock. Preferred stock promised to the holders for a fixed dividend. Preferred stock is paid off before common stock holders. The income from this type of investment is guaranteed. As compare to common stock, this type of stock that is commonly traded. Common stock will give their holders a portion of profit. If the company does good business in a certain period and generate high profit, the holders of this stock will be given a higher portion of income. This is the advantage of common stock over the other type of stock, which is more preferred.

2.3. Correlation between Stocks versus Bonds

According to www.motleyfools.com (2015) bond is indebtedness that is publicly sold in a set of increments. The bondholders are guaranteed monthly fixed interest plus repay capital in the last period of maturity date. Although bond and stocks investment are different, there are correlation between them since this instruments is able to help investor to maximize return if the investor choose to combine them through portfolio.

According to initial research on investment development in this early century by Bolten and Besley (1991) shows in the period of 1967 – 1987, a combination of portfolio in stocks and bonds re-balanced according to income earning and interest rates, give 12.9% annual return. This is compared to 10.6% return from all-stock portfolio and 7.8% return from all-bonds portfolio. However, this combination needs some approaches to obtain maximum result.

In predict the return of portfolio in long term index return, variance in return and the correlation among return, required strategic asset-allocation through portfolio from investors (Cheng & Ryan,2002). Two approaches that are required to be considered are tactical and strategic asset allocation decision. Tactical decision is a percentage range of allocating stock, the advantage taken from short term opportunities in order to create long-term strategic allocation, whereby strategic decision determinate target and rebalance investment portfolio (Sharpe, 1987).

2.4. Financial Management and Stock Investment

Financial Management is an activity to manage money or funds to achieve certain goals. Financial Management is divided into two categories, personal management and organizational management. Organizational financial management will dealing with top management decision to strive some goals, usually to make financial position becomes better. Whereas, personal financial management is an activity to manage personal income of an individual in order to be wealthier.

One of the approaches to obtain additional financial resource is through stock investment. Stock investment is an equity investment that represents ownership in a company. According to Smart, Gitman, and Joehnk (2014) there are two types of return that investors expect from stock investment: market appreciation and dividend from company. The advantage of investing in stock over the other type of equity is the returns that being offered. Stocks also generally give high returns over the long haul. Furthermore, an offer to be sold and bought easily, also the modest cost of trading is likely to be a benefit to invest in this equity.

However, the most significant disadvantage that should be emphasized is the risk associated with stock ownership. Stocks are affected by various types of risks, including financial risk, purchasing risk, business risk, event risk, and market risk. Additionally, high volatility and unpredictability related with atock investment are being discovered as the weaknesses (Smart, Gitman, and Joehnk, 2014).

Stock investment could be learned better if society provides appropriate financial education level. Financial Education enable people to be more informed in their decision making. Before engaging in financial contracts, it is better to provide sufficient financial knowledge.

Barber and Odean (2008) argues that in financial education process, theoretical understanding alone may not enough for empowering people to learn stock investment. Tools

that ease them to improve their familiarization before participating in real stock market environment should be developed. Using tools, they will have better perspective of stock market by practicing through an application. The aim of tools development is to improve experience when they trade chosen stocks. If the tools do not exist, they will have higher probability to lean on their instinct and luck. In addition, Sharma and Johri (2013) mentioned that learning tools helps people to apply empirical and theoretical knowledge that they have already been acquired.

2.5. Current Stock Education in the Market

The most common tool for learning about stocks is through a virtual stock trading system. Financial Education is allowed to be learned from that system, because knowledge domain could be accessed easily from virtual stock trading system. The system also enables people to be more knowledgeable and expected to be more rational when trading. It holds an important role in preparation phase before participating in real stock market (Wu et al, 2012).

Other than using tools, people can use site for expanding the investment knowledge. According to Smart, Gitman, and Joehnk (2014) stated that currently sites for learning investment are available online. The information and guideline for investment can be accessed by public. Some of good sites that feature investing fundamental are The Motley Fool, Investopedia, and Investorguide.com.

The Motleyfools.com

Developer   : David and Tom Gardner, and Erik Rydholm

Country   : United States

Description   :

Online financial-services company that have various product of investment through stock investing and personal finance product. In this site, investor is also able to learn fundamental of investing. But the weakness associate with this website include there is no proper arrangement of learning stock step by step. So the investor explores the website by themselves.

Figure 1 : Definition www.themotleyfool.com

Investopedia

Developer   : Cory Janssen and Cory Wagner

Country   : Canada

Description   :

An online resource that provides investing education, market analysis, personal finance, and trading simulator. Investopedia began as investing dictionary whereby the investors learn basic term and theory through this site.

Figure 2 : Definition investopedia

Those education investing are available online. But the weaknesses associated with those platforms is the arrangement of education not being arranged in such way that ease beginner investor to learn basic stock investment step by step. It is time consuming since the investor has to explore the content they want to learn by themselves. Another source that enable investor to gain their knowledge and experience for trading stock in stock market is using trading system.

The most popular trading system is Wall Street Survivor, this application the user will able to learn in stock market by simulation. Capital will be given to the users, and user will use that capital to trading in simulation of stock market.

Wall Street Survivor

Description   :

Is a popular trading simulator application in which the user allows to trade virtually using this system. The user will be given virtual capital, and they will use it for simulation trading using real record of share price and listed companies.

Figure 3: Wall Street Survivor

According to Wu et al. (2012) trading system is a combination of rules, parameters, and determination of entry and exit point for a chosen equity. Most of current developers build trading system with commercial orientation, which do not appropriate for financial education management since they have to spend some money to embark in this system. In the other side, annual competition in virtual trading system from several investment companies are not process-based oriented. Because feedback on user's mistake does not be provided as feedback information that helps the user to enhance skill, ability, also allow user to have wider knowledge. The systems in the competition are not being identified as an appropriate media for financial education management.

2.6. Mobile Application Learning

Currently, there is only limited mobile application to learn stock investment. The people who are willing to learn stock has to access necessary information through website page. In which they are not able to access anytime. The learners may have job every day and it is not a convenient way if they want to learn stock but has to open website page to acquire knowledge.

Based on Shuler (2009) mobile device is a convenient media for learning purpose because it is able to be carried easily in daily life. Moreover mobile device allows the user to learn knowledge anywhere and anytime. It enables the information to be accessed, gathered, and processed in any places. In this century, mobile devices are widely used by society.

In this 21st century, evolution of communication device is rapidly changing. Everything becomes more portable and to connect between one people to another is much easier. Mobile device transform into lighter, smaller, efficient to be brought anywhere. The applications in mobile device are more sophisticated and easily to be download. Although security mobile application still being a main issue, but digital era has already been started (Muthukumaran et al., 2000).

The advancement of current technology in mobile device affects many aspects of our daily life. The utilization in daily life are include surfing the web to read news, accessing sport

tool, and playing feature games. Moreover, the cutting edge of this device empowers people to be more dynamic. The more people use mobile device, the more probable that they utilize information system (Shuib et al., 2015).

Shuib et al. (2015) reported that learning activities usually limited to brick and mortar class room in a period of time. Nowadays, that style slowly shifted to a digital version as an impact of advancement technology. Online learning enables the student to learn anytime and anywhere. Web-based education incorporates with e-learning and m-learning to convey and administer for learning preparation and its material. The definition of mobile refers to the possibilities to do activities conducted in multiple places across the time boundaries (Kurkela, 2011). Many institutions have embarked in mobile learning to replace their conservative classroom. Mobile learning gives opportunity to student to share the knowledge. It also gives a benefit whereby the instructors and the peers collaborate effectively (Chen-Hsiun, 2013).

