

BORANG PENGESAHAN STATUS TESIS*

JUDUL: ARDUINO COFFEE POT VIA TWITTER

SESI PENGAJIAN: 2013

Saya SOFIA MURNI BINTI PAIMAN
(HURUF BESAR)

mengaku membenarkan tesis (PSM/Sarjana/Doktor Falsafah) ini disimpan di Perpustakaan Fakulti Teknologi Maklumat dan Komunikasi dengan syarat-syarat kegunaan seperti berikut:

1. Tesis adalah hakmilik Universiti Teknikal Malaysia Melaka
2. Perpustakaan Fakulti Teknologi Maklumat dan Komunikasi dibenarkan membuat salinan untuk tujuan pengajian sahaja
3. Perpustakaan Fakulti Teknologi Maklumat dan Komunikasi dibenarkan membuat salinan tesis ini sebagai bahan pertukaran antara institusi pengajian tinggi.
4. ** Sila tandakan (/)

_____ SULIT (Mengandungi maklumat yang berdarjah keselamatan atau kepentingan Malaysia seperti yang termaktub di dalam AKTA RAHSIA RASMI 1972)

_____ TERHAD (Mengandungi maklumat TERHAD yang telah ditentukan oleh organisasi/ badan di mana penyelidikan dijalankan)

___/___ TIDAK TERHAD

(TANDATANGAN PENULIS)

Alamat tetap: Lot 2903, Jalan Rdu 1,
Kampung Labohan Dagang,
42700 Banting, Selangor

Tarikh : _____

(TANDATANGAN PENYELIA)

EN MOHD NAJWAN BIN MD
KHAMBARI

Nama Penyelia

Tarikh : _____

ARDUINO COFFEE POT VIA TWITTER

SOFIA MURNI BINTI PAIMAN

This report is submitted in partial fulfilment of the requirements for the
Bachelor of Computer Science (Networking)

FACULTY OF INFORMATION AND COMMUNICATION TECHNOLOGY
UNIVERSITI TEKNIKAL MALAYSIA MELAKA
2013

DECLARATION

I hereby declare this project report entitled
ARDUINO COFFEE POT VIA TWITTER

is written by me and is my own effort and that no part has been plagiarized without
citations.

STUDENT : _____ Date: _____
(SOFIA MURNI BINTI PAIMAN)

SUPERVISOR : _____ Date: _____
(EN MOHD NAJWAN BIN MD KHAMBARI)

DEDICATION

To my beloved parents, Paiman Bin Selamat And Rossini Binti Misron

To my supervisor, Mr Mohd Najwan Bin Md Khambari

To husband, my sisters and brothers

To my cooperative friends

ACKNOWLEDGEMENTS

Alhamdulillah, Thanks to Allah SWT, whom with His willing give me the opportunity to complete this Final Year Project which is titled Arduino Coffee Pot Via Twitter. This final year project report was prepared for Faculty of Information and Communication Technology (FTMK), Universiti Teknikal Malaysia Melaka (UTeM), basically for student in final year to complete the undergraduate program that leads to the degree of Bachelor of Computer Science. This report is based on the methods given by the university.

Firstly, I would like to express my deepest thanks to my supervisor, Mr Mohd Najwan Bin Md Khambari for the inspirational instruction and guidance to me during this project. His guidance helped me in all the time in my project. I could not have imagined having a better supervisor for my project.

Deepest thanks and appreciation to my parents, my husband, siblings, and friends for their cooperation, encouragement, constructive suggestion and full of support for the report completion, from the beginning till the end.

ABSTRACT

Arduino Coffee Pot via Twitter is the next in fancy twitter enabled devices. This coffee pot enables its owner to make a pot of coffee from anywhere they have cell phone reception, using twitter and an arduino board. The application is the easy implementation for remote device control with a bit of code and some hardware. A main reason should create this project because the user need to switch on the coffee pot manually and have to wait for a several minutes until it ready. The objective for this project is a make coffee pot turn on and off with just a simple tweet, learn how to use arduino board and make it interactive and connecting social networking with appliances. For project methodology, this project use a System Development Life Cycle (SDLC) methodology which is a standard process followed in an organization to conduct all the steps necessary to analyze, design, implement, and maintain information systems. . Besides, in any given SDLC phase, the project can go back to an earlier phase if required. Lastly, for expected outcomes from the project is make sure twitter can communicate with arduino board and make coffee maker on.

