Implementation of RFID based Village Security System

by

Thenmoli A/P Pakeanathan

Dissertation submitted in partial fulfillment of
the requirements for the
Bachelor of Technology (Hons)
(Information Communications and Technology)

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CERTIFICATION OF APPROVAL

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A project dissertation submitted to the
Information Communications and Technology Programme
Universiti Teknologi PETRONAS
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Approved by,

_____
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May 2012

CERTIFICATE 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 the original work contained herein have not been undertaken or done by unspecified sources or persons.

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THENMOLI A/P PAKEANATHAN

ABSTRACT

This project focuses on a development of Radio Frequency Identification (RFID) implemented at dormitory in Universiti Teknologi Petronas (UTP).

By using the **RFID tag instill in students' metric card, a**ssigned with **unique bar code**, students are able to enter their house and rooms.The door of the house is auto locked and need to be swapped only once .While the door to enter students' respective room need to be swapped twice to be locked. All these entry and exit will be recorded in a system to ensure the safety of the students and their procession.

The system can only be logged in by the admin with password as these data are confidential. Once the admin is able to enter , two major task can be done. Firstly assigning the students with the unique bar code and deleting them once the duration is over and secondly able to track the students entry and exit of the house and room.

ACKNOWLEDGEMENTS

I would like to thanks UTP for the good Internet connection during the time I need to finish FYP I. Without the help of the Internet, I would find no possible mean to do this project.

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To my dear family members, who have always given me the motivation and prayers through times of uncertainty. To all friends of batch July 2008, I am sincerely thanks for everything.

Thank you.

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CHAPTER 1

INTRODUCTION

1.1 Background of Study

Universiti Teknologi Petronas (UTP) enrolls about five thousand students each year due to its distinctive curriculum structure and excellence performances. Majority of the students prefers to stay in the campus due to many factors such as transportation, fuel cost and etc. At the beginning of each semester, students will be placed in their respective village through few ways by RCSU. Some of the commonly used methods are by sending email, formal letter or some visit in person to obtain the key. While at the end of each semester, students are required to hand over their room keys to the respective Village supervisors manually.

This manual manner of key distribution have bought so much of trouble to both the management and students, but thanks to technology advancement, all these are made simpler and faster through the implementation of Radio Frequency Identification (RFID). RFID is a technology that identifies or track objects automatically, RFID uses radio waves in order to communicate between its main component which are; firstly, the tag where the identity data is stored and usually be attached with a object needs to identify; secondly, reader which is used for receiving the identification data from the tag and send it the back end system in order to proceed. RFID market nowadays very lucrative because of expansion of RFID application and RFID price reduction , as long as we talk about identification or tracking that means we have many opportunities to apply RFID starting from animal and plants to goods and products in various application, such as tracking , monitoring , identification. This implementation is designed in a manner to replace the manual door locking mechanism commonly practiced in UTP.

The implementation of RFID will assist the management some manual work and also strengthens the safety of the students residing in the campus. This project will also be a proposal for the University management to implement this technology in near future.

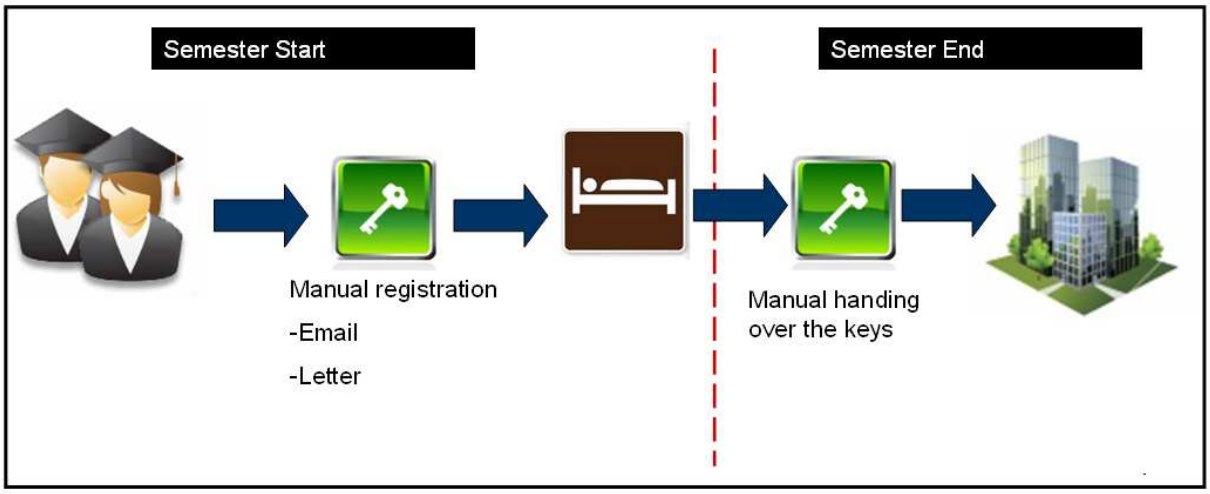

Figure 1: The current management of key distribution in UTP

1.2 Problem Statement

1.2.1 Problem Identification

Based on the background study as stated in the previous section and the observation from UTP students' feedback as well as personnel experiences, below are some of the common issues regarding dormitory keys.

- Physical condition of the door that are damaged and installed lock failed to work. This is due to force entry when the students have lost the key to the padlock. Even after repairing the door, the after effect kicks starts later on. The mechanism of the lock has been dismantled in many ways possible, resulting in changing the door along with its knob by the management.
- Entry of strangers is quite common as the current doors cannot be locked. This causes the safety of the students at risk. Family members of different gender are also frequently seen inside the house. This is made possible due to the minimal security instilled within the dormitory. Animals such as cats are also another common nuisance in the house, where they sneak in and ravage the pantry.
- Manual key distribution has been another disadvantage. Students have to queue up in long line to be in the office, once in the office, students have to register their name,

matrix ID, mobile number, and IC, then the management will search for the keys (hanging in a cupboard like structure) and hand it over. This procedure is not only time consuming but also tedious.

- At the beginning of each semester, students have to register for their room. Even though UTP's PRISM enables students to register to their respective rooms; this method is still not widely implemented due to inefficiency. Hence many students will send email or letter requesting for room. After the registration they had to come in person to get their keys. This seems to be a huge back-draw as students might arrive late at night and the responsible supervisor may not be available.
- UTP allows students to stay during the semester break due to events and etc. This becomes another problem where door had been padlocked by the first occupant of the room. When the second occupant turns up, he or she has no other choice but to break the padlock. This increases the paper work for both the management and students where they will have to inform officially and also time consuming.
- Number of thefts have increased. In 2010, only one case has been reported while for year 2011 fives cases were reported.

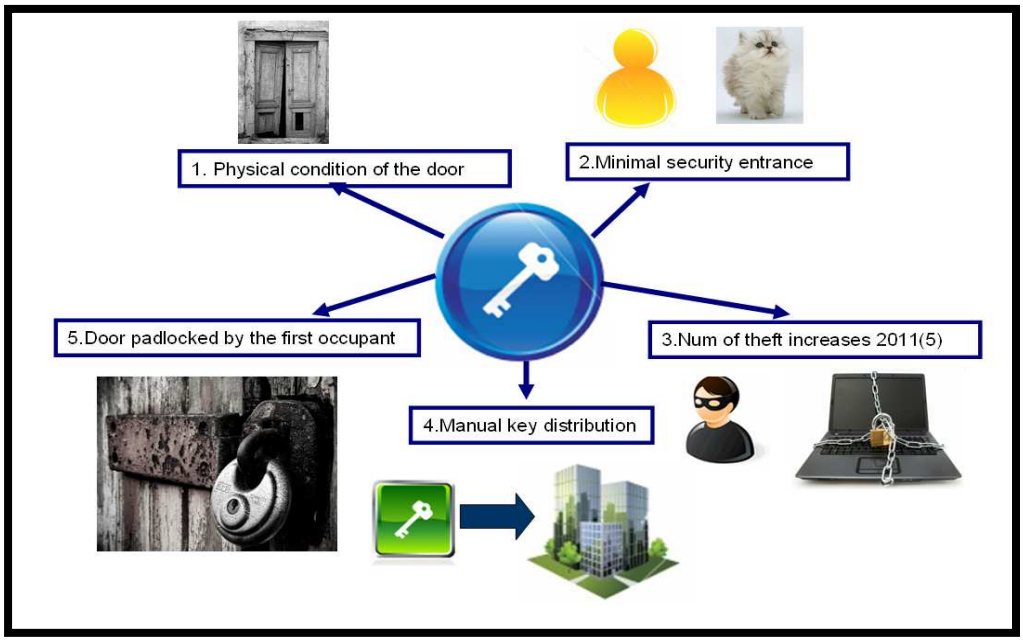

Figure 2: Factors contributing to the problem

1.2.1 Significance of the Project

Implementation of RFID based Village Security System will assist in the following ways:

- No manual distribution of keys which is not only time consuming but also tedious. As the system propose to use student's matric card as key to enter the house and respective rooms.
- Security of students and their procession will be safe from break in or strangers. The usage of metric card as ID will make breaking-in harder than manual key mechanism.
- Implements green technology as less paper will be needed.

1.3 Objective

Implementation of RFID in Villages (Dorm) aims to achieve the below lists:

- Overcome problem related to door malfunction or knob.
- Overcome the tendency of students forgetting their keys inside their room.
- Reduce management's hassle to manually distribute the keys.
- Support green technology has this system will reduce the usage of paper.
- Systematic and convenient for students.

1.4 Scope of Study

The general idea of the system is to tackle the problem of students misplacing the keys and rood doors malfunction by using RFID tag instill in students' metric card. When the students would like to enter their house, they will have to use their metric card to tag Upon entering the house , they will once again required to tag in to the RFID reader placed near their room door.

Each student will be assigned with their unique bar code to enter into their house and rooms, thus preventing any overlapping of code. Assigning of the code will be done at the end of the semester, whereby the students will be asked by the management if they would like to stay in the same room or shift to different village, floor, house, or room. Upon agreeing to the students' preferences and the availability of the room, the bar code will be attached to the

metric card. The door to enter the house (Door 1) will auto lock once entering , while the door to enter the room (Door 2) will only lock if the card is tagged twice. If Door 2 is only tagged once, it means the student is entering the room, there is no auto lock function implemented as students is not expected to carry their card to the pantry or the bathroom. Until Door 2 remains untagged for the second time, it will not be locked.