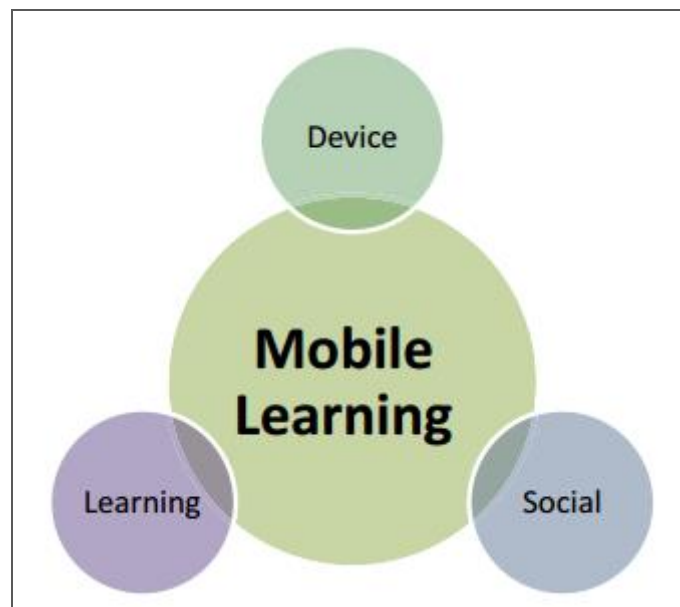Mobile learning consists of 3 distinct aspects: device, learning, and social.

Figure 4 : Mobile Learning Division

Mobile pervasive is a data engineering that currently grows rapidly. The term collaborate data innovation into the lives of individual. Mobile devices then associated with remote communication and internet. That helps the people to acquire knowledge anywhere and anytime.

2.7. Web versus Phone Apps

At the early stage of application development, web application is a well-known technology that helps organization to promote the information online. To conduct business effectively, company develop their internal application that ease daily work. Some of the applications that commonly owned by company who has multiple branches are reporting application, accounting application, and HR benefit calculation. Every company has corporate site, and it becomes more complex nowadays (Ceke & Milasinovic, 2015).

According to Dogan et al. (2014) web application has a significant impact in society. The needs of web application become broader and wider. Society lean more on web application for past decades. Technology keep advance and more sophisticated, moreover society has embarked on digital era.

Applications that are installed in website are able to be run in different platform. As compare to local based application, web based becomes more efficient since it is able to be downloaded from everywhere. However, web application found to be less convenient if it is opened from mobile devices. The users required to adjust the size of web application into mobile devices window. From that problem, currently company starts to enter new initiatives of their application into mobile application. Such as banking companies, they start to have service via mobile application to increase user experience. Some of others advantages are visibility to customers all times when using mobile application because people begin to spend more time on mobile phone, also provide up to date value to people since on-hand information is more preferable nowadays.

CHAPTER 3

METHODOLOGY

3.1. Introduction

Methodology phase in this project is to discuss on how to achieve and why develop mobile application. This project uses waterfall model, whereby each step will be developed sequentially before embarking to the next step. The steps are :
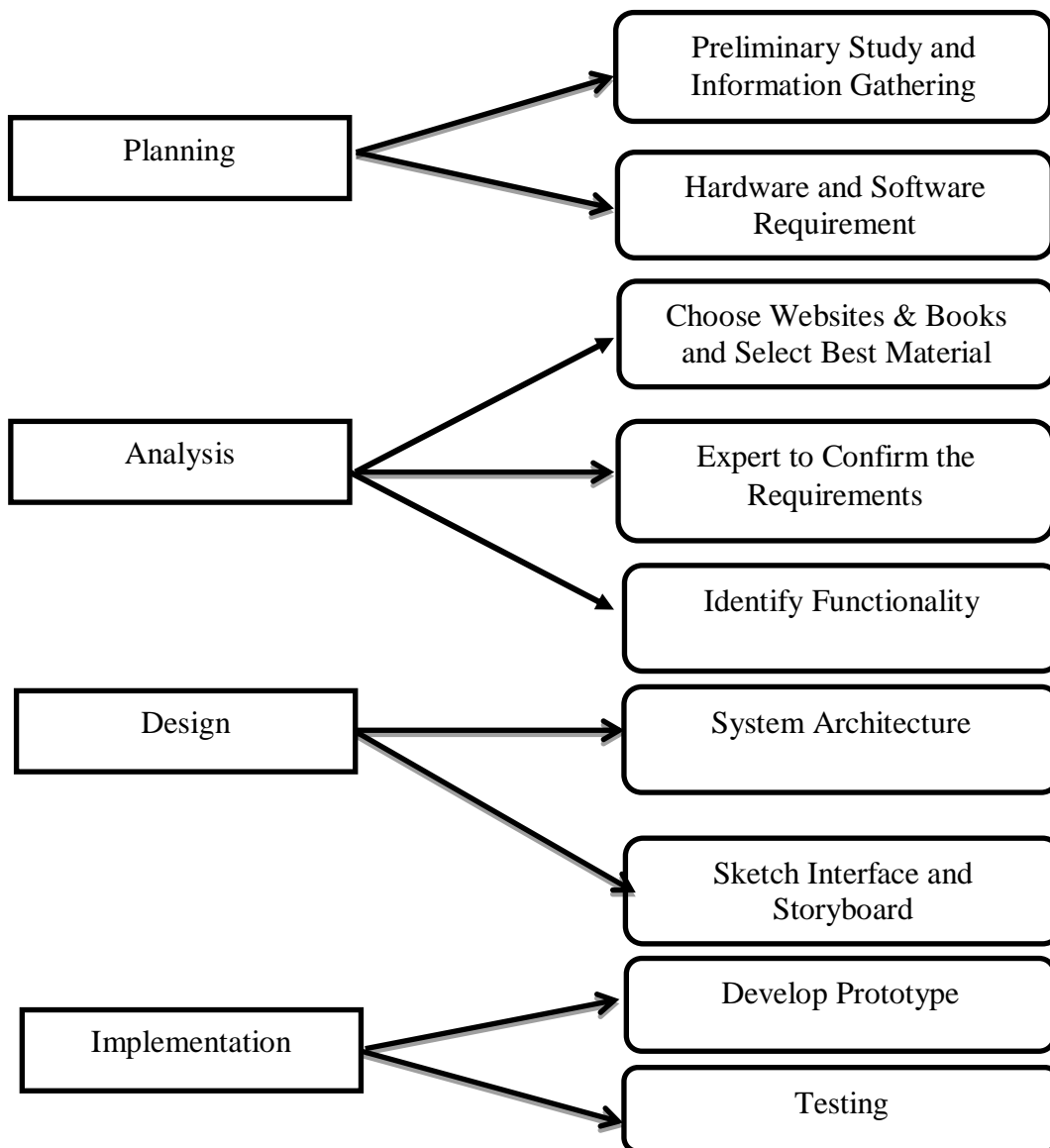

Figure 5 : Methodology of Project Development

3.2. Planning

Planning is an important part to develop this project. Because main purposes of planning phase is to set objective and lead the development into successful deliverable. In this phase, there are two major activities that would like to develop which are preliminary study and information gathering & hardware and software Requirement.

3.2.1. Preliminary Study and Information Gathering

Preliminary study and information gathering will be developed by analyzing literature studies and current technology is carried out to obtain data in order to design and build the application. Literature studies will be done by collecting materials from papers publication, journal publications, and books. Whereas analyzing current technology will be conducted by search latest application in internet and google play.

Information also will be gathered from expert via interview. The aim of this Interview with expert is to get an overview regarding current stock education trend lately. Expert who is chosen for this project is Dr. Lai Fong Woon (UTP Lecturer). The propose point is to get better insight of current trend stock education as he has experience on stock market in Malaysia. He also gave suggestion on how to design and build the system.