ABSTRAK

Arduino mesin kopi melalui Twitter adalah applikasi seterusnya dalam twitter peranti yang boleh dibuat. Mesin kopi ini membolehkan pemilik untuk membuat kopi dari mana-mana sahaja mereka berada yang boleh menggunakan telefon bimbit, Twitter dan Arduino. Aplikasi ini adalah pelaksanaan yang mudah untuk alat kawalan jauh dengan sedikit kod dan beberapa perkakasan. Satu sebab utama perlu mewujudkan projek ini kerana kita perlu menghidupkan mesin kopi secara manual dan perlu menunggu beberapa minit sehingga ia siap. Objektif projek ini adalah membuat mesin kopi dihidupkan dan dimatikan dengan hanya satu tweet yang mudah, belajar bagaimana untuk menggunakan papan Arduino dan membuat ia interaktif dan menghubungkan rangkaian sosial dengan peralatan. Untuk projek metodologi, saya memilih Pembangunan Sistem Kitaran Hidup (SDLC) metodologi yang merupakan satu proses biasa diikuti dalam sesebuah organisasi untuk menjalankan segala langkah yang perlu untuk menganalisis, merekabentuk, melaksana, dan mengekalkan sistem maklumat. . Selain itu, dalam mana-mana fasa SDLC diberikan, projek itu boleh kembali ke tahap yang lebih awal jika perlu. Akhir sekali, dijangka hasil daripada projek ini ialah memastikan twitter boleh berkomunikasi dengan papan Arduino dan mesin pembuat kopi.

TABLE OF CONTENT

| CHAPTER | SUBJECT | PAGE |
|-------------------|---|------------|
| | DECLARATION | ii |
| | DEDICATION | iii |
| | ACKNOWLEDGEMENTS | iv |
| | ABSTRACT | v |
| | ABSTRAK | vi |
| | TABLE OF CONTENT | vii |
| | LIST OF TABLES | ix |
| | LIST OF FIGURE | x |
| | | |
| CHAPTER I | INTRODUCTION | |
| | 1.1 Project Background | 1 |
| | 1.2 Problem Statement | 1 |
| | 1.3 Objective | 2 |
| | 1.4 Scope | 2 |
| | 1.5 Project Significant | 3 |
| | 1.6 Expected Output | 3 |
| | 1.7 Conclusion | 3 |
| | | |
| CHAPTER II | LITERATURE REVIEW | |
| | 2.1 Introduction | 4 |
| | 2.2 Facts and Findings | 4 |
| | 2.3 Domain | 5 |
| | 2.4 Existing Product | 7 |
| | 2.4.1 Improvement From Existing Product | 8 |
| | 2.4 Conclusion | 8 |

| | | |
|--------------------|---------------------------------------|----|
| CHAPTER III | PROJECT METHODOLOGY | |
| | 3.1 Project Methodology | 9 |
| | 3.2 System Development Phases | 10 |
| | 3.2.1 Planning | 11 |
| | 3.2.2 Analysis | 11 |
| | 3.2.3 Design | 12 |
| | 3.2.4 Implementation | 12 |
| | 3.2.5 Testing | 12 |
| | 3.3 Gantt Chart | 13 |
| | 3.4 Milestone and Date | 14 |
| | 3.5 Conclusion | 16 |
| | | |
| CHAPTER IV | DESIGN AND IMPLEMENTATION | |
| | 4.1 Introduction | 17 |
| | 4.2 Project Requirement | 17 |
| | 4.2.1 Hardware Requirement | 18 |
| | 4.2.2 Software Requirement | 22 |
| | 4.3 Architecture Of Design | 23 |
| | 4.3.1 Data Flow Diagram (DFD) | 23 |
| | 4.3.2 Physical Design | 24 |
| | 4.4 Implementation | 25 |
| | 4.4.1 Setting Up The Notebook | 25 |
| | 4.4.1.1 Installing Python Software | 25 |
| | 4.4.1.2 Installing ActiveState Python | 28 |
| | 4.4.1.3 Modifying System Path | 31 |
| | 4.4.1.4 Install Python Packages | 33 |
| | 4.4.1.5 Setting Up Arduino | 36 |
| | 4.4.2 Setting Up The Twitter | 40 |
| | 4.4.3 Coding Of Python Twitter | 45 |
| | 4.4.4 Coding Of Arduino IDE | 47 |
| | 4.4.5 Setup The Hardware | 49 |
| | 4.4.6 Testing The Application | 49 |
| | 4.5 Sample Of Result/Output | 50 |