In a nutshell, the implementation of RFID in villages will be very useful for student in near future. This project has taken three months of literature review, background studies and design and another four months of implementation to come up with working prototype

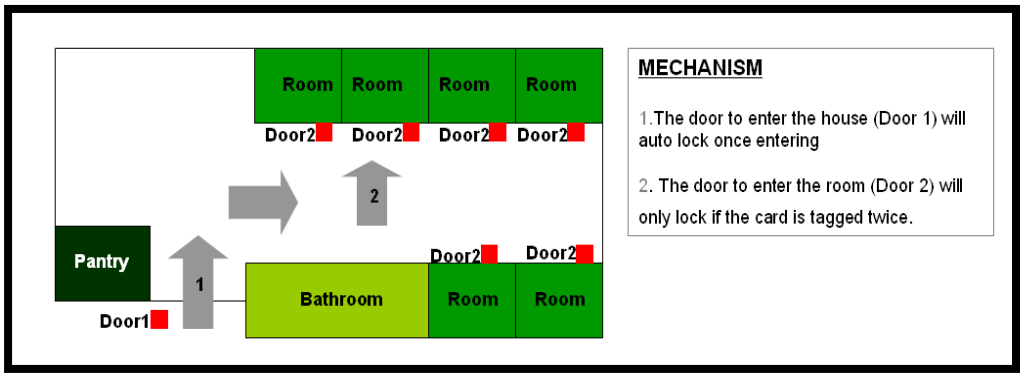

Figure 3: Proposed mechanism

1.5 The Relevancy of the Project

Implementation of RFID in Villages (Dorm) will assist in the following ways

- No manual distribution of keys as it is time consuming & tedious.
- Security of students and their possessions will be safe from break-ins or strangers since breaking the code are harder than manual key mechanism.
- Implements green technology for less paperwork will be needed.

1.6 Feasibility of the Project within the Scope and Time frame

Basically, this system allows students to enter and exit rooms by simply use their matric card without stopping at the gate for checking process. It will help the students as well as

management to save time, minimize their manpower, avoid fault or people failure. There are 3 different kinds of feasibility analysis which are technical feasibility, economic feasibility and organizational feasibility. For this project, only two feasibilities are analyzes which are technical feasibility and economic feasibility.

- Technical feasibility

The first step in the feasibility analysis is technical feasibility of the project, the extent to which the new system can be successfully developed and implemented.

- User's familiarity with the system:

First and foremost, we need to realize that this system is free for students they do not have to buy any new equipment to be aligned with the system because RFID tags are already available in our matric cards but now still not active for students yet. There is not much problem regarding the usage of RFID itself since it was designed to be user-friendly and our approach is quite similar to Touch-n-Go, a very popular system in Malaysia, so users do not need to learn or even read a long manual to know all functions and how to use.

- Project size:

The size of the project is quite small since we already have RFID tag integrated in metric cards. The main concern here is in order to achieve the new system; we need to build up a grid of RFID readers plus one server for database processing and a software interface to facilitate communication between database server and RFID readers.

About RFID readers, we just have to buy extra reader that can be aligned with our metric card. Additionally, UTP's database server contains complete records of students' information so we do not have to build up a totally new one database server; we just have to add a relation for time IN/OUT of students. So the most difficult part will be the application interface used as a bridge between RFID reader and database server. However, its work is just send a tag code to database server and request a copy of

student's info including picture, IC/passport number, phone number… so the application is not so complicated to write.

- Economic feasibility

The second element of feasibility analysis is economic feasibility analysis which identifies the financial risk associated with the project. Economic feasibility is determined by identifying costs and benefits associated with the system, assigning values to them and the calculating the cash flow and return on investment for the project.

- Identify costs and benefits:

The costs and benefits can be broken down into four categories which are development costs, operational costs, tangible benefits and intangible benefits. Our project is more focus on development cost; the expense that incurred during the construction of the new security system such as hardware expenses like RFID reader. For operational cost; the cost that is required to operate the system also be considered such as the salary of the operation staff which is technician.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

The abbreviation *RFID* comes from Radio Frequency Identification, sometimes this technology is called an Automatic Identification and Data Capture *(AIDC)* and come into being as a natural upgrade of *Barcode Labels*, commonly used in 80's and of course nowadays (Łukasz Geldner & Paweł Nowiński, 2003).

Radio Frequency is a term that refers to alternating current (AC) having characteristics such that, if the current is input to an antenna, an electromagnetic field is generated suitable for wireless broadcasting and communications. These frequencies cover a significant portion of the electromagnetic radiation spectrum, extending from 9 kilohertz to thousands of gigahertz (Siti Ruzzana Binti Roslant, 2009).

Any radio frequency field has a wavelength that is inversely proportional to the frequency. In the atmosphere or in outer space, if *f* is the frequency in megahertz and *s* is the wavelength in meters, then RFID is a contactless technology that uses radio frequency signals to transmit and receive data wirelessly, from a distance, from RFID tags or transponders to RFID readers (Ann Cavoukian, 2008). RFID is relatively new invention. First works, tests and ideas appeared in 1991, but first real solutions appeared in 1995 (Łukasz Geldner & Paweł Nowiński, 2003). RFID technology is generally used for automatic identification and to trigger processes that result in data collection or automation of manual processes (Ann Cavoukian, 2008). RF tags are available in a variety of shapes and sizes.

RFID is being employed to help manage and track document assets. In fact, about 35% of the document- tracking market in Malaysia is expected to use RFID by 2010. In the United States, several legal firms and tax courts, not to mention dental offices, have recently started tracking

assets with RFID. Other potential uses would be in police departments, where paper-based case files are regularly maintained (RFID Applications: Document Tracking, 2006)

2.2 Frequency Range

The RFID system is distinguished by its frequency ranges. With the exception of the lowest-frequency segment, each band represents an increase of frequency corresponding to an order of magnitude (power of 10). Low frequency (30 KHz to 500 KHz) systems have short reading ranges and lower system costs. They are most commonly used in security access, asset tracking, and animal identification applications.

High frequency (850 MHz to 950 MHz and 2.4 GHz to 2.5 GHz) systems, offering long read ranges (greater than 90 feet) and high reading speeds, are used for such applications as railroad car tracking an automated toll collection. However, the higher performance of high-frequency RFID systems incurs higher system costs (Siti Ruzzana Binti Roslant, 2009).

Designation	Abbreviation	Frequencies	Free-space Wavelength
Very Low Frequency	VLF	9 kHz – 30 kHz	10 km – 100 km
Low Frequency	LF	30 kHz – 300 kHz	1 km – 10 km
Medium Frequency	MF	300 kHz – 3 MHz	100 m – 1 km
High Frequency	HF	3 MHz – 30 MHz	10 m – 100 m
Very High Frequency	VHF	30 MHz – 300 MHz	1 m – 10 m
Ultra High Frequency	UHF	300 MHz – 3 GHz	10 cm – 100 cm
Super High Frequency	SHF	3 GHz – 30 GHz	1 cm – 10 cm
Extremely Hugh Frequency	EHF	30 GHz – 300 GHz	1 mm – 10 mm

Table 1:Frequency Range

2.3 Basic Component

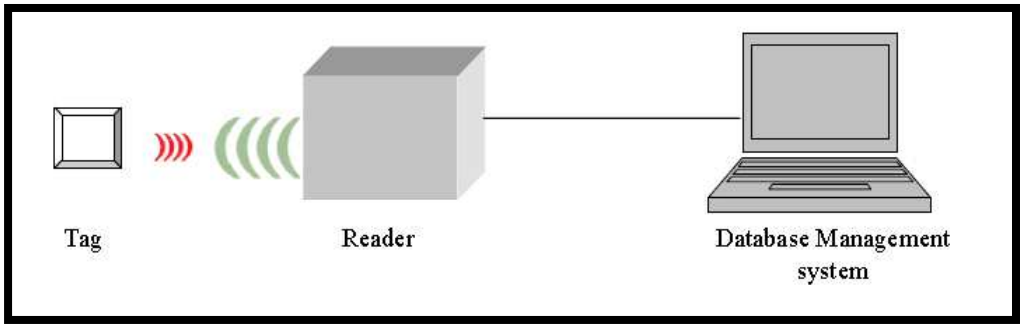

Figure 4: Basic Component of RFID

A Radio-Frequency Identification system (RFID) has three component parts:

- A transponder - the RFID tag - that has been programmed with unique information
- A reader or interrogator which is connected to an antenna that sends and receives the information
- A Database management system

2.3.1 RFID Tag/Transponder

Most RFID tags contain at least two parts. One is an integrated circuit for storing and processing information, modulating and demodulating a radio-frequency (RF) signal, and other specialized functions. The second is an antenna for receiving and transmitting the signal ("Radio-Frequency Identification", n.d.).

RFID tags have a wide variety of shapes and sizes. Animal tracking tags, inserted beneath the skin, can be as small as a pencil lead in diameter and one-half inch in length. Tags can be screw-shaped to identify trees or wooden items, or credit-card shaped for use in access applications ("RFID / What is RFID / Component", n.d).

Figure 5: Figure of RFID Tag

Besides that, RFID tags may be of one of two types: active or passive. Active RFID tags have their own power source whereas passive RFID tags do not have batteries, can be much smaller, and have a virtually unlimited life span.

2.3.2 RFID Reader/interrogator

RFID reader is an electronic device used for communication between RFID tags and a host computer system. A reader generally consists of an RF transmitter and receiver and an antenna for communicating with tags. A digital interface enables the reader to communicate with the host computer system.

Often the antenna is packaged with the transceiver and decoder to become a reader, which can be configured either as a handheld or a fixed-mount device. The reader emits radio waves in ranges of anywhere, depending upon its power output and the radio frequency used. When an RFID tag passes through the electromagnetic zone, it detects the reader's activation signal. The reader decodes the data encoded in the tag's integrated circuit and the data is passed to the host computer for processing (Siti Ruzzana Binti Roslant, 2009). Examples of RFID antenna are:

Figure 6 : Figure of RFID antenna

2.3.4 Working Principle

The three primary components that make RFID "Work" are Tags, Readers, and Software that collects data from the readers and helps turn it into actionable information (How RFID "Works", n.d).

Generally, for RFID to work, the antenna emits radio signals to activate the tag and to read and write data to it. Antennas are the conduits between the tag and the transceiver, which controls the system's data acquisition and communication. The electromagnetic field produced by an antenna can be constantly present when multiple tags are expected continually. If constant interrogation is not required, a sensor device can activate the field. Often the antenna is packaged with the transceiver and decoder to become a reader, which can be configured either as a handheld or a fixed-mount device. The reader emits radio waves in ranges of anywhere, depending upon its power output and the radio frequency used ("RFID / What is RFID / Component", n.d).