3.2.2. Hardware and Software Requirement

Software and tools are planning to be used :
- App Inventor and Android Simulator
- Adobe Photoshop

Whereas Hardware chosen are:
- Android Smartphone Lenovo
- Personal Laptop

3.3. Analysis

Process separating information into details element will be elaborated in analysis phase. Analysis phase that will be used for developing this project is through research websites and basic stock investment book. After choose relevant websites and books, best features will be used for content and material in mobile application.
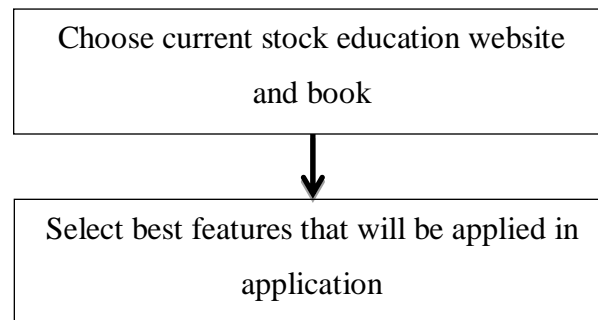
```
┌─────────────────────────────────────┐
│   Choose current stock education    │
│          website and book           │
└─────────────────────────────────────┘
                  │
                  ▼
┌─────────────────────────────────────┐
│  Select best features that will be  │
│        applied in application       │
└─────────────────────────────────────┘
```

Figure 6 : Analysis Phase

3.3.1. Choose Current Stock Education Website & Book and Select Best Features

As stated in literature review, there are some relevant websites to learn stock investment for beginners:

- Themootleyfools.com
- Investopedia.com
- Wall Street Survivor

And relevant book as guideline:

- Fundamental of Investing

After analyze those resources, selecting best features and determine level of learning objectives will be performed.

3.3.2. Select Best Material

Fundamental concepts of stock are the basic material that must be understood, such as type of stocks, some terms and theory of stock, and symbols in stock market. The main theory and terms chosen should be able to lead the targeted user to understand and familiar in risk and return.

- Risk   : Uncertainty associated with buying stock
- Return   : Reward that will be earned from investing in stock

3.3.3. Interview Expert to Confirm the Requirements

Interview has already conducted to strengthen whether all requirements have been completed. This interview section conducted with Dr Lai Fong Woon to strengthen all requirements. Dr Lai Fong Woon said the important parts that have to be understood by people who want to play in stock market are risk and return. How to measure unsystematic and systematic risks have to be learned in order to minimize loss when trading in stock market.

3.3.4. Identify Functionality

Functionality requirement for developing mobile application are:

- The system should be run under android platform
- The system should be able to display determined number of content, consist of theory and terms stock investment, for each level with unlimited time
- After display content, the system should randomly display 5 questions stored in local database.

- Users that able to answer correctly 5 questions displayed, they can unlock next level.

- After unlocking all levels, the user can play simulation trading and step-by-step guidance how to invest in stock market are provided application.

Non –Functionality of this application are:

- The system should be developed for android application
- The system should be able to accessed offline

3.4. Design

In design phase, overall system design needs to be determined. There are abundant system designs can be implemented to develop mobile application, but one particular design that most suitable yet efficient and effective must be chosen. Hardware, software, and time constraints should be considered in order to determine system design.

3.4.1. Identify System Architecture

System architecture is a set of rules and standard implemented in a computer system's technical design, including user requirement, that the system adopt in integrating hardware, software, and networks components.
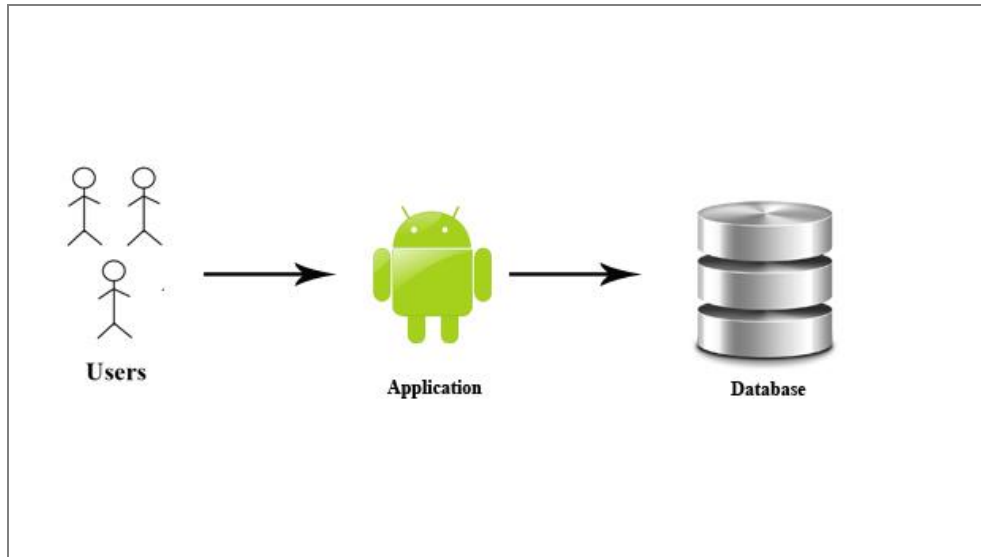
Figure 7: System Architecture

- Users   :

  End users are the people who will use the application. That application could be downloaded from google play. End users could play the game: read theory, answer questions, and unlock next level. After that, they are able to play stock trading simulation

- Application   :

  Application is the software that is able to be played. It is run all contents that are stored in database.

- Database   :

  Database is the medium to store all data, consists of theories, term, and questions.

3.4.1.1. Activity Diagram Take Lesson

Activity diagram is the flowchart that shows data process flow in the application. There are 2 kinds of activity diagram in this project. One is take lesson diagram and the second one is take quiz diagram.
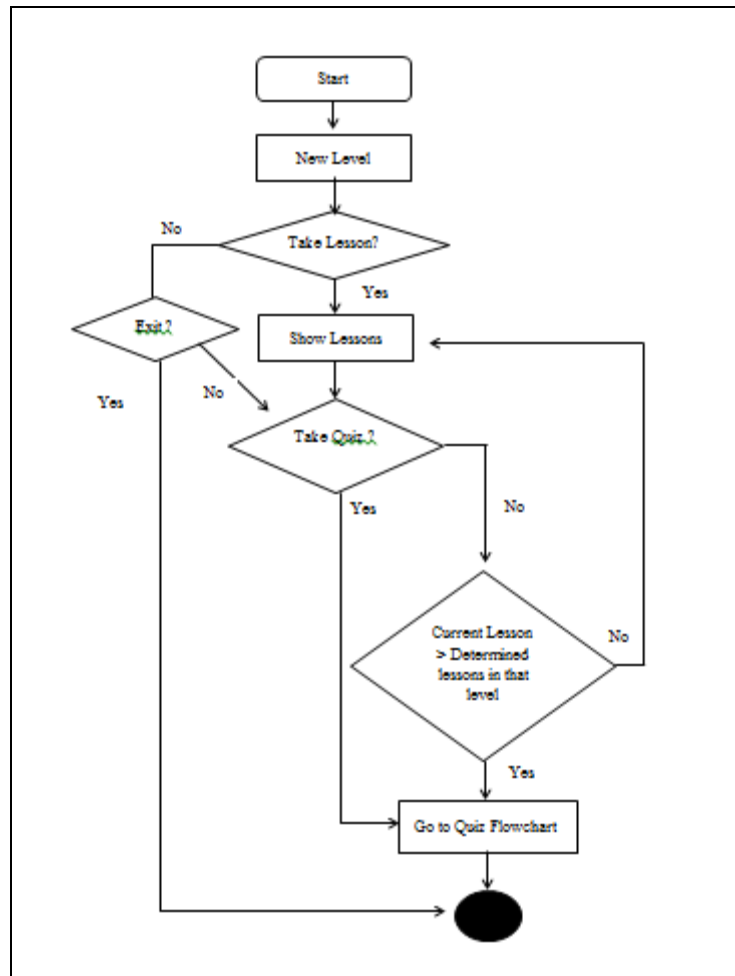

Figure 8 : Activity Diagram Take Lesson

In this take-lesson diagram, the user will begin on the new level.

o   If the user wants to take lesson :
    Then the lesson will be shown. If after see lesson the user want to take quiz, then user will be directed to quiz section. If not then the application will count whether next lesson less than lessons within that level or not. If

no, then the next lesson will be showm, if yes, then it will go to quiz section.

o If the user does not want to take lesson :
   There will be 2 choices available. One choice is want to exit, and another one is does not want to exit. if the user wants to exit current page, then the user will exit from current page. If the user does not want to exit current page, then the user will go to quiz section.