| | | |
|-------------------|-------------------------------|----|
| | 4.5.1 Twitter Expected Output | 50 |
| | 4.5.2 Python Expected Output | 51 |
| CHAPTER V | TESTING | |
| | 5.1 Introduction | 52 |
| | 5.2 Test Plan | 53 |
| | 5.2.1 Test Organization | 53 |
| | 5.2.1.1 System Tester | 54 |
| | 5.2.1.2 Hardware Tester | 54 |
| | 5.2.2 Test Environment | 55 |
| | 5.2.2.1 Location/Environment | 55 |
| | 5.2.2.2 Hardware | 55 |
| | 5.2.2.3 Software | 55 |
| | 5.2.3 Test Schedule | 56 |
| | 5.3 Test Strategy | 57 |
| | 5.3.1 Classes Of Test | 58 |
| | 5.4 Test Design | 58 |
| | 5.4.1 Test Description | 59 |
| | 5.5 Test Result and Analysis | 62 |
| | 5.6 Conclusion | 65 |
| CHAPTER VI | CONCLUSION | |
| | 6.1 Introduction | 66 |
| | 6.2 System Strengths | 66 |
| | 6.2.1 Security | 66 |
| | 6.2.2 Easy to use | 67 |
| | 6.2.3 Compatibility | 67 |
| | 6.3 System Weaknesses | 67 |
| | 6.3.1 Dedicated Notebook | 67 |
| | 6.3.2 Internet Connectivity | 68 |
| | 6.4 Contribution | 68 |
| | 6.5 Future Works | 68 |
| | 6.6 Conclusion | 68 |

LIST OF FIGURES

| FIGURE | TITLE | PAGE |
|---------------|--|-------------|
| Figure 3.1 : | System Development Life Cycle (SDLC) | 9 |
| Figure 3.2 : | Phases of System Development Life Cycle | 10 |
| Figure 3.3 : | Gantt Chart For Arduino Coffee Pot Via Twitter | 13 |
| Figure 4.1 : | Arduino Uno Board | 19 |
| Figure 4.2 : | Relay Module | 19 |
| Figure 4.3 : | Coffee Pot | 20 |
| Figure 4.4 : | Notebook HP Pavilion | 21 |
| Figure 4.5 : | Data Flow Diagram Of Project | 23 |
| Figure 4.6 : | Physical design Of Project | 24 |
| Figure 4.7 : | Run the python.exe | 25 |
| Figure 4.8 : | Select the destination folder | 26 |
| Figure 4.9 : | Select the features want to install | 26 |
| Figure 4.10 : | Installing in progress | 27 |
| Figure 4.11 : | Installation was completed | 27 |
| Figure 4.12 : | Run ActiveState Python.exe | 28 |
| Figure 4.13 : | Accept the term of agreement | 28 |
| Figure 4.14 : | Select the features want to install | 29 |
| Figure 4.15 : | Ready to install | 30 |