Basically, for a passive tag, when it passes through an electromagnetic field within reader, the tag is then powered on and transmits its information to the interrogator. The reader decodes the data encoded in the tag's integrated circuit. The information then is automatically sent into the Data System. Information exchange is done via air interface, precisely through electromagnetic waves, so without physical contact with reader (Łukasz Geldner & Paweł Nowiński, 2003).

If compared to the passive tag which is only powered on when passing through the reader's field, the active tag is always power on or continuously energized. This is due to the battery which it posses. Active tag has a read range of up to 300', but when the battery runs out, it will stop working.

2.4 RFID Types

2.4.1 Active RFID

Active RFID is a long range communication approach that has a reading distance between 50 m (150 feet) to 100 m (300 feet). Tags are powered by an internal battery and are typically read/write, where tag data can be rewritten and/or modified. An active tag's memory size varies according to application requirements; some systems operate with up to 1MB of memory.

In a typical read/write RFID work-in-process system, a tag might give a machine a set of instructions, and the machine would then report its performance to the tag. This encoded data would then become part of the tagged part's history. The battery supplied power of an active tag generally gives it a longer read range. The trade off is greater size, greater cost, and a limited operational life (which may yield a maximum of 10 years, depending upon operating temperatures and battery type) (“RFID / What is RFID / Component”, n.d).

2.4.2 Passive RFID

Tags operate without a separate external power source and obtain operating power generated from the reader. Passive tags are consequently much lighter than active tags, less expensive, and offer a virtually unlimited operational lifetime. The trade off is that they have shorter read ranges than active tags and require a higher-powered reader. Read-only tags are typically passive and are programmed with a unique set of data (usually 32 to 128 bits) that cannot be modified. Read-only tags most often operate as a license plate into a database, in the same way as linear barcodes reference a database containing modifiable product-specific information.

2.4.3 Differences between active and passive RFID

Active RFID and Passive RFID technologies, while often considered and evaluated together, are fundamentally distinct technologies with substantially different capabilities. In most cases, neither technology provides a complete solution (Active and Passive RFID, 2009). The majority of the RFID tags in use today are of the passive variety. Active RFID tag technology is still evolving and its widespread availability is expected to increase over the next several years ("Solving the New Technology Requirements for RFID Business Applications", 2009).

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	Passive RFID	Active RFID
Tag Power Source	External (Energy transferred from reader through RF)	Internal (Battery)
Tag Readability	Only within the area covered by the reader, typically up to 3 meters.	Can provide signals over an extended range, typically up to 100 meters.
Energization	A passive tag is energized only within field of reader.	An active tag is always energized.
Magnetic Field Strength	High, since the tag draws power from the electromagnetic field provided by the reader.	Low, since the tag emits signals using internal battery source.
Available Signal Strength from Tag to Reader	Low	High
Shelf Life	Very high, ideally does not expire over a life time.	Limited to about 5 years, the life of a battery.
Data storage	Limited data storage, typically 128 bytes.	Can store larger amounts of data.
Cost	Cheap	Expensive
Size	Smaller	Slightly bulky (due to battery)

Table 2: Technical differences between Active and Passive RFID technologies.

Some other applications of RFID'S are as following:

- **RFID Tags for Malls:**

In the world of RFID Walmart is currently the strongest actor pushing the adoption of this new way of identifying everything that can be marked with a tag.Walmart encourages its supplier to adopt this technology by 2005 to have real time based supply chain management system. The Metro Group operates "next-generation" supermarket in Sheinberg, Germany, with RFID implemented, where benefits of the technology have been seen

- **RFID Tags for Hospitals and Nursing Homes:**

Two companies that have been in RFID market for quite sometimes: Dreamydress and Tagsys have recently announced that their RFID solutions will now be heading in hospitals ,hopefully around France and Italy. It is the laundry market in both hospitals and nursing homes, which has brought these two companies together

Unusual as it seems, RFID has a role in most industries, including the laundry market. The two companies will be helping to provide RFID equipment for tracking and traceability for employees' uniforms as well as garments for nursing home residents. Each piece of clothing will be developed with a link to a patient lot or establishment found on a red button shaped RFID tag.

- **RFID System used in Public Library**

The Frisco Public Library reopens with an RFID System after being closed for ten days for system upgrades involving the update of some 145,000 books, DVDs, and CDs. Library personnel however, will be on hand to demonstrate how the device operates. This will cut the time staff spends on checking out materials from the library. The saved time may now be used in efficiently returning materials to their proper shelves making them available again for another's use a lot faster. This system is also environmental friendly

because it is paperless List of borrowed items may be sent through email to the user's inbox. The upgraded system also involves flashing of clear gates just inside library doors when books are not properly checked out and a help button near the terminals will call for further assistance from the staff .

⇨ **SO, WHY NOT IMPLEMENTED IT AT UNIVERSITY CAMPUS?**

Simple as it seems, RFID is playing an important role for security purposes throughout the whole world. Its implementation does not need to require a big amount of budget, nor complicated kind of system. All it needs is an RFID reader, and a system whereby the administrators can monitor (because our matrix card already comes with the RFID tag).It would be a huge benefit to cutting the costs, simplifies the process, and also ensures that the belonging of the students are safe.

2.5 Critical Analysis

Based on the literature review below are the three major implementation been used on daily basis.

Article	Major Contribution	Limitation
RFID Tags for Malls: Wal-Mart 	- Real time based monitoring RFID system for supple chain management	-Focuses only on supply chain management
RFID Tags for Hospitals and Nursing Homes: Dreamydress & Tagsys 	-Reduce human error on filling system, and laundry market	-Argument of the radio frequency effects on medical apparatus and support machinery.
RFID System used in Public Library: The Frisco Public Library 	- Efficiently returning materials to their proper shelves making them available again for another's use a lot faster	-Doesn't have a system that actually tells the user that the book is available and is in place on the respective shelves.

Table 3: Critical Analysis

2.6 Relevancy and Recentness of the Literature

- Research made to convince user that the **new system will simplify** their current method of carrying out work.
- It **does not require complex installation** compare to Tagys and Wal-Mart. Any updates performed on the system will be done in the back end without having to interfere user's work activity.
- **Very specific system** fully catered for students in UTP
- **Does not involve any other department** such as UTP Corporate Management.

CHAPTER 3

METHODOLOGY

3.1 Research Methodology

Prototyping life cycle model based on evolutionary development

In the process of developing the system for implementation of RFID in Villages (Dorm) at UTP, the methodology that suits the system development the best is the prototyping life cycle model. A prototyping-based methodology performs the analysis, designs, and implementation phases concurrently and all three phases performs repeatedly in a cycle until the system is completed..

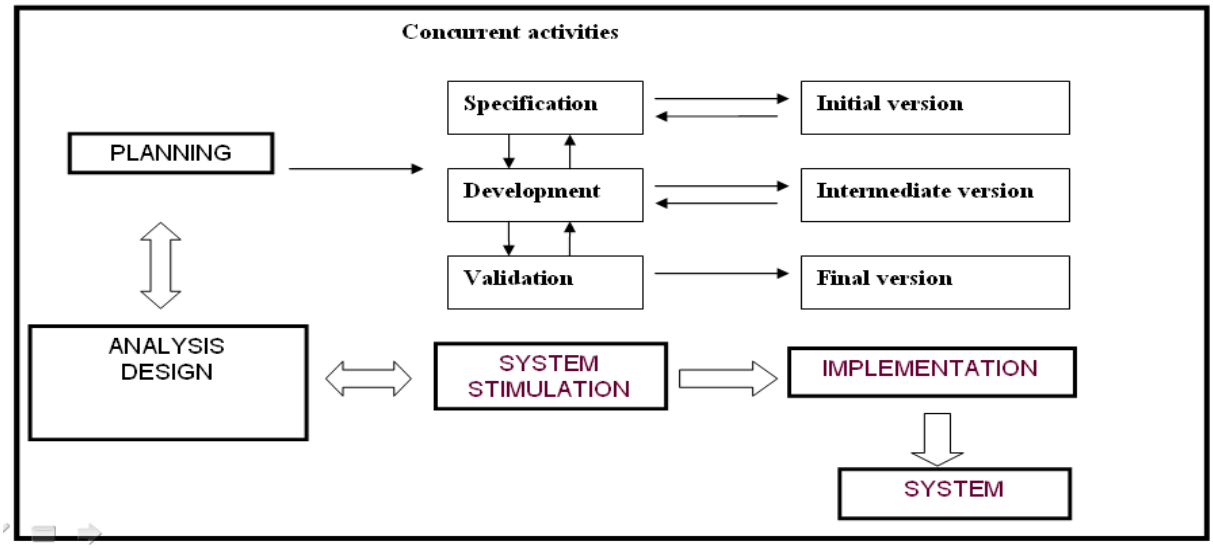

Figure 7: Prototyping life cycle model based on evolutionary development

- Planning

The planning phase is the fundamental process in the project initiation and project management of implementation of RFID in Villages (Dorm). During the project initiation, the system's business value to the organization is identified. The system request and feasibility analysis are presented to an information systems approval committee, which decides whether the project should be undertaken

- Analysis

During the analysis phases, it is necessary to investigate the current system, identify improvement opportunities, and develop concept. The analysis strategy is developed to analyze the current system and to design a new system. Then the requirement's gathering through interviews leads to the development of a concept for a new system. The analysis, system concept, and the models are combined into a document

- Design

The design phase determines the system specification on how the system will operate. This leads to the development of the basic architecture design for the system that describes the hardware, software and network structure that will be used. The interface design specifies how the user will move through the system and the reports that the system will use. Besides, database and file specifications are developed by defining the location and data to be stored.

- Implementation

The implementation phases is during the system is actually built. During this phase, there will be system construction to build and test the system to ensure it performs as designed. Then it will come with the first prototype which is usually the first part of the system that the user will use. After the prototype is installed, refinement occurs until it is accepted as the new system.

3.2 Project Activities

Before the designing and implementation of the project, intensive study regarding literature review and background studies will be carried out via various available sources such as internet sources, books, journals, paper ant etc. These sources are accessible personally as well as from our IRC (Information Resource Center). Interviews and questionnaires regarding the proposed topic will also be conducted both at students' and lectures' side in UTP, as well as other

universities and colleges. Data gathering and analysis is to be implemented intensively to support the study before the project is implemented. Last but not least, after the implementation, feedbacks and comments are to be collected from users also, to ensure the implementation is beneficial.