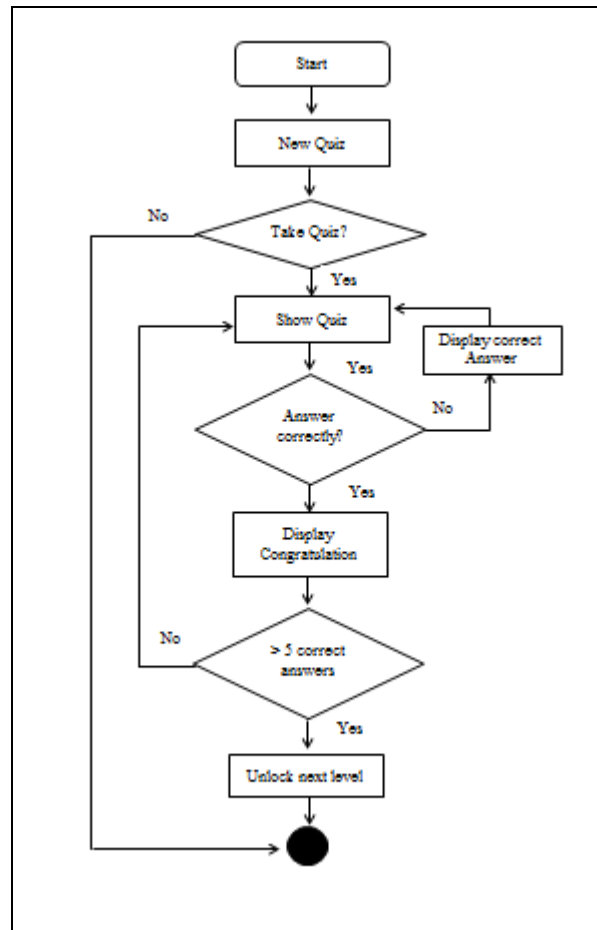***3.4.1.2. Activity Diagram Take Quiz***

Figure 9 : Activity Diagram Take Quiz

In this take-quiz activity diagram, there are 2 options whether the user wants to continue take quiz or exit from current page. If the user wants to continue, then the quiz will be shown. If the users answer correctly, then display congratulation, and if the user has answered 5 questions correctly, then unlock next level.

Otherwise, the right answer will be told, and show another quiz. Until the user answer 5 questions correctly, then they can unlock next level.

3.4.1.3. Use Case Diagram

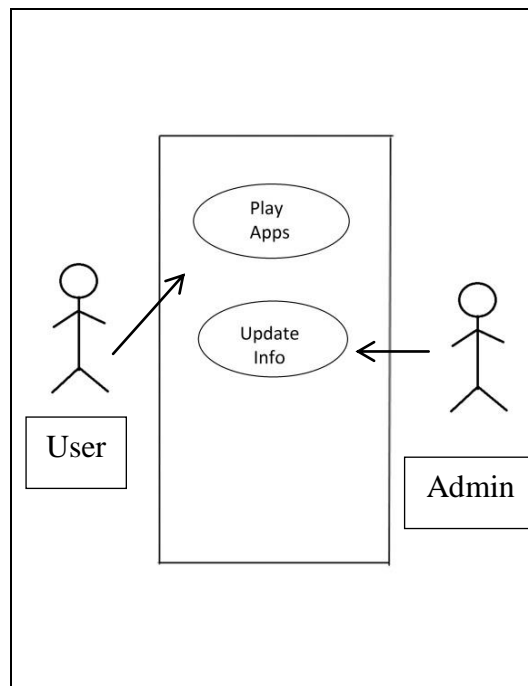Use case diagram shows interaction between system and its environment

Figure 10 : Use Case Diagram

User will interact to system for playing apps, whereas the admin will update on any changes.

3.4.2. Prototype and Storyboard

Development of mobile application prototype will be done after selecting materials needed. The aim of prototyping is to show partial deliverable of the application. There are some approaches of prototype: Conceptual, horizontal, vertical, and story boarding.

- Conceptual : Examining different types of development approach
- Horizontal : Analyzing key component of the project
- Vertical : Focus on feedback from the user
- Story boarding : Graphical design of the application

Although all of the approaches could be implemented in the application, but story boarding will be used more in this project before developing the application in AppInventor.

A better overview and to ease development of this application are the reason why storyboarding is made. This application should have some sections :

- Home page section
- Lesson Section
- Quiz Section
- Simulation Section
- Investment Guidance Section

3.5. Implementation

During implementation phase, the application has already developed in the prototype shape. The end user of this application is able to see the physical design. In this phase, there are 2 kind of activities that are being done : Develop prototype and User Testing

3.5.1. Develop Prototype

This application will be developed using MIT AppInventor. MIT AppInventor is the open source from Google collaborated with MIT that enable the user to develop software application for android operating system using cloud system. The advantage of using this platform is because the stability. Backup *apk file is also the reason why this project using MIT AppInventor.

3.5.2. Testing

User testing is an investigation conducted by end user, whether end user agrees to accept this application. Testing phase include the activity executing the application with intention to find the bugs. It involves evaluation all components of this application. The objectives are:
- o Whether the application meet requirement that stated in the previous phase
- o Output are correct based on certain inputs
- o Run its function with acceptable criteria
- o Can be installed
- o Achieve all end user expectation

3.6. Gantt Chart and Key Milestone

This project is conducted for 28 weeks. The breakdown of the timeline are :

No	Activity	Weeks													
		1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	**Requirement Phase**	▨	▨	▨	▨										
	Problem Identification	■	■												
	Preliminary Study on Project Background			■											
	Define objective and Scope of Study				■										
2	**Project Analysis**					▨	▨	▨	▨	▨	▨				
	Literature Review					■	■	■	■						
	Research Findings						■	■							
	ConductInterview								■						
	Data Analysis									■	■				
3	**Project Design**										▨	▨	▨	▨	▨
	Identify the functionalities and contents										■	■			
	Choose Source of Content											■	■		
	Sketch Interface and Storyboard												■	■	

No	Activity	Weeks													
		15	16	17	18	19	20	21	22	23	24	25	26	27	28
4	**Implementation**	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨			
	Analyze current open-sources for developing prototype	■	■												
	Develop Prototype			■	■	■	■								
	User Testing							■	■	■					
	Fix Bugs									■	■	■			
5	**Finalize Documentation**												▨	▨	▨
	Writing Dissertation												■	■	■

CHAPTER 4
RESULT & DISCUSSION

4.1. Discussion on Result Interview

An interview with Dr. Lai Fong Woon has already conducted with objective is to understand level of depth and decide learning objective of contents for this project. It is understood that currently in Malaysia there is no such training or class provided to learn basic stock. The existing seminar and talk usually been held for people that has already understood all basic terms and concepts in stock investment.

There are two options to trade in stock market, one option is trade individually and another option is to trade through financial manager. But the disadvantage to trade with financial manager is costly. And if trade individually, people can trade by open trading account or by put money in unit trust.

Investing from unit trust has disadvantage because the investor only put their money and let financial managers trade their money based on best effort, also their preference on risk and return. If suddenly market is not stable, the possibility for investor to lose money is high.

New investors should be provided by basic knowledge before trading. Risk and return concept and calculation should be understood clearly to generate more income by trading stock.