| | |
|---|-----------|
| Figure 4.16 : Installing in progress | 30 |
| Figure 4.17 : Installation completed | 30 |
| Figure 4.18 : System Properties | 31 |
| Figure 4.19 : Environment Variables | 31 |
| Figure 4.20 : System Variable | 32 |
| Figure 4.21 : Run Python at Command Prompt | 32 |
| Figure 4.22 : Installation of easy_install manager | 33 |
| Figure 4.23 : Installation of python twitter package | 33 |
| Figure 4.24 : Installation of pyserial package | 34 |
| Figure 4.25 : Installation of Oauth2 package | 34 |
| Figure 4.26 : Check the packages had installed | 35 |
| Figure 4.27 : Driver of Arduino Uno | 36 |
| Figure 4.28 : Warning Flag at Device Manager | 36 |
| Figure 4.29 : Update driver software | 37 |
| Figure 4.30 : Install driver software manually | 37 |
| Figure 4.31 : Browse the driver of arduino uno | 38 |
| Figure 4.32 : Ready to install | 38 |
| Figure 4.33 : The driver was successfully installed | 39 |
| Figure 4.34 : Check the port at Device Manager | 39 |
| Figure 4.35 : Sign up new account of twitter | 40 |
| Figure 4.36 : Register the application with twitter | 41 |
| Figure 4.37 : Choose “manage your apps” | 41 |
| Figure 4.38 : Create a new application | 42 |

| | |
|---|-----------|
| Figure 4.39 : Application twitter form | 42 |
| Figure 4.40 : Create a access token | 43 |
| Figure 4.41 : Keep all the access token | 44 |
| Figure 4.42 : Beginning of python coding | 45 |
| Figure 4.43 : Ending of python coding | 46 |
| Figure 4.44 : Beginning of Arduino Coding | 47 |
| Figure 4.45 : Ending of Arduino Coding | 48 |
| Figure 4.46 : Hardware Setup Schematic Diagram | 49 |
| Figure 4.47 : Twitter Tweet | 50 |
| Figure 4.48 : Python Terminal | 51 |

LIST OF TABLES

| TABLE | TITLE | PAGE |
|--------------|--|-------------|
| Table 3.1 : | Milestones And Date Of Project | 14 |
| Table 4.1 : | Specifications of Arduino Uno Board | 18 |
| Table 4.2: | Computer Requirements | 21 |
| Table 5.1 : | Description of System Tester | 54 |
| Table 5.2 : | Description of Hardware Tester | 54 |
| Table 5.3 : | List of software | 55 |
| Table 5.4 : | Description of Test Schedule | 56 |
| Table 5.5 : | Description of Classes | 58 |
| Table 5.6 : | Python Twitter Test Case | 59 |
| Table 5.7 : | Twitter Account Test Case | 59 |
| Table 5.8 : | Arduino IDE Test Case | 60 |
| Table 5.9 : | Relay Module Test Case | 60 |
| Table 5.10 : | Notebook Test Case | 61 |
| Table 5.11 : | Test Result and Analysis for Python Coding | 62 |
| Table 5.12 : | Test Result and Analysis for Twitter Account | 63 |
| Table 5.13 : | Test Result and Analysis for Arduino Coding | 63 |
| Table 5.14 : | Test Result and Analysis for Relay Module | 64 |
| Table 5.15 : | Test Result and Analysis for Notebook | 64 |

CHAPTER I

INTRODUCTION

1.1 Project Background

Nowadays, social networking had become popular and many people use it. It easy to use, save time and have many applications. The best part of social networking is it allows the user to build their own applications. The user can create an application to integrate with Twitter as a platform. For this project, try to make integration between twitter and coffee machine with arduino board as microcontroller. Arduino is an open-source electronics prototyping platform based on flexible, easy-to-use hardware and software. It's intended for anyone interested in creating interactive objects or environments.

1.2 Problem Statements

1. User need to switch on a coffee machine manually.
2. To make some coffee usually need few minutes before it ready.

1.3 Objectives

1. Make coffee machines turn on automatic with just simple tweet.

Can tweet from Twitter to arduino board and switch on the coffee maker automatically.

2. Learn how to use arduino board and make it interactive.

Explore about Arduino Board brand. Arduino board can be a great microcontroller if we know how to use it.

3. Connecting social networking with appliances.

Social networking such as Twitter allow user to make their own application. For this project, would like to integrate Twitter with coffee pot.

1.4 Scopes

The scopes for developing this project are :

1. This project will use arduino board as microcontroller because it is easy to use with hardware and software.
2. The AC voltage will be relayed by Relay Module to make an interface between arduino board and appliance.
3. Only one user can use this application because this application need a secret access token that can grab when the user register twitter account application.