- Online survey

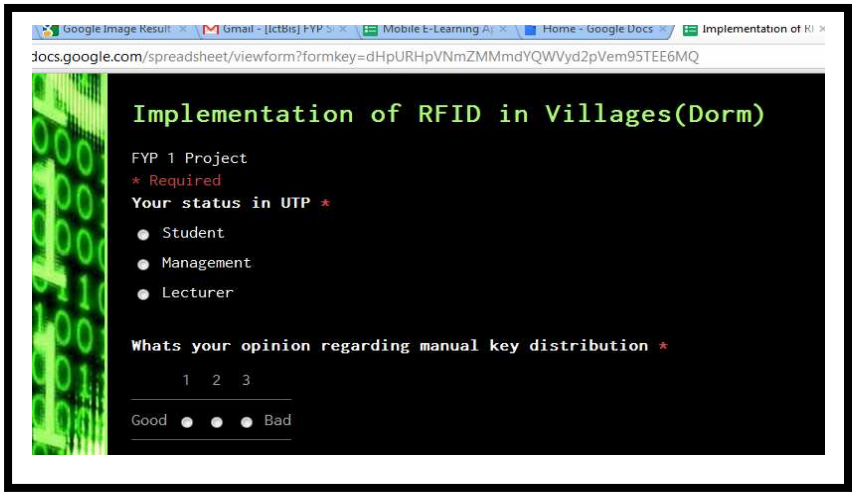

Figure 8: Online survey

- Interviews with student

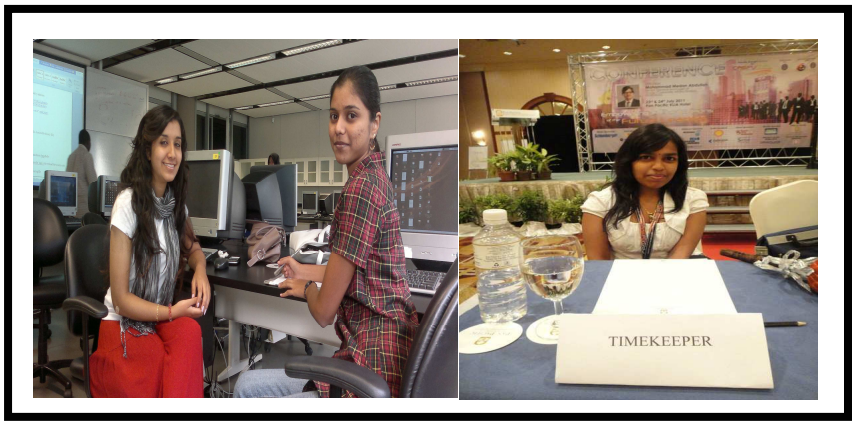

Figure 9: Interview with students

- Hands on experience with RFID

Figure 10: Hands on experience

- Phone interview with RCSU

3.3 Key Milestones

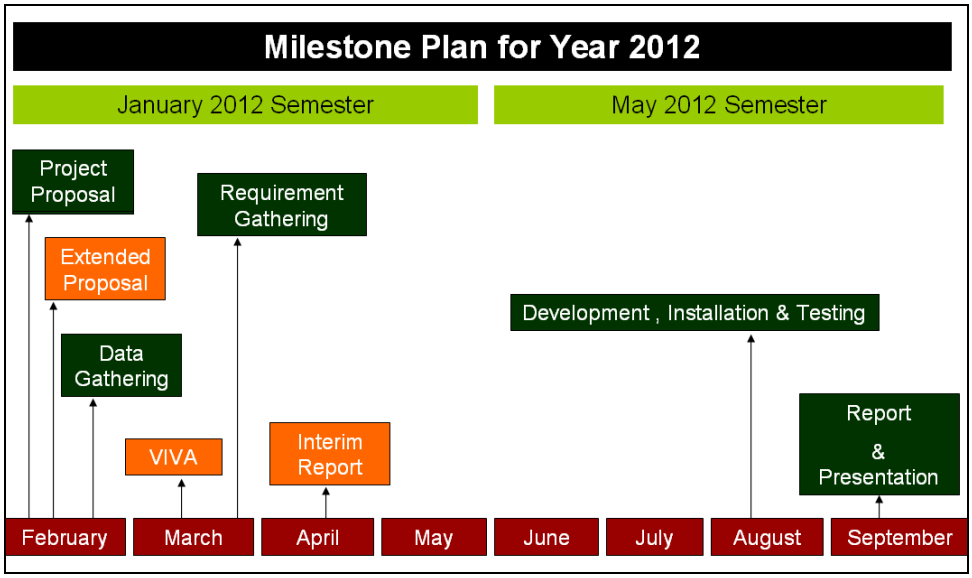

Figure 11: Key milestones (orange) and activities to be accomplished (dark green).

3.4 Gantt Chart

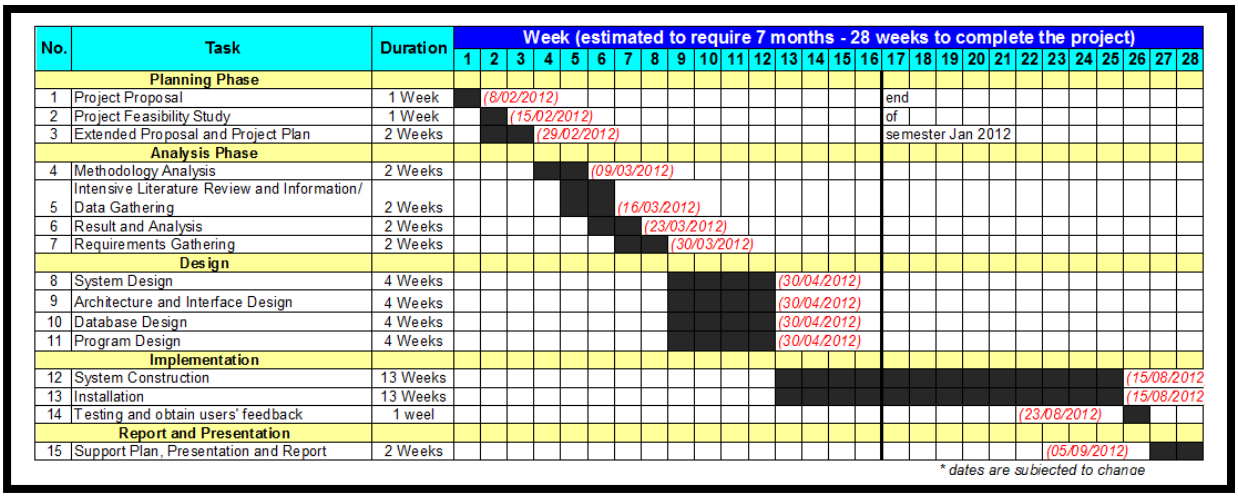

Figure 12: Gantt chart

3.5 Development Tools

At this stage, the detailed technical aspects of the project are not yet in the concern, but roughly the software includes of Microsoft Visual Studio 2008, Microsoft Access, and Microsoft Excel.

- MICROSOFT VISUAL STUDIO 2008 (VB.NET)

  This RFID will be developed by using .NET technology. Visual Basic .NET is part of the technology. It is a set of programming tools that allows in creating the RFID system application. Visual Basic combines the BASIC programming languages with a graphical user interface ease in developing RFID System applications. Besides, with the Open Database Connectivity (ODBC) of visual basic makes it possible for the applications to access the information store in a local database by creating a Data Source Name (DSN) for the database.

- MICROSOFT ACCESS

  Is a database management system from Microsoft that combines with a graphical user interface and software-development tools. MS Access stores data in its own format based

on the Access Jet Database Engine. It can also import or link directly to data stored in other applications and databases

- MICROSOFT EXCEL

Microsoft Excel has the basic features of all spreadsheets, using a grid of cells arranged in numbered rows and letter-named columns. The Windows version of Excel supports programming through Microsoft's Visual Basic for Applications (VBA) thus programming with VBA allows spreadsheet manipulation with standard spreadsheet techniques. Programmers may write code directly using the Visual Basic Editor (VBE), which includes a window for writing code, debugging code, and code module organization environment.

3.6 Hardware Tools

The hardware tools are associated physical equipment directly involve in the performance of data processing and communications functions .

- RFID TAG

Radio-frequency identification (RFID) is the use of an object (typically referred to as an RFID tag) applied to or incorporated into a product, animal, or person for the purpose of identification and tracking using radio waves. Some tags can be read from several meters away and beyond the line of sight of the reader. Radio-frequency identification involves *interrogators* (also known as *readers*), and *tags* (also known as *labels*).Most RFID tags contain at least two parts. One is an integrated circuit for storing and processing information, modulating and demodulating a radio-frequency (RF) signal, and other specialized functions. The second is an antenna for receiving and transmitting the signal. There are generally three types of RFID tags: passive RFID tags, which have no battery and require an external source to provoke signal transmission, active RFID tags, which contain a battery and can transmit signals once an external source ('Interrogator') has been successfully identified, and battery assisted passive (BAP) RFID tags, which require an

external source to wake up but have significant higher forward link capability providing greater range.

Figure 13: Example of RFID tag

- RFID READER

An RFID reader is a device that is used to interrogate an RFID tag. The reader has an antenna that emits radio waves; the tag responds by sending back its data. A number of factors can affect the distance at which a tag can be read (the read range). The frequency used for identification, the antenna gain, the orientation and polarization of the reader antenna and the transponder antenna, as well as the placement of the tag on the object to be identified will all have an impact on the RFID system's read range.

Figure 14: RFID Reader

- COMPUTER MACHINE

In the development process, a computer machine is the main device to interface with RFID reader to manipulate data. This machine will be the connection and storage device for 2 servers which are the UTP server and data repository and reporting server. The server will be allocated in virtual machine of the computer itself. The machine will run the reporting at the data repository and reporting server which the reports will be viewed by the user.

CHAPTER 4

RESULT AND DISCUSSION

4.1 Introduction

This chapter will basically discuss on the results obtain from the survey questionnaire; and the interfaces and databases which are created by both Visual Basic 2008 and Access respectively.