The proposed learning objectives are:

1. Learn basic concept, terms, and theories.
2. Securities Market and Transaction
3. Time Value of Money
4. Risk and Return concept & calculation
5. Stock Market Simulation

4.2. Learning Objectives

Those 5 learning objectives will be classified into different classes inside the application.

Learning Objectives	Name of Class inside the apps	Description
1.Basic concept, terms, and theories.	Level 1	• Attributes of Investment • Types of Investment • Types of Stocks • Liquidity Needs • Analyzing Stock • Stock Valuation
2.Securities Market and Transaction	Level 2	• Securities Market • Globalization of Securities Markets • Trading Hours and Regulation • Basic Types of Securities Transaction
3.Time Value of Money	Level 3	• Present Value • Future Value • Present Value Annuity • Future Value Annuity
4.Risk and Return	Level 4	• Concept Return and Risk • Measure Return and Risk
5.Trading Simulation	Trading Simulation	• Simulation Trading in Stock Market

Table 2 : Learning Objectives

4.3. Interface

A. Homepage

Interface home page of the application. There are 2 menus:

- Start : to play the application
- About Us : Information email address admin

B. About Us
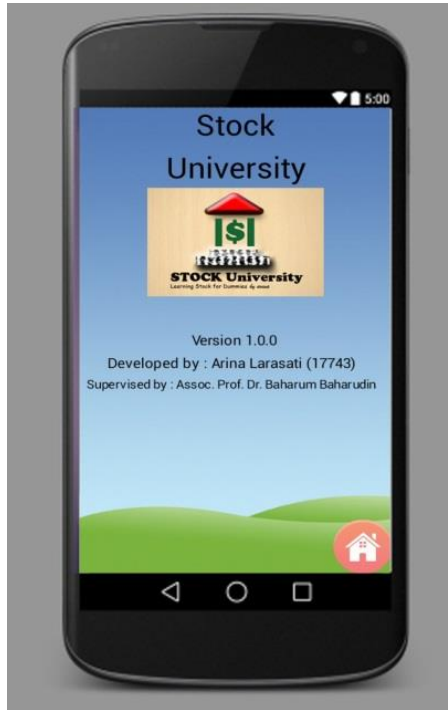
Interface of about-us section shows the information of the developer

C. Start Menu

When the user clicks start menu, the list of menu is appeared. Level section can be opened only if the user finishes learning the previous level. For example : in order to unlock level 2, the user must finish quizzes and lesson in level 1. Lock indicates the users cannot open that level yet. The user is only be able to start with the level without unlock icon. Simulation and Investment guidance are provided as well.

D. Each Level Menu

In each level, there are 2 choices : take lesson (for reading learning materials) and take quiz (for take quiz).

E. Take Lesson Menu

There are several reading materials in each level. It will shows until the end of reading material, then there are quizzes. The user also can jump directly to quiz after read certain material. The user can exit to home page.
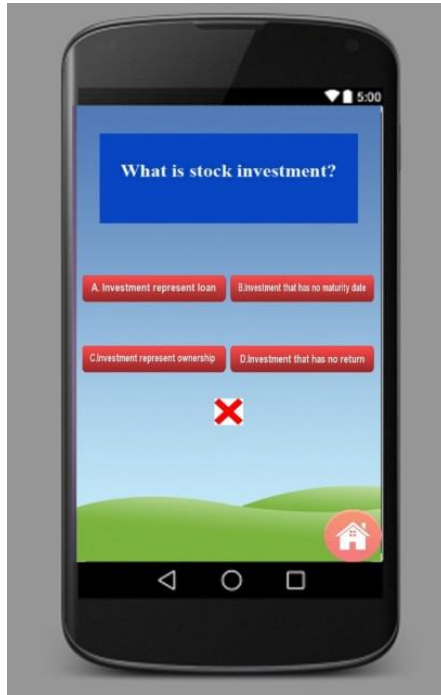
F. Take Quiz Menu
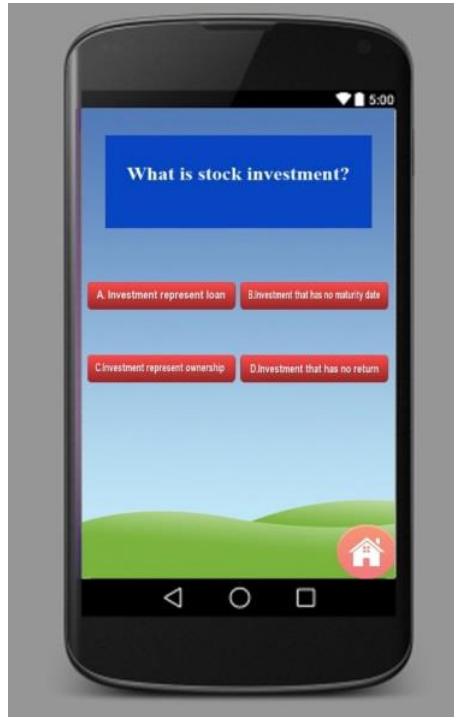
It will show 5 questions within a level. Exit button is provided in this menu as well.

G. Correct Answer
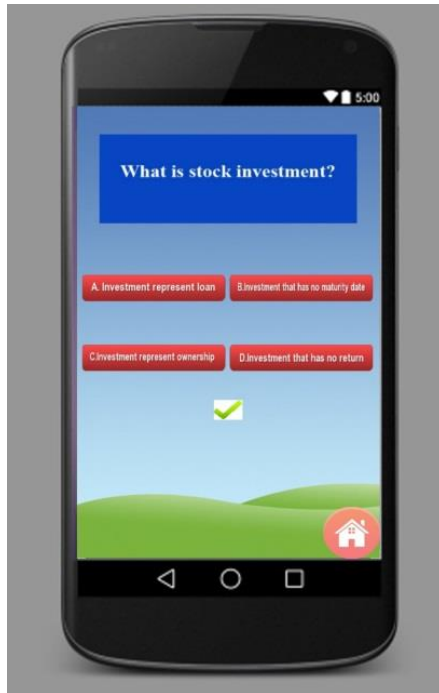
If the answer is correct, green check icon will appeared in the below of the options.

H. Not Correct Answer

If the answer is correct, red cross icon will appeared in the below of the options

I. Investment Guidance

If the user ready to invest, there will be options to read step-by-step invest in Malaysia. List of brokers, watch short videos, and read additional materials are the menu inside this section.

J. Step-by-Step Investing
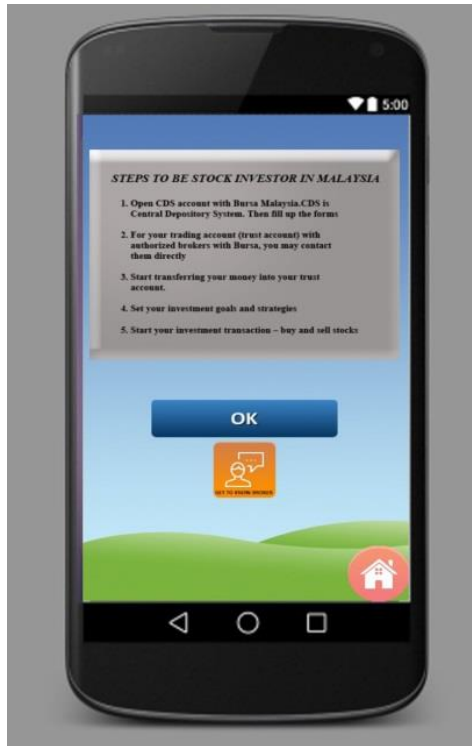
Step by step how to invest is explained in this menu

K. List of Broker

The user is able to check the information of authorized broker in this menu

L. Reading Material

M. Additional Video

4.4. User Testing

User testing is conducted to test whether the application could be accepted by end user. Testing of application was done to 28 selected end users consist of 11 male and 17 female, with majority of end user are student from finance major Universiti Teknologi PETRONAS.

