

**MOBILE APPLICATION DEVELOPMENT FOR STUDENT ATTENDANCE
MANAGEMENT SYSTEM USING BLUETOOTH TECHNOLOGY**



UNIVERSITI TEKNIKAL MALAYSIA MELAKA

MOBILE APPLICATION DEVELOPMENT FOR STUDENT ATTENDANCE
MANAGEMENT SYSTEM USING BLUETOOTH TECHNOLOGY


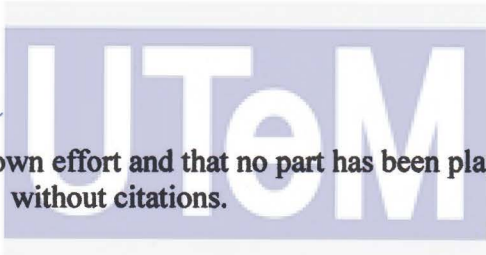


This report is submitted in partial fulfillment of the requirements for the
Bachelor of Computer Science (Computer Networking)

FACULTY OF INFORMATION AND COMMUNICATION TECHNOLOGY UNIVERSITI
TEKNIKAL MALAYSIA MELAKA

DECLARATION

I hereby declare that this project report entitled
**MOBILE APP DEVELOPMENT FOR STUDENT ATTENDANCE
MANAGEMENT SYSTEM USING BLUETOOTH TECHNOLOGY**

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

اونيورسيتي تيكنيكل مليسيا ملاك

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

STUDENT : 
FATIN NUR HALILAH BT MOHD SAID

DATE : 17/8/2017

SUPERVISOR : 
DR. RAIHANA SYAHIRAH
ABDULLAH

DATE : 23/8/17

BORANG PENGESAHAN STATUS TESIS*

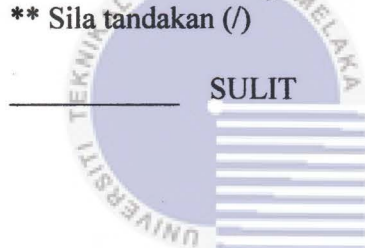
JUDUL: MOBILE APPLICATION DEVELOPMENT FOR STUDENT
ATTENDANCE MANAGEMENT SYSTEM USING BLUETOOTH
TECHNOLOGY

SESI PENGAJIAN: SESI 2017/2018

Saya FATIN NUR HALILAH BINTI MOHD SAID

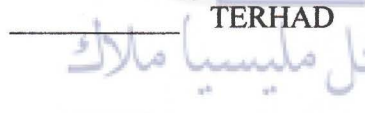
mengaku membenarkan tesis (PSM/Sarjana/Doktor Falsafah) ini disimpan di
Perpustakaan
Fakulti Teknologi Maklumat dan Komunikasi dengan syarat-syarat kegunaan seperti
berikut:

1. Tesis dan projek 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 : 3252, Felda Besout 3,
35600, Sungkai Perak.

Tarikh: 17/6/2017


(TANDATANGAN PENYELIA)

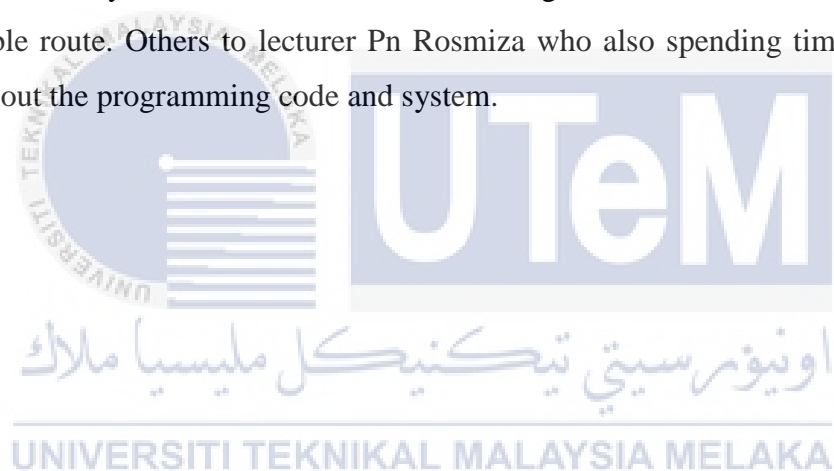
DR. RAIHANA SYAHIRAH BINTI ABDULLAH
Pensyarah Kanan
Fakulti Teknologi Maklumat dan Komunikasi
Universiti Teknikal Malaysia Melaka (UTeM)

Tarikh: 23/8/17

CATATAN: * Tesis dimaksudkan sebagai Laporan Akhir Projek Sarjana Muda (PSM)
** Jika tesis ini SULIT atau TERHAD, sila lampirkan surat daripada pihak berkuasa.