4.2 Results for Survey Questionnaire

A general survey questionnaire via internet had been conducted .There are about ninety four respondents that have participated in this survey. Mostly, the respondents' ages are between 19 to 33 years old and coming from different technical background such as education, medical, finance and engineering. The results analysis of the survey is shown below:

1. Have you ever heard about RFID?

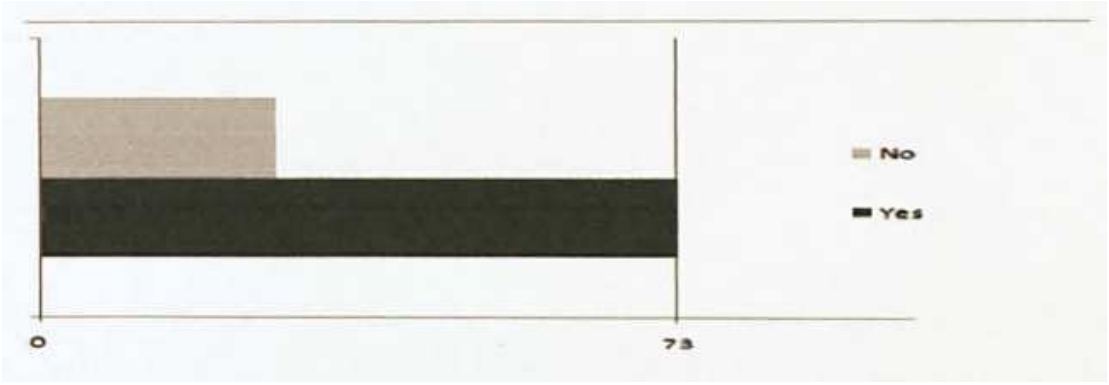

Figure 15: Bar Chart for Question I

About 73 % respondents answer "Yes" and 27% answers "No". It shows that most of the respondents already know about the RFID technology.

2. Have you ever faced difficulties obtaining keys manually?

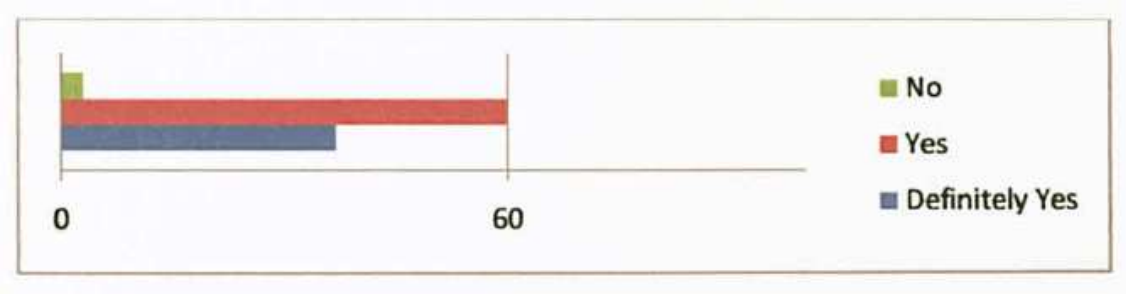

Figure 16: Bar Chart for Question 2

Only 3% respondents answer "No". It shows that most of the respondent are always facing difficulties in obtaining keys from the management.

3. Have you ever lost your keys?

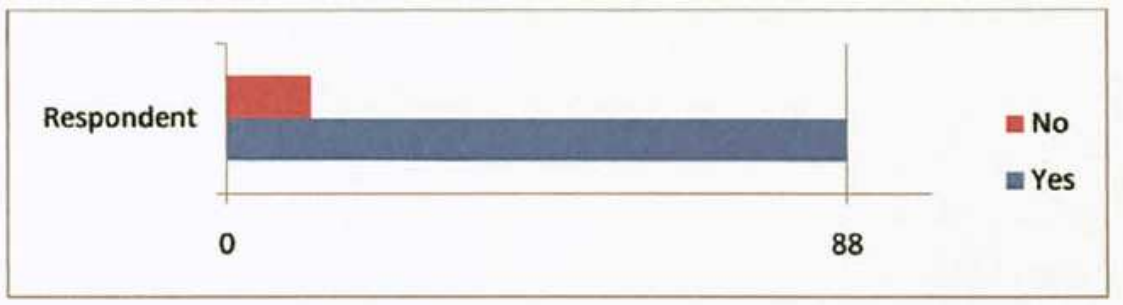

Figure 17: Bar Chart for Question 3

About 88 % respondents answer "Yes". It shows that most of them have experience in losing room keys.

4. Does the existing method of room assigning give you so much trouble?

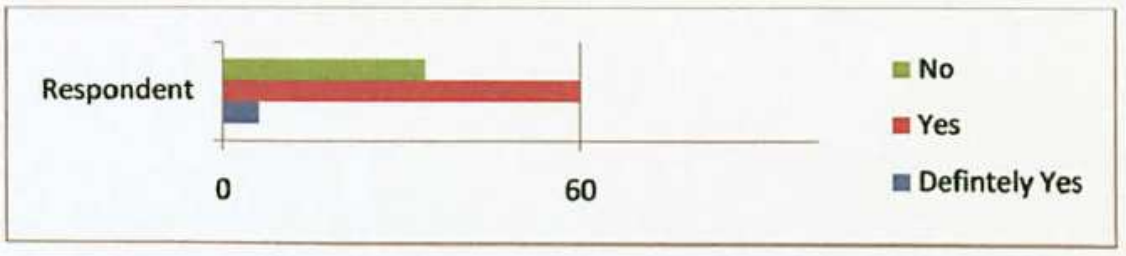

Figure 18: Bar Chart for Question 4

About 34 % respondents answer "No". It shows that most of the respondents have experience the difficulties in obtaining keys using current method of key distribution that is by manually.

5. Have you ever heard about application of RFID used in dormitory system?

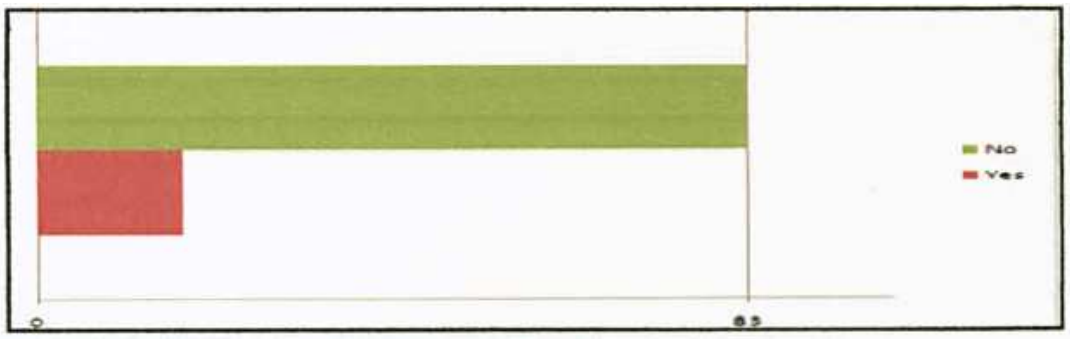

Figure 19: Bar Chart for Question 5

Only 17 % answer "Yes". It shows that they are not aware with the latest application of RFID dormitory usage as it is yet to be widely implemented.

6. What are your expectations from the system? Please describe it.

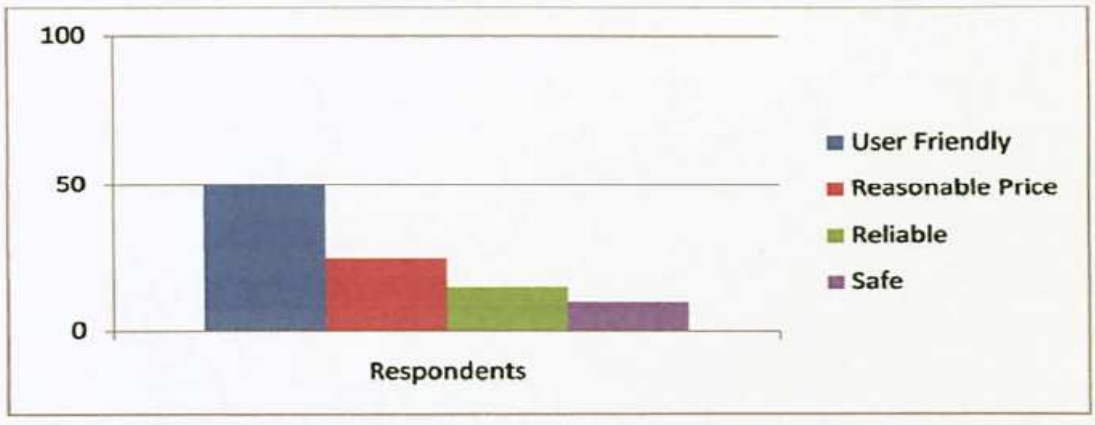

Figure 20: Bar Chart for Question 6

About 50 % of the respondents want the system would be "User friendly", 25% of them want the system will be sold with "Reasonable price". Besides that, 15% of the respondents want the system will be "Reliable" and the rest about 10% of them want the system to be secured in design.

4.3 System Overview

Basically, the main components of the system are Active RFID tags, readers and controller PC. Two readers will be used for this project. One reader will be located near the door to monitor the student in and out the hostel. Another reader will be located at the door of the room. The controller PC will be located in the management's room. Because of the student details are considered to be personal , only the authorized staffs have access to the controller PC. This controller PC contains the system software and controls the system.

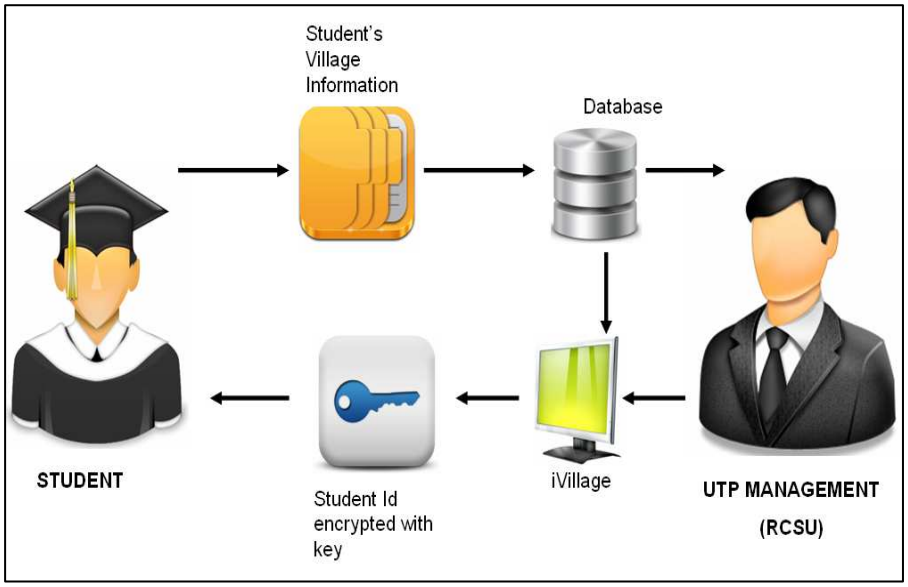

Figure 21: System Overview

The system works by the sequence of process as follows:

1. Each student has a unique matric ID given upon registration and the details will be stored in Student's Village Information.
2. The database will that be sync to the iVillage sytem to distribute the unique tag.
3. The RFID (radio frequency identification) tag is then attached to the matric card.
4. Only authorized personals will have the authority to key-in students details.