The users were allowed to use the system, play the system, and check all functionalities, the survey was provided to note any feedback from end-user. The users are also expected to give rate about this application. Sample of survey will be attached in the appendix.

A. Occupation
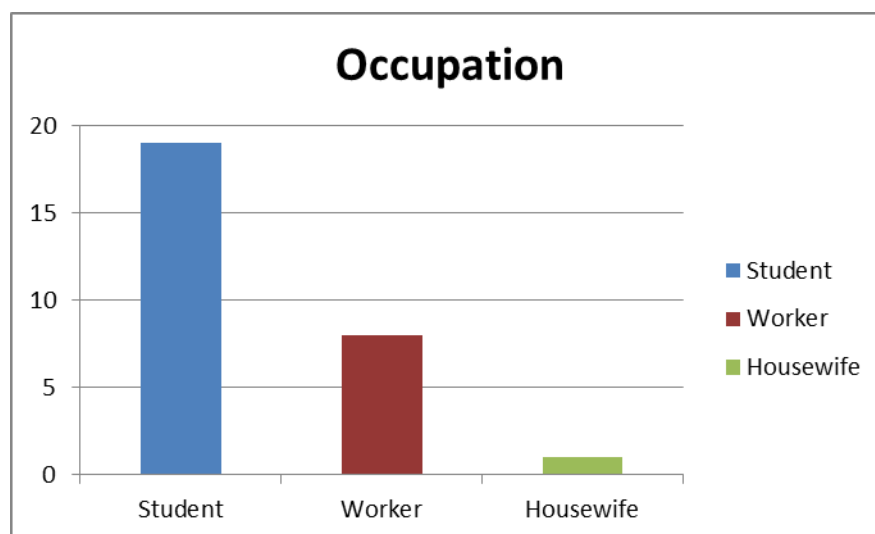
The occupations of the respondents are 19 students, 8 workers, and 1 housewife. Students are chosen because they are taking finance class, and mostly the students who are taking finance class need to have better overview how stock market works. Also to prepare themselves to invest once they embark on working environment.

Workers are chosen because they need to have financial additional income, but they have less overview how stock market goes. Whereby, the housewife is chosen because of having additional yet profitable activity in house.
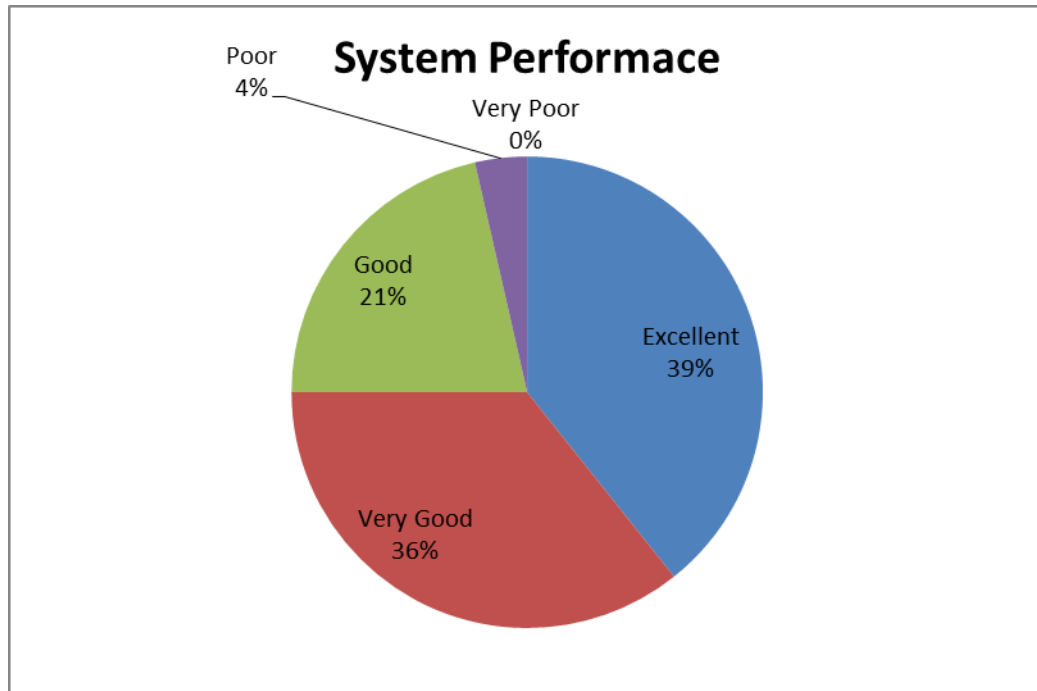
B. System Performance

Figure 11 :Pie Chart System Performance

System performance is tested by end users. The aim is to check whether the performance of this application could be accepted by them. In figure above, 39% of end users said that the performance is excellent, while 36% said very good, 21% said good, and only 4% said it is poor. Because the majority are at range of excellent until good, the system is able to be accepted by end user.
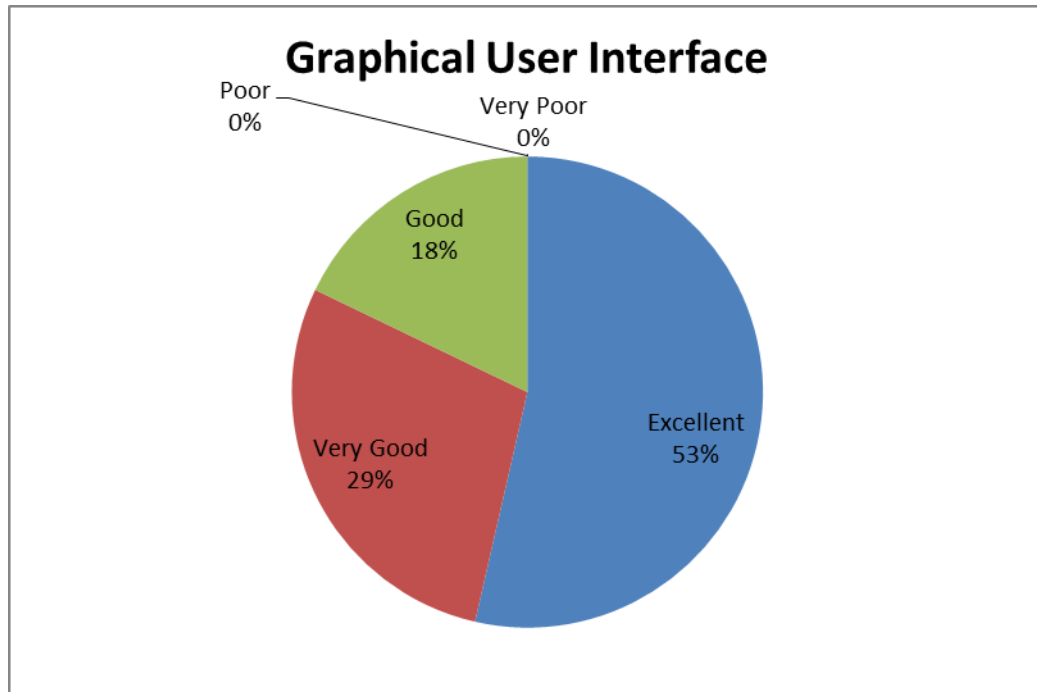
C. Graphical User Interface