DEDICATION

This thesis is dedicated to all those who have supported, encouraged, challenged, and inspired me. Especially to my beloved parents, Mohd Said Kamarudin Saripah Lazim and my family. Also to my friends for all their attention which has made it possible for me to make it up this point and as well as my supervisor Pn. Haniza Bt Nahar and Dr Raihana Syahirah Bt Abdullah who courage me and awareness to follow the possible route. Others to lecturer Pn Rosmiza who also spending time for teaching me about the programming code and system.



ACKNOWLEDGEMENT

First and foremost I would like express my gratitude to the Lord Almighty, whom without His guidance, for keeping me in the path of righteousness I would not have been able to be as I am today. Next, a million thanks to **Pn. Haniza Nahar and Dr Raihana Syahirah** for helping and guidance me through endless obstacles, the true success of beating the odds really pushes my knowledge boundary even further. Then, thanks a lot to **Pn Rosmiza** that give me the time for teaching about the programming code.

Also a millions to my mother for the support and strong encouragement and motivation throughout this project and also for my late father. To all of a heroes or should I be called friends really play a big role for my project who are directly or indirectly in providing ideas and suggestions. Especially, to **Zakwan Shaj, Lim Xin Jong , Amalina Jasmi and Amirah Bharon** thank you for your time in teaching me and correct me whenever I make a mistake about database and coding. Others to **Mr Mihdir Khan** and **En Syazwan Suazwi** that guide me through the mobile application development. Thanks to all the guidance, advice and guide I will never forget. Hopefully, this project was conducted to get the blessing from God.

ABSTRACT

Until today, most of the universities and college are still using the conventional method for taking the student's attendance. The most conventional method is either by passing around the attendance sheet and required the student to put their signature or by lecturer calling out the student name one by one for confirming their presence. As a result, both method is cumbersome and time-consuming. In addition, such method is higher risk of having the student cheating about their presence and potential to human error especially when there is a lot of student in one class. Therefore, a method of taking an attendance using the lecturer's mobile telephone has been introduced in this paper using wireless technology such as Bluetooth which is more quick and accurate. The software application is installed in the lecturer's mobile and use student's MAC Address (MAC) for confirming their presence for the attendance. In addition, to support this proposed system to be more effective, a web-based system is develop to manage the attendance information such as generate the warning letter, produce statistic and for a filing and printing purpose. This system will help to eliminate the current issues of taking a manual student attendance while also promoting a paperless environment for the go-green campaign. The proposed system is cost-effective since no additional hardware cost is required since mobile phone is widely used nowadays and everyone have it.

ABSTRAK

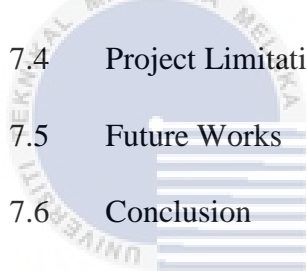
Sehingga hari ini, kebanyakan universiti dan kolej masih menggunakan kaedah konvensional untuk mengambil kehadiran pelajar. Kaedah yang paling konvensional sama ada dengan mengedarkan lembaran kedatangan itu dan yang dikehendaki pelajar untuk meletakkan tandatangan mereka atau dengan pensyarah memanggil nama pelajar satu demi satu untuk mengesahkan kehadiran mereka. Akibatnya, kedua-dua kaedah adalah rumit dan memakan masa. Di samping itu, kaedah itu adalah berisiko tinggi untuk mempunyai pelajar menipu mengenai kehadiran dan potensi mereka untuk kesilapan manusia terutamanya apabila terdapat banyak pelajar dalam satu kelas. Oleh itu, satu kaedah mengambil kehadiran menggunakan telefon bimbit pensyarah telah diperkenalkan dalam kertas ini menggunakan teknologi tanpa wayar seperti Bluetooth yang lebih cepat dan tepat. Aplikasi perisian yang dipasang dalam pensyarah mudah alih dan penggunaan pelajar MAC Alamat (MAC) untuk mengesahkan kehadiran mereka untuk kehadiran. Di samping itu, untuk menyokong sistem yang dicadangkan ini untuk menjadi lebih berkesan, sistem berasaskan web adalah membangunkan untuk menguruskan maklumat kehadiran seperti menjana surat amaran, mengeluarkan statistik dan untuk makluman dan percetakan tujuan. sistem ini akan membantu untuk menghapuskan isu-isu semasa mengambil kehadiran pelajar manual samping menggalakkan persekitaran tanpa kertas untuk kempen go-hijau. Sistem yang dicadangkan adalah kos efektif kerana tiada kos perkakasan tambahan diperlukan kerana telefon bimbit digunakan secara meluas pada masa kini dan semua orang memilikinya.