4.4 Graphical User Interface (GUI)

This is how the system for the Graphical User Interface (GUI) works using Visual Basic (VB). After the RFID reader is successfully communicate with the tag, the connection between the reader and host computer are made to checked there is input signal between reader and the interface. Several testing has been done, and the reader is successfully communicates with the interface build. For security purpose, the user has to login the system by insert the registered user name and password in the Login window as shown below:

Figure 22: Login Window

If the user entered wrong password or username the following box will pop-up ensuring the security will not be tempered.

Figure 23: Pop-up message for unauthorized user

After successfully login into the system, the iVillage Main Page will appear that contain "Edit Existing Student" button, and "New Student Register" button, " as shown in Figure XX.

Figure 24: iVillage main page

The purpose of "New Student Register" button is to register new students into the database as shown below. The user (management) have to key in attributes such as Name, Matric ID, Village, Floor, and Room number.

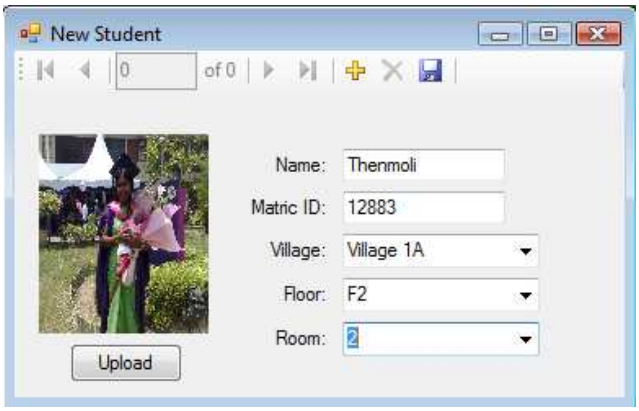

Figure 25: New Student registration window

Upon registration, a message box as following will be displayed

Figure 26: Successful student registration pop-up box window

Once the data are saved, click the "Edit Existing Student" button to search or edit the data of existing students. The figures below show a simple simulation of how the prototype works. The search functions works by entering the Student's Matric ID. Once selected, the details will automatically be displayed.

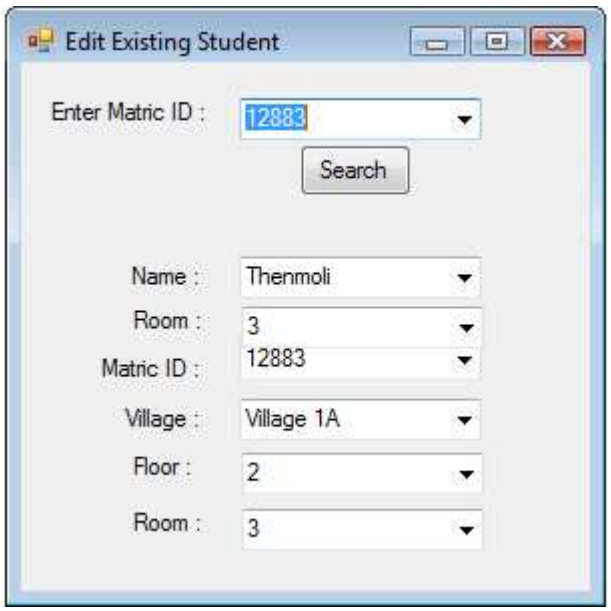

Figure 27: Edit Existing Student window

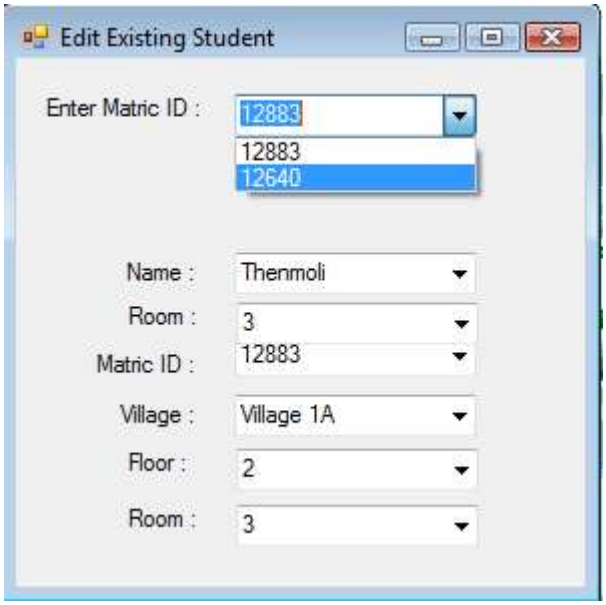

Figure 27: Selecting student using ID window

Once the changes are successfully made, the below message box will appear.

Figure 28:Successful update of student pop-up message window

CHAPTER 5

CONCLUSION AND RECOMMENDATION

5.1 Conclusion

This report is mainly to initiate the 'Implementation of RFID based Village Security System". The report defined the problem statement with the support ideas from literature review studies. The objective and scope of study gave the scope of project that was discussed and estimate the completion of project within the given time frame. There are a few results out of this project initiative, they are: *methodology* that is presented as the project development for this system for the whole system prototype develop life cycle.

As a UTP student, who has experience facing all the problems stated in problem stamen section, which is why I have very strong determination to develop this proposing system. By putting my knowledge, hard-work, and effort all together the end product of this project will successfully came out as a prototype of Implementation of RFID in Villages(Dorm), which scopes have been defined earlier. This project expectation is that it can improve UTP residential security working process as well as provide a safer logging for UTP students.

5.2 Recommendation

There are a few recommendations for this project. The first is to improve graphical user interface (GUI) so that the application look for attractive. Second, the platform for interface should be flexible so that administrator can have easy access.

5.3 Future Enhancement

Instead of having the physical card (student it) enhanced to mobile solution. The bar code can be obtained as a mobile app in any smart phone.

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APPENDIX

Login Page

```
Public Class LoginPage

    Private Sub Label1_Click(ByVal sender As System.Object, ByVal e As
System.EventArgs) Handles Labellogin_1.Click

    End Sub

    Private Sub Button2Main_Quit2_Click(ByVal sender As System.Object, ByVal
e As System.EventArgs) Handles Button2Login_Quit2.Click
        'Exit the project.
        Me.Close()

    End Sub

    Private Sub TextBox1_UserID_TextChanged(ByVal sender As System.Object,
ByVal e As System.EventArgs) Handles TextBox1_UserID.TextChanged

    End Sub

    Private Sub Button1Login_Login_Click(ByVal sender As System.Object,
ByVal e As System.EventArgs) Handles Button1Login_Login.Click
        If TextBox1_UserID.Text = "12883" Then
            If TextBox2_Password.Text = "12883" Then
                Dim SecondForm As New MainPage
                MainPage.Show()

            End If
        Else
            MsgBox("Wrong password")
        End If

    End Sub

    Private Sub LoginPage_Load(ByVal sender As System.Object, ByVal e As
System.EventArgs) Handles MyBase.Load

    End Sub

    Private Sub Labellogin_2_Click(ByVal sender As System.Object, ByVal e As
System.EventArgs) Handles Labellogin_2.Click

    End Sub

    Private Sub PictureBox1_Click(ByVal sender As System.Object, ByVal e As
System.EventArgs) Handles PictureBox1.Click

    End Sub
End Class
```

iVillage main page

```
Public Class MainPage

    Private Sub Label1_Click(ByVal sender As System.Object, ByVal e As
System.EventArgs) Handles Label1Login_preferences.Click

    End Sub

    Private Sub Button1login_edit_Click(ByVal sender As System.Object, ByVal
e As System.EventArgs) Handles Button1login_edit.Click
        Dim ThirdForm As New EditExistingStudent
        EditExistingStudent.Show()

    End Sub

    Private Sub Button2Login_New_Click(ByVal sender As System.Object, ByVal
e As System.EventArgs) Handles Button2Login_New.Click
        Dim FourthForm As New NewStudent
        NewStudent.Show()
    End Sub
End Class
```

New Student registration

```
Public Class NewStudent

    Private Sub Button2_Click(ByVal sender As System.Object, ByVal e As
System.EventArgs)

    End Sub

    Private Sub Button1NewStudent_Register_Click(ByVal sender As
System.Object, ByVal e As System.EventArgs)
        Dim FifthForm As New PopUpRegistration
        PopUpRegistration.Show()

    End Sub

    Private Sub Table1BindingNavigatorSaveItem_Click(ByVal sender As
System.Object, ByVal e As System.EventArgs) Handles
Table1BindingNavigatorSaveItem.Click
        Me.Validate()
        Me.Table1BindingSource.EndEdit()
        Me.TableAdapterManager.UpdateAll(Me.NewStudentDataSet)

    End Sub

    Private Sub NewStudent_Load(ByVal sender As System.Object, ByVal e As
System.EventArgs) Handles MyBase.Load
        'TODO: This line of code loads data into the
'NewStudentDataSet.Table1' table. You can move, or remove it, as needed.
        Me.Table1TableAdapter.Fill(Me.NewStudentDataSet.Table1)

    End Sub
```

```
    Private Sub VillageComboBox_SelectedIndexChanged(ByVal sender As
System.Object, ByVal e As System.EventArgs) Handles
VillageComboBox.SelectedIndexChanged

    End Sub

    Private Sub Button1_Click(ByVal sender As System.Object, ByVal e As
System.EventArgs)

    End Sub

    Private Sub OpenFileDialog1_FileOk(ByVal sender As System.Object, ByVal
e As System.ComponentModel.CancelEventArgs) Handles OpenFileDialog1.FileOk

    End Sub
End Class
```