Figure 12 : Pie Chart Graphical User Interface

Graphical User Interface is tested with the aim of collecting the respond from end users whether the GUI is attractive and the function works well. From 28 respondents, 53% said that the GUI is excellent, while 29% said it is very good. And the rest said it is good. From this finding, it could be concluded that the GUI this application is able to be accepted by user.
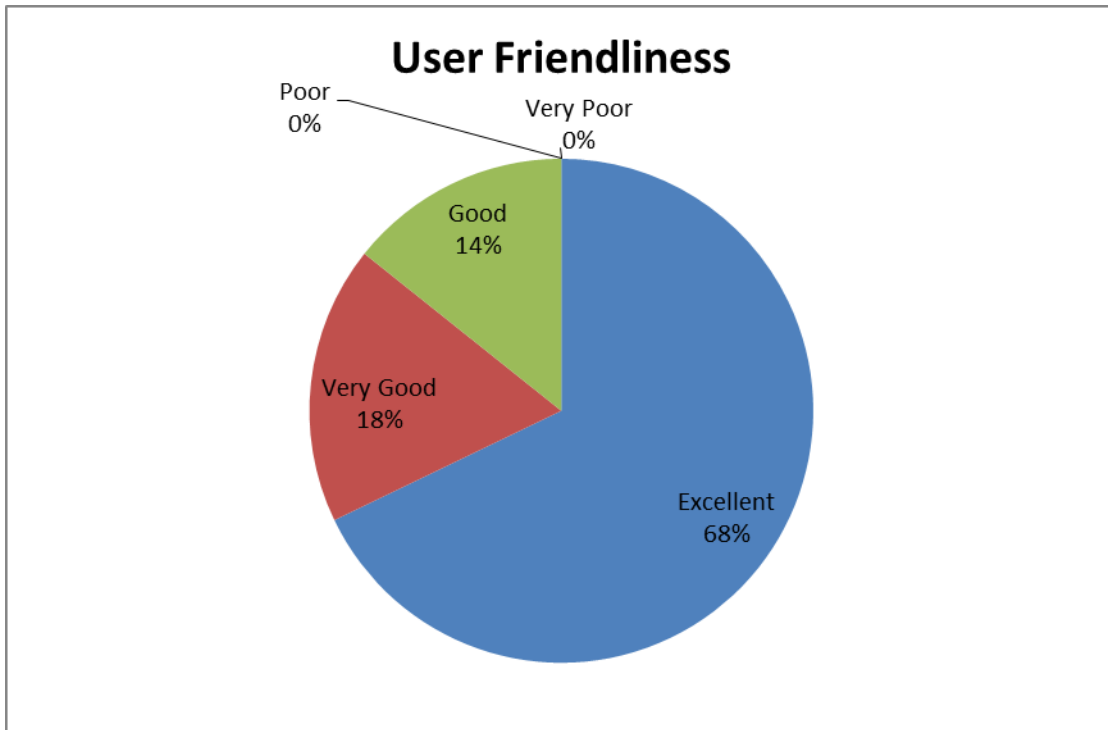
D. User Friendliness

Figure 13 : Pie Chart User Friendliness

User friendliness is tested with the aim to test whether the system is could be easily accessed by the end users with limit instructions. All respondents after open the application, it is found that 68% said the application has excellent rate, while 18% said it is very good, and the rest 14% said it is good. It could be concluded that the application is user-friendly.
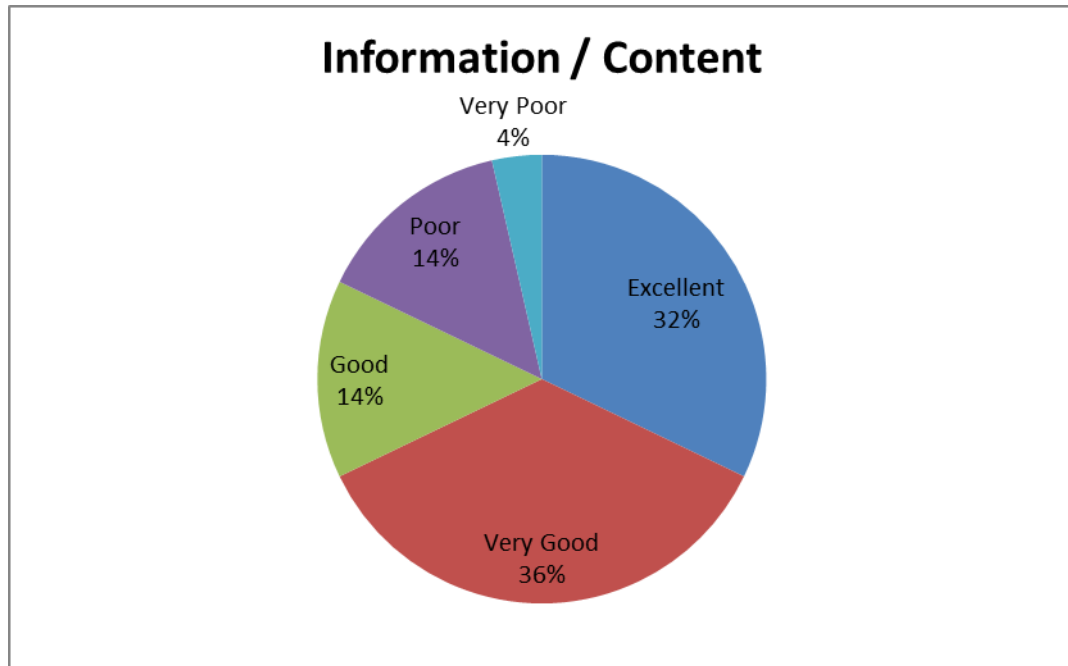
E. Information / Content

Figure 14 : Pie Chart Information

The information and content of this application is tested. From 28 respondents, 32% said it is excellent, while 36% said it is very good, 14% said it is good. The reason of respond between excellent and good rate is because this application is helped them to understand basic stock investment. While 14% said it is poor and 4% said poor, this range is raised because they expect more content as they have stock investment background.
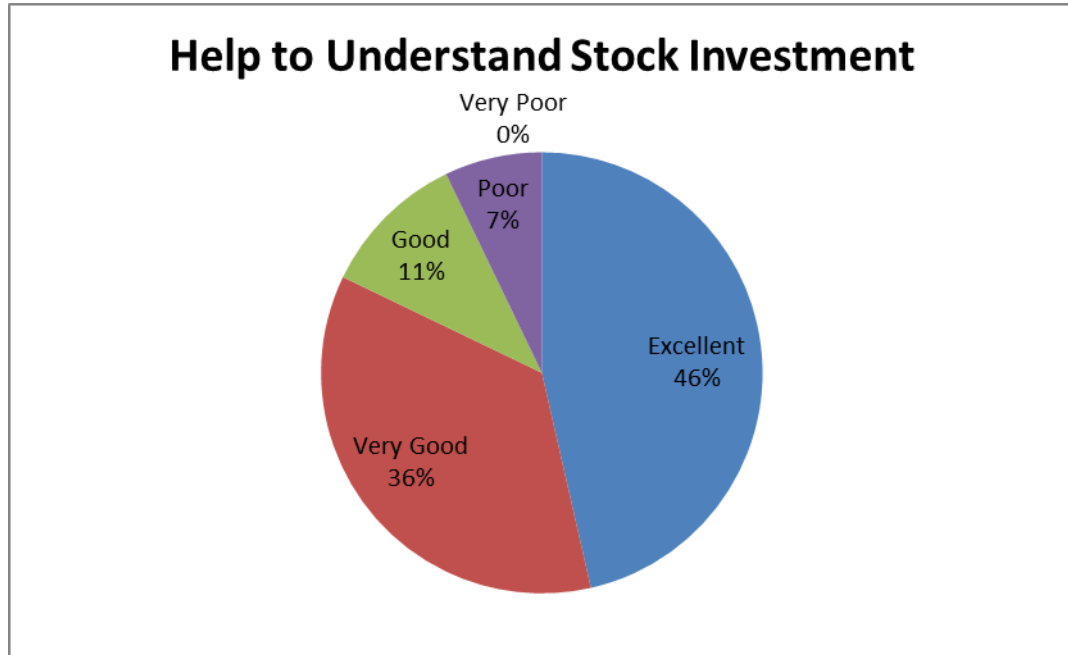
F. Help to Understand Stock Investment