TABLE OF CONTENTS

DECLARATION	ii
DEDICATION	iii
ACKNOWLEDGEMENT	iv
ABSTRACT	v
ABSTRAK	vi
TABLE OF CONTENTS	vii
LIST OF FIGURES	x
LIST OF TABLES	xii
CHAPTER I	1
INTRODUCTION	1
1.1 Introduction.....	1
1.2 Problem Statement.....	2
1.3 Project Question.....	4
1.4 Project Objective.....	5
1.5 Project Scope.....	6
1.6 Project Contribution.....	6
1.7 Report organization.....	7
1.8 Conclusion.....	8
CHAPTER II	9
LITERATURE REVIEW	9
2.1 Introduction.....	9
2.2 Related Work.....	10
2.3 Critical Review of Current Problem and Justification.....	21
2.4 Proposed Solution.....	29
2.5 Conclusion.....	30

CHAPTER III	31
METHODOLOGY	31
3.1 Introduction.....	31
3.2 Methodology	32
3.3 Project Milestone	36
3.4 Gantt Chart.....	38
3.5 Conclusion	38
CHAPTER IV	39
ANALYSIS AND DESIGN	39
4.1. Introduction.....	39
4.2. Problem Analysis	40
4.3. Requirement analysis	43
4.4. High-Level Diagram	42
4.5. Detailed Design.....	50
4.6. Conclusion	
CHAPTER V	79
IMPLEMENTATION.....	79
5.1 Introduction	79
5.2 Software Development Environment Setup	80
5.3 Software Configuration Management	82
5.4 Implementation Status	92
5.5 Conclusion	94
CHAPTER VI.....	95
TESTING.....	95
6.1 Introduction	95

6.2	Test Plan	96
6.3	Test Strategy	97
6.4	Test Design	99
6.5	Test Result and Analysis	102
6.6	Conclusion	104
CHAPTER VII.....		105
TESTING.....		105
7.1	Introduction	105
7.2	Project Summarization	106
7.3	Project Contribution	106
7.4	Project Limitation	108
7.5	Future Works	109
7.6	Conclusion	109
Reference.....		110



LIST OF FIGURES

NO	FIGURES	PAGE
2.1	Wireless Network Taxonomy Diagram	23
2.2	RFID Attendance System	27
2.3	IRIS Recognition	28
2.4	FingerPrint Attendance System	29
2.5	NFC Attendance System	30
2.6	Face Recognition Attendance System	32
2.7	Flow Chart 1	34
2.8	Flow Chart 2	35
2.9	Flow Chart 3	36
3.1	SDLC Diagram	42
3.2	Gantt Chart	47
4.1	Flow Chart Current System	50
4.2	Context Diagram	56
4.3	DFD Level 1	57
4.4	DFD Level 2	58
4.5	System Architecture	62
4.6	Layer Architecture	63
4.7	Application Architecture	63
4.8	Web Architecture	64
4.9	Login Interface	66
4.10	Student Registration Interface	66
4.11	Lecturer Registration Interface	66
4.12	Subject Registration Interface	67
4.13	Add Mac Address Interface	67
4.14	Add Attendance Interface	68
4.15	User Profile (Student)	69
4.16	User Profile (Lecturer)	69
4.17	Attendance list interface	70
4.18	Subject list interface	70