Edit Existing Student

```
Public Class EditExistingStudent

    Private Sub Button1Edit_OK_Click(ByVal sender As System.Object, ByVal e
As System.EventArgs) Handles Button1Edit_OK.Click


    End Sub

    Private Sub Label2_Click(ByVal sender As System.Object, ByVal e As
System.EventArgs) Handles Label2.Click

    End Sub

    Private Sub EditExistingStudent_Load(ByVal sender As System.Object,
ByVal e As System.EventArgs) Handles MyBase.Load
        'TODO: This line of code loads data into the
'NewStudentDataSet1.Table1' table. You can move, or remove it, as needed.
        Me.Table1TableAdapter.Fill(Me.NewStudentDataSet1.Table1)

    End Sub
End Class
```

Technical Report

Implementation of RFID based Village Security System

(Radio Frequency Identification Technology)

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ABSTRACT-This paper is intended to present the author's Final Year Project, Implementation of RFID based Village Security Sytem. by focusing on a development of Radio Frequency Identification (RFID) implemented at dormitory in Universiti Teknologi Petronas (UTP). By using the RFID tag instill in students' metric card, assigned with unique bar code, students are able to enter their house and rooms. The door of the house is auto locked and need to be swapped only once .While the door to enter students' respective room need to be swapped twice to be locked. All these entry and exit will be recorded in a system to ensure the safety of the students and their procession. The system can only be logged in by the admin with password as these data are confidential. Once the admin is able to enter , two major task can be done. Firstly assigning the students with the unique bar code and deleting them once the duration is over and secondly able to track the students entry and exit of the house and room

I. INTRODUCTION

Majority of the students prefers to stay in the campus due to many factors such as transportation, fuel cost and etc. At the beginning of each semester, students will be placed in their respective village through few ways by RCSU. Some of the commonly used methods are by sending email, formal letter or some visit in person to obtain the key. While at the end of each semester, students are required to hand over their room keys to the respective Village supervisors manually. This manual manner of key distribution have bought so much of trouble to both the management and students, but thanks to technology advancement, all these are made simpler and faster through the implementation of Radio Frequency Identification (RFID).

Some of the common issues regarding dormitory keys are physical condition of the door that are damaged and installed lock failed to work. Entry of strangers is quite common as the current doors cannot be locked. This causes the safety of the students at risk. Family members of different gender are also frequently seen inside the house. This is made possible due to the minimal security instilled within the dormitory. Animals such as cats are also another common nuisance in the house, where they sneak in and ravage the pantry Manual key distribution has been another disadvantage. Students have to queue up in long line to be in the office, once in the office, students have to register their name, matrix ID, mobile number, and IC, then the management will search for the keys (hanging in a cupboard like structure) and hand it over. This procedure is not only time consuming but also tedious.

The objective of the project will be to overcome problem related to door malfunction or knob, overcome the tendency of students forgetting their keys inside their room, reduce management's hassle to manually distribute the keys, support green technology has this system will reduce the usage of paper and to have a systematic and convenient methods for students

The relevancy of this project will assist in increasing the security of students and their possessions will be safe from break-ins or strangers, implements green technology and discards manual distribution of keys as it is time consuming & tedious

II. LITERATURE REVIEW

The abbreviation *RFID* comes from Radio Frequency Identification, sometimes this technology is called an Automatic Identification and Data Capture *(AIDC)* and come into being as a natural upgrade of *Barcode Labels*, commonly used in 80's and of course nowadays[1]. Radio Frequency is a term that refers to alternating current (AC) having characteristics such that, if the current is input to an antenna, an electromagnetic field is generated suitable for wireless broadcasting and communications. These frequencies cover a significant portion of the electromagnetic radiation spectrum, extending from 9 kilohertz to thousands of gigahertz[2].Any radio frequency field has a wavelength that is inversely proportional to the frequency. In the atmosphere or in outer space, if f is the frequency in megahertz and s is the wavelength in meters, then RFID is a contactless technology that uses radio frequency signals to transmit and receive data wirelessly, from a distance, from RFID tags or transponders to RFID readers[3]. RFID is relatively new invention. First works, tests and ideas appeared in 1991, but first real solutions appeared in 1995[4]. RFID technology is generally used for automatic identification and to trigger processes that result in data collection or automation of manual processes [5]. RF tags are available in a variety of shapes and sizes.RFID is being employed to help manage and track document assets. In fact, about 35% of the document- tracking market in Malaysia is expected to use RFID by 2010. In the United States, several legal firms and tax courts, not to mention dental offices, have recently started tracking assets with RFID. Other potential uses would be in police departments, where paper-based case files are regularly maintained [6]

The RFID system is distinguished by its frequency ranges. With the exception of the lowest-frequency segment, each band represents an increase of frequency corresponding to an order of magnitude (power of 10). Low frequency (30 KHz to 500 KHz) systems have short reading ranges and lower system costs. They are most commonly used in security access, asset tracking, and animal identification applications.
High frequency (850 MHz to 950 MHz and 2.4 GHz to 2.5 GHz) systems, offering long read ranges (greater than 90 feet) and high reading speeds, are used for such applications as

railroad car tracking an automated toll collection. However, the higher performance of high-frequency RFID systems incurs higher system costs[7].

Designation	Abbreviation	Frequencies	Free-space Wavelength
Very Low Frequency	VLF	9 kHz – 30 kHz	10 km – 100 km
Low Frequency	LF	30 kHz – 300 kHz	1 km – 10 km
Medium Frequency	MF	300 kHz – 3 MHz	100 m – 1 km
High Frequency	HF	3 MHz – 30 MHz	10 m – 100 m
Very High Frequency	VHF	30 MHz – 300 MHz	1 m – 10 m
Ultra High Frequency	UHF	300 MHz – 3 GHz	10 cm – 100 cm
Super High Frequency	SHF	3 GHz – 30 GHz	1 cm – 10 cm
Extremely Hugh Frequency	EHF	30 GHz – 300 GHz	1 mm – 10 mm

A Radio-Frequency Identification system (RFID) has three component parts,a transponder - the RFID tag - that has been programmed with unique information, a reader or interrogator which is connected to an antenna that sends and receives the information and a database management system. Most RFID tags contain at least two parts. One is an integrated circuit for storing and processing information, modulating and demodulating a radio-frequency (RF) signal, and other specialized functions. The second is an antenna for receiving and transmitting the signal[8]. RFID reader is an electronic device used for communication between RFID tags and a host computer system. A reader generally consists of an RF transmitter and receiver and an antenna for communicating with tags. A digital interface enables the reader to communicate with the host computer system

The three primary components that make RFID "Work" are Tags, Readers, and Software that collects data from the readers and helps turn it into actionable [9]Generally, for RFID to work, the antenna emits radio signals to activate the tag and to read and write data to it. Antennas are the conduits between the tag and the transceiver, which controls the system's data acquisition and communication. The electromagnetic field produced by an antenna can be constantly present when multiple tags are expected continually. If constant interrogation is not required, a sensor device can activate the field. Often the antenna is packaged with the transceiver and decoder to become a reader, which can be configured either as a handheld or a fixed-mount device. The reader emits radio waves in ranges of anywhere, depending upon its power output and the radio frequency used [10].Basically, for a passive tag, when it passes through an electromagnetic field within reader, the tag is then powered on and transmits its information to the interrogator. The reader decodes the data encoded in the tag's integrated circuit. The information then is automatically sent into the Data System. Information exchange is done via air interface, precisely through electromagnetic waves, so without physical contact with reader [11].If compared to the passive tag which is only powered on when passing through the reader's field, the active tag is always power on or continuously energized. This is due to the battery which it posses. Active tag has a read range of up to 300', but when the battery runs out, it will stop working. Active RFID and Passive RFID technologies, while often considered and evaluated together, are fundamentally distinct technologies with substantially different capabilities. In most cases, neither technology provides a complete solution[12]. The majority of the RFID tags in use today are of the passive variety. Active RFID tag technology is still evolving and its widespread availability is expected to increase over the next several years[13]

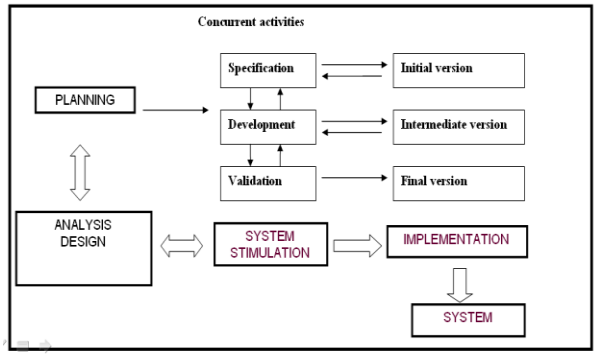
	Passive RFID	Active RFID
Tag Power Source	External (Energy transferred from reader through RF)	Internal (Battery)
Tag Readability	Only within the area covered by the reader, typically up to 3 meters.	Can provide signals over an extended range, typically up to 100 meters.
Energization	A passive tag is energized only within field of reader.	An active tag is always energized.
Magnetic Field Strength	High, since the tag draws power from the electromagnetic field provided by the reader.	Low, since the tag emits signals using internal battery source.
Available Signal Strength from Tag to Reader	Low	High
Shelf Life	Very high, ideally does not expire over a life time.	Limited to about 5 years, the life of a battery.
Data storage	Limited data storage, typically 128 bytes.	Can store larger amounts of data.
Cost	Cheap	Expensive
Size	Smaller	Slightly bulky (due to battery)

.

III. METHODOLOGY

a) Research Methodology

In the process of developing the system for implementation of RFID in Villages (Dorm) at UTP, the methodology that suits the system development the best is the prototyping life cycle model. A prototyping-based methodology performs the analysis, designs, and implementation phases concurrently and all three phases performs repeatedly in a cycle until the system is completed.