1.5 Project Significance

This application will be going to help user save time when want some coffee. And the most important part is it just can be done with simple tweet. Besides, this project also use arduino board which is a popular microcontroller in market. The main reason to choose the arduino board is there no soldering needed. Just need programmed the programming into it and make some creativity then it done. This project use a twitter as a platform because it is a most popular social networking besides facebook. More over, twitter has become trend for today communication.

1.6 Expected Output

The expected output for this project is twitter able to send a order to arduino board. The arduino board will display a tweet at dedicated computer and directly switch on the coffee machine with relay module as a voltage interface.

1.7 Conclusion

As a conclusion, this project was develop to make an interaction between social networking and appliances. As a result, this interaction will make user save a time, and more easier.

From this chapter, the project background, problem statement, objectives, scope, project significance and expected output are being identified in order to develop the project that will used by the target user.

Lastly, after finishing this chapter, it will continue to the second chapter that is the literature review and project methodology.

CHAPTER II

LITERATURE REVIEW

2.1 Introduction

This chapter will discuss about literature review of the related published information with this project. Literature review is a collecting related data, analyze project processess, analysis of current problem and create the conclusion. A literature review can be just a simple summary of the resources, but it usually has an organizational pattern and combines both summary and synthesis. A summary is a recap of the important information of the source, but a synthesis is a re-organization of that information. It might give a new interpretation of old material or combine new with old interpretations.

2.2 Facts and Findings

Fact and finding is an activity that is intended to find out information about something. Fact finding also is an extremely important component of the communication process which presents its own special set of problem and opportunities to people working to increase the constructiveness of intractable conflicts. This section will be descussing about the domain of this project.

In order to develop a successful project, the current application or journal are collected. Three journal that related to the Arduino Coffee Pot Via Twitter are searched and analyzed are *Arduino And Kinect Project* by Enrique Ramos Melgar, *Using the internet of things to enable electrical load optimisation* by Butgereit, L, and *Social networks for lonely objects* by John Anthony. Studies of these journal or conferences are significant to develop a valid, reliable and efficient application.

2.3 Domain

Enrique R.M (2012) say in his book *Arduino And Kinect Project* that is not impossible to controlling all home appliances remotely just using body movements and gestures. There are a several items that can be controlled electrically in an automated house, such as television, fan, lamps, and the aircond. In order to avoid the problem of overload voltage with mains power and another risks, the book will show how to hacking an external element that can control the devices which is a general-purpose remote control. It more easy and simple to hacking a remote control which just need to open the remote and connect it to the Arduino Board. Then, the user may use the kinect to perform gesture recognition to activate different functions of devices.

Butgereit, L (2012) in his journal *Using the internet of things to enable electrical load optimisation* say that the internet of devices is a new innovation with physical objects, or appliances which is connected to the internet. If physical objects are enhanced with artificial intelligence, the internet of things will grows up. Before this, the communication with the objects is only uni-directional. However, now there is bi-directional communication that allow the object to post information about itself and also allow the appliances to be controlled by some process. Unfortunately, some appliances could be switched on and off depending on certain conditions and situations.

John A (2010) in his thesis *Social networks for lonely objects* say that objectives of ubiquitous computing describe a network of devices that can help humans in their routine, but this may have a risk that can make a relationship between humans and their electronic objects become complicated. To make a visions become reality, there is an opportunity to rethink how to interact the objects with networks of objects, and make the humans can communicate with machine. This thesis determines social and mechanism for products which may consist of many physical and digital objects. These new objects will not look like stripped-down existing computers, but added normal objects that are focused on input and output, especially on Twitter.

Applications in the cloud use Twitter as a platform to start the appropriate objects to execute human tasks. Inspire from constructs that human use to manage many human relationship, a social network can be used as platform to allows applications and their owners to manage a large network of computing objects . Based on that idea, take a step forward a consumer agree with implementation of ubiquitous computing.

2.4 Existing Product

After do some research about coffee maker, the coffee machine were designed to make a coffee process more easier. Before, coffee making was a quite complicated process that involved several things. Since the coffeemaker are introduced, people were able to prepare the drink without having to heat water in kettle and then mix it with coffee grounds in jug. Based on the principle, several models were created, including the vacuum, percolator and the drip coffeemakers. Although all the models made for the purpose of making coffee drink, basically it use somewhat different processes. In 1960's, the drip brewer or coffee maker became commercially and have improvements years after its introduction. Because of this project was use a electric coffee maker, so would like to explain more about this type.