4.19	Warning Letter interface	71
4.20	ERD Diagram	72
4.21	Business Rule Admin	73
4.22	Business Rule Lecturer	74
4.23	Business Rule Student	74
4.24	Business Rule Subject	75
4.25	Business Rule Warning Letter	75
5.1	Student Attendance System Architecture	80
5.2	Web Based Flow Chart	83
5.3	Interface Code	84
5.4	Interface Output	84
5.5	Database Code	85
5.6	Database Output	85
5.7	Login Page Code	86
5.8	Login Page Output	86
5.9	Module Function Code	87
5.10	Module Function Output	87
5.11	Mobile Apps Flow Chart	88
5.12	Login Page Code	89
5.13	Login Page Output	89
5.14	Interface Code	90
5.15	Interface Output	90
5.16	Function Code	91
6.1	Black Box Testing	98

LIST OF TABLES

NO PAGE	TABLE	
1.1	Problem Statement	13
1.2	Project Question	15
1.3	Project Objective	16
1.4	Project Contribution	17
2.1	Summarization table	37
3.1	Project Milestone	45
4.1	Table Student	52
4.2	Table Admin	53
4.3	Table Lecturer	53
4.4	Table Subject	54
4.5	Table Student_Subject	54
4.6	Table Lecturer_Subject	54
4.7	Table Warning_Letter	55
4.8	Table Attendance	55
4.9	Table Software Requirement	59
4.10	Table Hardware Requirement	60
4.11	Table Student	75
4.12	Table Admin	76
4.13	Table Lecturer	77
4.14	Table Subject	77
4.15	Table Student_Subject	78
4.16	Table Lecturer_Subject	79
4.17	Table Warning_Letter	79
5.1	Table Software Setup	81
5.2	Table Implementation Status	92
6.1	Table Test Organization	96

CHAPTER I

INTRODUCTION



1.1 Introduction

Nowadays, lecturer at the university or college are taking the students attendance manually either by calling out the students name or passing the list name or attendance sheet for the signature to confirm the presence of student. The major issues of this method is it is both cumbersome and required high time-consuming also have the potential risk of having students cheating about their presence especially in a larger classroom. These days, in most educational university, the presence of student in the learning process is important and regarded as a vital exercise for the process of transferring the information and knowledge. This conclude that, student need to attend the lecture class in order to gain knowledge or important information.

The common method used is by having the students for manually sign on the attendance name list that are passed around the classroom either at the end of the class or while a lecturer is giving the lecture. This method can greatly allow the student to cheat about their presence in the class where another students which is his or her friend may sign for an absent student. Besides, sometimes, lecturer could misplaced or lost the sheet or forget to bring it along. This consequence will required students to manually fill in their name, student ID and signed it. Other approach that can be used to prevent students cheating about their attendance is where a lecturer will calls out each student name from the list and validate their presence. Calling out individual names or spreading the sheets is both time-consuming and cumbersome. Thus, all this problem required a semi-automated system that would eliminate all the troubles. Therefore, it is the main objectives to develop a portable student attendance management system as well as to promote paperless and a greener environment. Besides that, this mobile application will help in order to reduce the time being wasted and leading to a higher learning productivity in class.

1.2 Problem Statement

There is two problem statement in this project. The first one is the manual attendance tracking process both cumbersome and time consuming and the other one is difficulty to manage the student attendance information. The problem statement has been identified is summarized in Table 1.1 below:

Table 1.1: Problem Statement

PS	Problem Statement
PS1	Manual attendance tracking process both cumbersome and time consuming
PS2	Difficulty to manage the student attendance information

PS1: Manual attendance tracking process both cumbersome and time consuming

Vulnerabilities of this manual attendance produce a cumbersome and time consuming during the attendance tracking process which is the attendance sheet is spread around the class during the lecture for the students sign it or calling out individual name to validate the presence of the students. The attendance sheet that contain the student signature or any mark for the student attendance could be misplaced or lost it since a lecturer may have more than one subject to be teach and it is hard to get the information of student attendance if the attendance sheet is lost

PS2: Difficulty to manage the student attendance information

After taking the student attendance, lecturer needs to manage the attendance information in the other form as the documentation of the attendance. This is use to organize the attendance and to identify if any student did not attend the class with a reasonable reason or medical certificate and with that a warning letter will be produced.

1.3 Project Question

Project Question (PQ) is produced based on the problem statement that has been clarified in the previous section. The project question is summarized in Table 1.2 below.

Table 1.2: Project Question

PS	PQ	Project Question
PS1	PQ1	What is the issue of the current system used for attendance system?
	PQ2	How the technology able to overcome the issues?
PS2	PQ3	How to implement the effective ways to manage the attendance information?