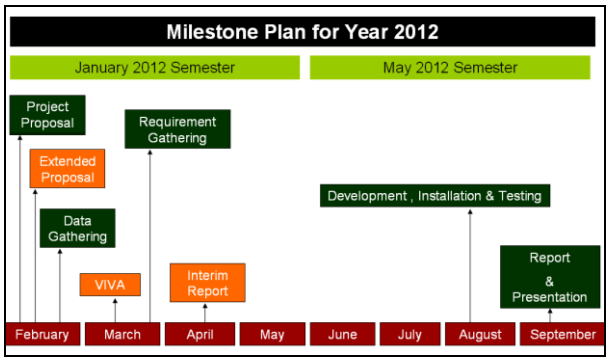


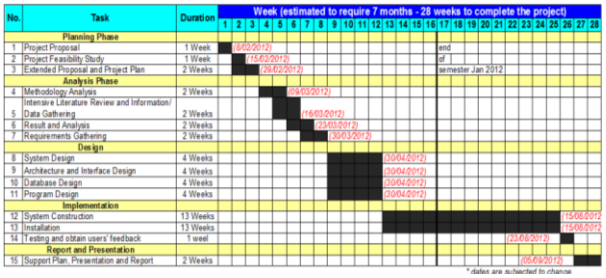
b) Project Activities

Before the designing and implementation of the project, intensive study regarding literature review and background studies will be carried out via various available sources such as internet sources, books, journals, paper ant etc. These sources are accessible personally as well as from our IRC (Information Resource Center). Interviews and questionnaires regarding the proposed topic will also be conducted both at students' and lectures' side in UTP, as well as other universities and colleges. Data gathering and analysis is to be implemented intensively to support the study before the

project is implemented. Last but not least, after the implementation, feedbacks and comments are to be collected from users also, to ensure the implementation is beneficial.

c) Key Milestone and Gantt Chart





d)Hardware and Development Tools

The hardware tools are associated physical equipment directly involve in the performance of data processing and communications functions .

RFID TAG-Radio-frequency identification (RFID) is the use of an object (typically referred to as an RFID tag) applied to or incorporated into a product, animal, or person for the purpose of identification and tracking using radio waves. Some tags can be read from several meters away and beyond the line of sight of the reader.

RFID tag

RFID READER-An RFID reader is a device that is used to interrogate an RFID tag. The reader has an antenna that emits radio waves; the tag responds by sending back its data. A number of factors can affect the distance at which a tag can be read (the read range). The frequency used for identification, the antenna gain, the orientation and polarization of the reader antenna and the transponder antenna, as well as the placement of the tag on the object to be identified will all have an impact on the RFID system's read range.

RFID Reader

COMPUTER MACHINE-In the development process, a computer machine is the main device to interface with RFID reader to manipulate data. This machine will be the connection and storage device for 2 servers which are the UTP server and data repository and reporting server. The server will be allocated in virtual machine of the computer itself. The machine will run the reporting at the data repository and reporting server which the reports will be viewed by the user.

At this stage, the detailed technical aspects of the project are not yet in the concern, but roughly the software includes of Microsoft Visual Studio 2008, Microsoft Access, and Microsoft Excel.

MICROSOFT VISUAL STUDIO 2008 (VB.NET)-This RFID will be developed by using .NET technology. Visual Basic .NET is part of the technology. It is a set of programming tools that allows in creating the RFID system application. Visual Basic combines the BASIC programming languages with a graphical user interface ease in developing RFID System applications. Besides, with the Open Database Connectivity (ODBC) of visual basic makes it possible for the applications to access the information store in a local database by creating a Data Source Name (DSN) for the database.

MICROSOFT ACCESS-Is a database management system from Microsoft that combines with a graphical user interface and software-development tools. MS Access stores data in its own format based on the Access Jet Database Engine. It can also import or link directly to data stored in other applications and databases

MICROSOFT EXCEL-Microsoft Excel has the basic features of all spreadsheets, using a grid of cells arranged in numbered rows and letter-named columns. The Windows version of Excel supports programming through Microsoft's Visual Basic for Applications (VBA) thus programming with VBA allows spreadsheet manipulation with standard spreadsheet techniques. Programmers may write code directly using the Visual Basic Editor (VBE), which includes a window for writing code, debugging code, and code module organization environment

IV. RESULT AND DISCUSSION

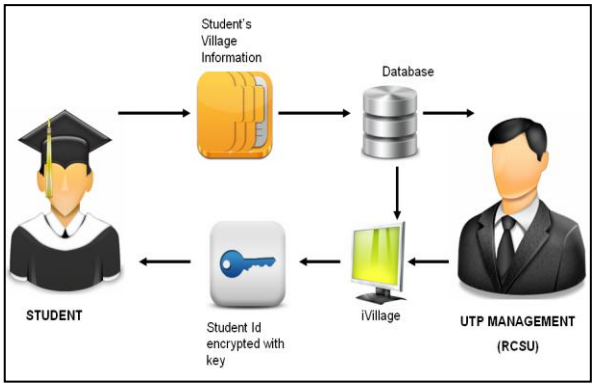
a) Questionnaire

A general survey questionnaire via internet had been conducted .There are about ninety four respondents that have

participated in this survey. Mostly, the respondents' ages are between 19 to 33 years old and coming from different technical background such as education, medical, finance and engineering. Most of the respondents already know about the RFID technology and are always facing difficulties in obtaining keys from the management.70% of respondents have experience the difficulties in obtaining keys using current method of key distribution that is by manually. 83% shows that they are not aware with the latest application of RFID dormitory usage as it is yet to be widely implemented. About 50 % of the respondents want the system would be "User friendly", 25% of them want the system will be sold with "Reasonable price". Besides that, 15% of the respondents want the system will be "Reliable" and the rest about 10% of them want the system to be secured in design.

b)System Overview

Basically, the main components of the system are Active RFID tags, readers and controller PC. Two readers will be used for this project. One reader will be located near the door to monitor the student in and out the hostel. Another reader will be located at the door of the room. The controller PC will be located in the management's room. Because of the student details are considered to be personal , only the authorized staffs have access to the controller PC. This controller PC contains the system software and controls the system.



System Overview

The system works by the sequence of process as follows:

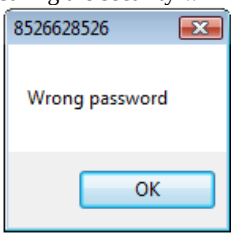
1. Each student has a unique matric ID given upon registration and the details will be stored in Student's Village Information.
2. The database will that be sync to the iVillage sytem to distribute the unique tag.
3. The RFID (radio frequency identification) tag is then attached to the matric card.
4. Only authorized personals will have the authority to key-in students details.

c)Graphical User Interface (GUI)

This is how the system for the Graphical User Interface (GUI) works using Visual Basic (VB). After the RFID reader is successfully communicate with the tag, the connection between the reader and host computer are made to checked there is input signal between reader and the interface. Several testing has been done, and the reader is successfully communicates with the interface build. For security purpose, the user has to login the system by insert the registered user name and password in the Login window as shown below:

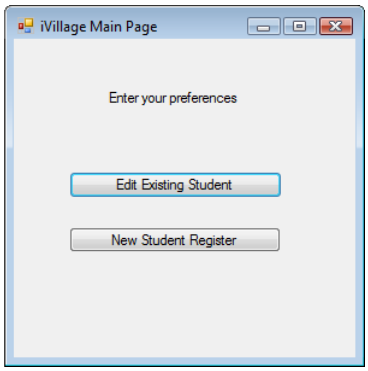
Login Window

If the user entered wrong password or username the following box will pop-up ensuring the security will not be tempered.



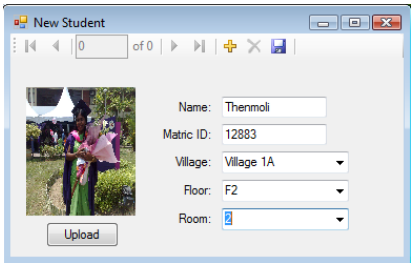
Pop-up message for unauthorized user

After successfully login into the system, the iVillage Main Page will appear that contain "Edit Existing Student" button, and "New Student Register" button, " as shown in Figure XX.



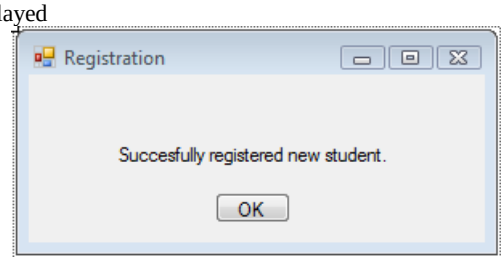
iVillage main page

The purpose of "New Student Register" button is to register new students into the database as shown below. The user (management) have to key in attributes such as Name, Matric ID, Village, Floor, and Room number.



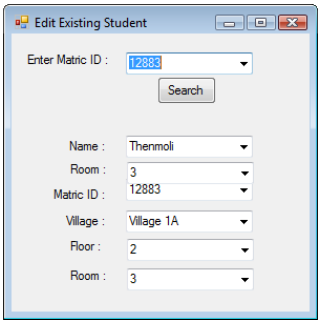
New Student registration window

Upon registration, a message box as following will be displayed

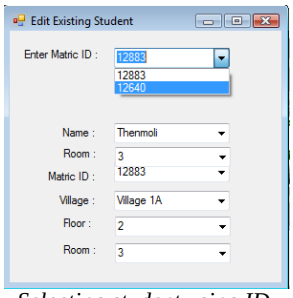


Successful student registration pop-up box window

Once the data are saved, click the "Edit Existing Student" button to search or edit the data of existing students. The figures below show a simple simulation of how the prototype works.The search functions works by entering the Student's Matric ID. Once selected, the details will automatically be displayed.

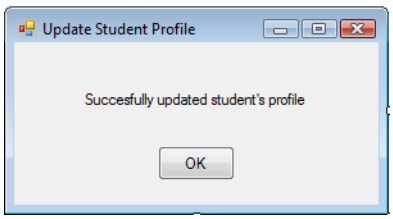


Edit Existing Student window



Selecting student using ID window

Once the changes are successfully made, the below message box will appear.



Successful update of student pop-up message window

V. CONCLUSION

This report is mainly to initiate the 'Implementation of RFID based Village Security System". The report defined the problem statement with the support ideas from literature review studies. The objective and scope of study gave the scope of project that was discussed and estimate the completion of project within the given time frame. There are a few results out of this project initiative, they are: *methodology* that is presented as the project development for this system for the whole system prototype develop life cycle.

As a UTP student, who has experience facing all the problems stated in problem stamen section, which is why I have very strong determination to develop this proposing system. By putting my knowledge, hard-work, and effort all together the end product of this project will successfully came out as a prototype of Implementation of RFID in Villages(Dorm), which scopes have been defined earlier. This project expectation is that it can improve UTP residential security working process as well as provide a safer logging for UTP students.

VI. RECOMMENDATION

There are a few recommendations for this project. The first is to improve graphical user interface (GUI) so that the application look for attractive. Second, the platform for interface should be flexible so that administrator can have easy access. Instead of having the physical card (student it) enhanced to mobile solution. The bar code can be obtained as a mobile app in any smart phone.

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