Figure 15 : Pie Chart Help to Understand Stock

This user testing also being tested to seek the comment whether this system is helped the end-user to understand basic stock investment. More than half of the respondents fall in the range of excellent until good. It is could be concluded that this application has helped them to understand stock investment.
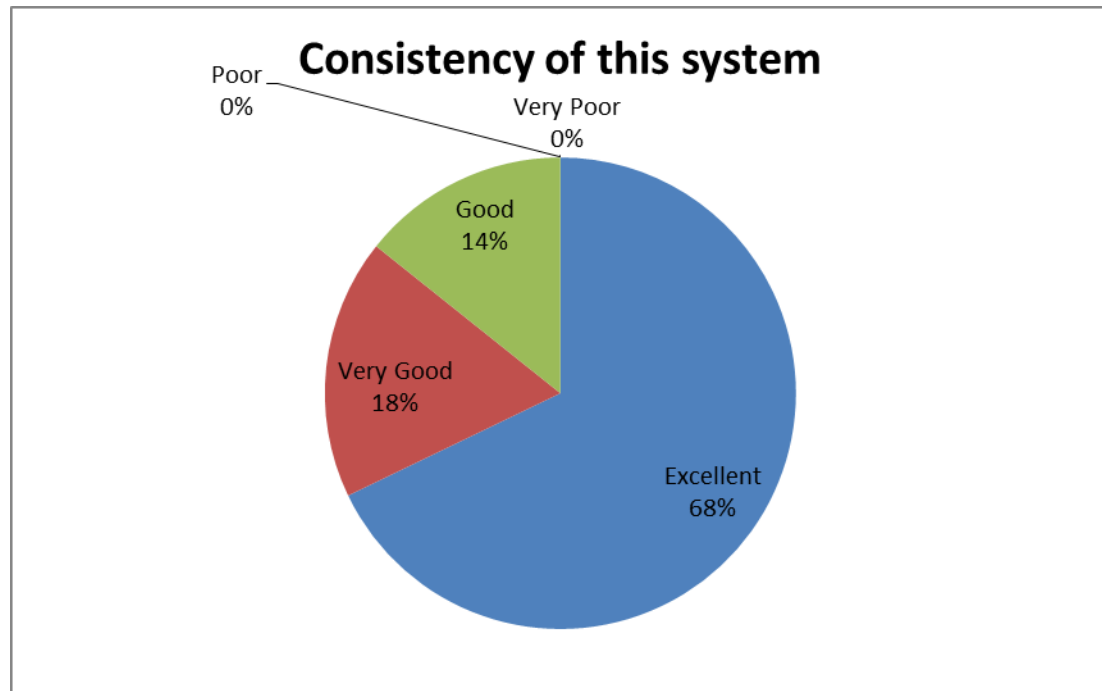
G. Consistency of the System

Figure 16 : Pie Chart Consistency of the System

From the findings, it is found that all correspondents are fallen in the range of excellent and good. It is able to be concluded that the system is consistent in term of functionality, theme, and information.

The conclusion from all findings discussed before, it could be summarized that users found that this application is useful and give benefit to them to learn basic stock investment. Using this system, the users are able to learn from the scratch to the end of the level which enables them to ready to trade in stock market.

CHAPTER 5

CONCLUSION AND FUTURE RECOMMENDATION

5.1. Conclusion

Stock investment becomes an attractive way to earn additional income nowadays. Because by investing in stock people will generate income from dividend and capital gains. For management student, it is easy for them to learn stock because they have class on investment. Hire Financial Adviser could be a problem solving, but to hire them is very costly. Trade individually in stock market could remedy the situation. But before play in stock market, it is better to understand basic theories. Currently, it is bit hard for them to find reliable platform to guide them step by step learning stock investment.

This aim of this project is to design and develop mobile application for learning basic stock investment. Contents of this mobile application will be acquired from chosen websites and books, namely the motleyfool.com, investopedia.com, Wall Street Survivors, and fundamentals of investing books. Those contents will be divided into several levels to ease user learning step by step. Before proceed to next level, the user have to answer some quizzes that test their understanding.

To end this project, prototype has already developed to give physical outcome of this project. In the application, there are 4 levels, each level has certain amount of theories and quizzes. At the end of the level, trading simulation could be played to give the user better understanding on how to play in real stock market. And investing guidance has provided as well to help people directly embark on stock trading activity. User testing has already been done as well. The result of this testing is 93% of the users said that this application is help them to understand basic stock investment. It is concluded that the objective of this project is achieved.

After finishing this project, it is concluded that the objective mentioned before is achieved. After accessing this application, the end users are able to learn stock investment from

scratch, then they can play simulation after understand all theories, if they are ready to invest, there are features to help them invest in stock.

5.2.   Future Recommendation

For future recommendation, more functionality and Graphical User Interface should be more developed in order to attract more people to learn stock investment using this application. The code optimization should be done as well in the future. The application for the next enhancement should be developed for intermediate and advance level for broader users. And the application should be able to run under iOS as well.

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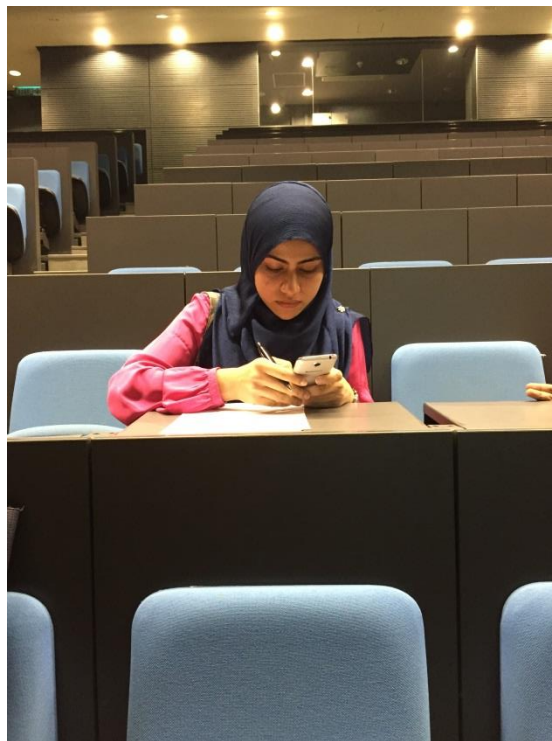
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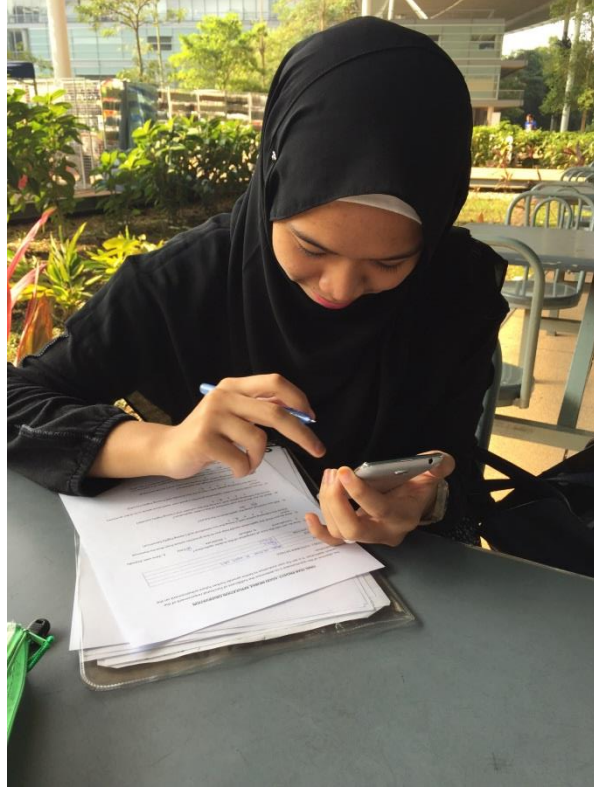
H. APPENDICES

User Acceptance Testing by Fakhri Akhdan Akhiar

User Acceptance Testing by Sabrina Majid

User Acceptance Testing by Tengku Hazleen