An electric drip coffee maker also known as a dripolator. It normally works by transfer water from a cold water container into a flexible hose in the base of the container leading directly to a heating area, where a heating element surrounding the metal tube heats the water. Then, the hot water moves through the machine using thermosiphon principle. Thermally-induced pressure and the siphoning effect move the hot water through an insulated rubber or vinyl riser hose, to the spray head, and onto the ground coffee, which is contained in a drink basket mounted below the spray head. The coffee passes through a filter and drips down into the jug. A one way valve in the tubing prevents water from siphoning back into the container. To prevent the water from overheating in the metal tube, need to attached the thermostat to the heating element which it will turns off the heating element, then turns back on when the water cools below a certain threshold to make a coffee drink always in warm condition.

2.4.1 Improvement From Existing Product

Usually, the coffee maker can make an instant coffee automatically with just switch on the machine. But, the user still need to switch on the coffee maker manually by hand and have to wait for a minutes until a coffee ready. Even though the latest and modern coffee maker in the market, the user still need to switch on the machine manually by hand. Based on this situation, this project try to create an application that can switch on the coffee machine automatic without see the coffee machine. And the most important part is the user can switch the coffee maker with just simple tweet from Twitter. This application is a integration between Arduino board and Twitter. With Arduino board as a microcontroller, it can help the Twitter communicate with coffee machine.

2.5 Conclusion

As a conclusion, by undertaking a literature review are able to critically summarise the current knowledge in the area under investigation and identifying any strengths and weaknesses in previous work. It help to identify them in this project and thus eliminate the potential weaknesses, whilst bringing to the fore the potential strengths. In addition, undertaking a literature review is useful for information seeking, as it hones my ability to locate and peruse the relevant literature efficiently and effectively. Then, it helps in critical analysis, as it enhances my ability to apply analytical principles in identifying unbiased and valid research in my project. Lastly, with literature review ensure will not be replicating existing knowledge or reproducing technical errors and learn how researches findings are discussed and presented in my discipline area directly provide the intellectual context for my work and situate it within the field. Only after literature review is done, can continue to the next chapter which discuss about project development.

CHAPTER III

PROJECT METHODOLOGY

3.1 Project Methodology

The project methodology used to develop this application is a System Development Life Cycle (SDLC). This methodology was chosen because it fits the approach for developing the system which relies on techniques that produce deliverables intended. SDLC presents guidance for selecting appropriate methods, techniques and tools based on the specific requirements for the project. With this approach, project is desired to move consecutively according to steps planned for each phase. The phases involved for this project are requirements planning, design, implementation, testing and evolution.

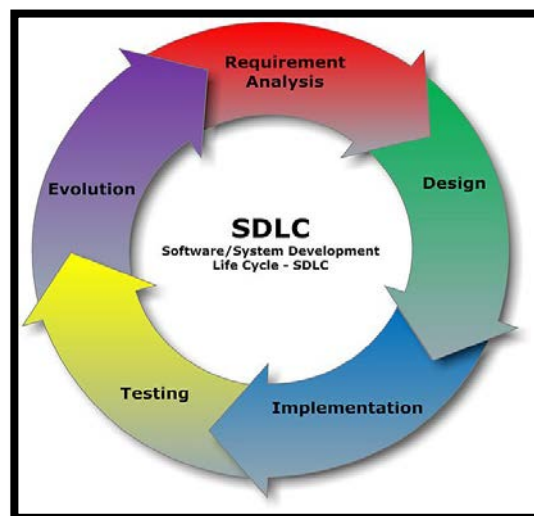


Figure 3.1 : Software Development Life Cycle (SDLC)

3.2 System Development Phases

The System Development Life Cycle framework provides a sequence of activities for system designers and developers to follow. It consists of a steps or phases in which each phase of the SDLC uses the results of the previous one. A System Development Life Cycle (SDLC) adheres to important phases that are essential for developers, such as planning, analysis, design, and implementation, and are explained in the diagram. It include evaluation of present system, information gathering, feasibility study and request approval.

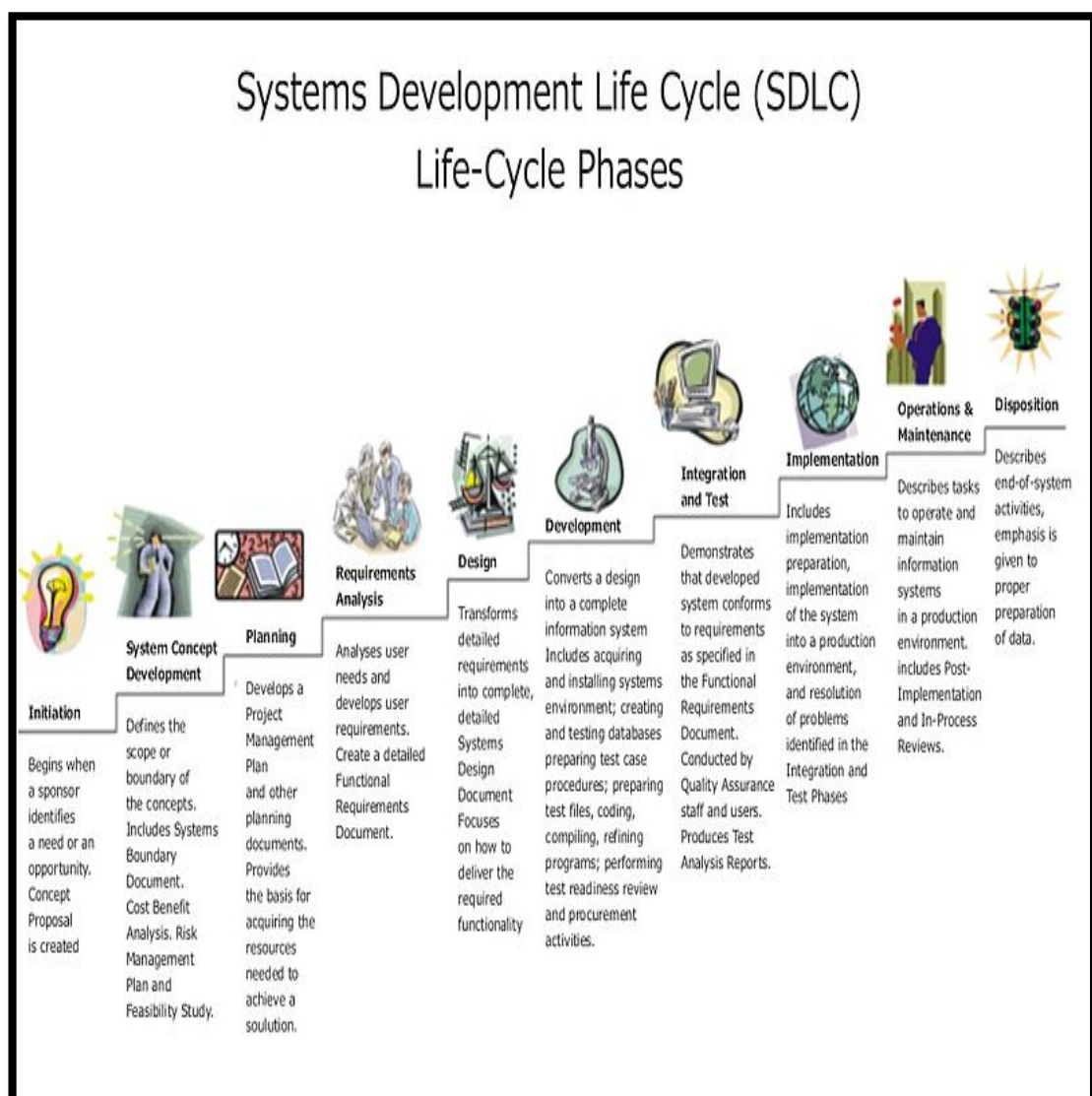


Figure 3.2 : Phases of System Development Life Cycle