PQ1: What is the issue of the current system used for attendance system?

Identify the issues and problem that occur in the current student attendance management system.

PQ2: How the technology able to overcome the issues and become more effective way for attendance system?

Identify the method and ways to develop the propose application for student attendance management system.

PQ3: How to implement the effective ways to manage the attendance information?

Identify the best method to implement for managing the information in the effective ways.

1.4 Project Objective

Based on the project questions that has been constructed in the previous section, an appropriate project objective (PO) are produce as follows. The objective is important to ensure that the project will reach the goals. The project objective (PO) must be able to answer all the project question (PQ) and solve all the problem statement (PS). The Project Objective (PO) is summarized into Table 1.3 below.

Table 1.3: Project Objective

PS	PQ	PO	Project Objective
PS1	PQ1	PO1	To study the issues of the current system used for student attendance system.
	PQ2	PO2	To analyze an application that can provide an automated student attendance management system.
PS2	PQ3	PO3	To develop and testing the application and system for student attendance.

PO1: To study the issues of the current system used for student attendance system

To study all the issues related to the current student attendance system.

PO2: To analyze an application that can provide an automated student attendance management system

To analyze an application that can provide the best solution compared to the previous system.

PO3: To develop and testing the application and system for student attendance.

To develop and testing the application and system for the automated student attendance.

1.5 Project Scope

The Scope of this research paper will be focusing on the aspects stated below

1. Development of mobile application for lecturer for taking student attendance system using Bluetooth technology.
2. Development of web system for managing attendance record and information.
3. Testing the mobile application and web based system.

1.6 Project Contribution

Project contribution for this proposed system is stated as the table 1.4 below:

Table 1.4: Project Contribution

PS	PQ	PO	PC	Project Contribution
PS1	PQ1	PO1	PC1	Identify and clarify the issues related with the current system.
	PQ2	PO2	PC2	Develop a new application that capable to provide an automated attendance system.
PS2	PQ3	PO3	PC3	Propose a new automated student attendance management system.

1.7 Report organization

This report consist of seven chapter which is Chapter 1: Introduction, Chapter 2: Literature review, Chapter 3: Methodology, Chapter 4: Analysis and Design, Chapter 5: Implementation, Chapter 6: Testing and last but not least Chapter 7: Conclusion

Chapter 1: Introduction

This chapter is consist of introduction, background of the project, problem statement , project question, project objective, project scope, project contribution and report organization.

Chapter 2: Literature Review

This chapter is focusing on explaining about the related work or the frame work of the related system or the proposed one. This will be supported with the reading materials such as journal and conference paper.

Chapter 3: Methodology

This chapter is explain about the method that will be used in this project. The method used in this project is the waterfall process. The advantages is it is step by step and easy to organize the implementation of the project.

Chapter 4: Analysis and Design

This chapter will discuss on the analysis about the problem and requirement needed in the project. This chapter also covers the high level design, user interface design and the system architecture.

Chapter 5: Implementation

This chapter focusing on the activity that involved for the implementation phase, the software development environment setup, software configuration management and the implementation status.

Chapter 6: Testing

This chapter will be discusses about the activity involved during the testing phase, the test plan that includes test environment, test schedule and test strategy and also the test result and analysis.

Chapter 7: Conclusion

In this chapter, consist of project summarization and discuss about objective been achieved, the strength and weakness about the project and the contributions.


1.8 Conclusion

As for conclusion, at the end of the project, the objective, problem statement, project scope, project significant and the expected output had been clearly identified. The next chapter will be discussed about the literature review that will be covering about the model approach and frame work about the Bluetooth attendance management system.

CHAPTER II

LITERATURE REVIEW

2.1 Introduction



In the previous chapter, problem statement, project objective and project scope have been clearly discussed and clarify. So in this chapter, the project will conduct an in-depth discussion about the literature review on Bluetooth technology, mobile application and other related project that is similar on the techniques that shall be used. Literature Review is a group of text that aims to review critically the current knowledge on a specific topic. Most often associated with science-oriented literature, such as a thesis, a literature review that usually precedes the proposed research, methodology and results. The main goal is to bring the reader up to date with current literature on the topic and form the basis for other goals, such as justification for future research in that area

From the literature review, the results on issues of manual attendance system management will cover all the project objectives (PO1, PO2 and PO3), which is to have a clear understanding on the issues of current system used, to study an application that can provide an automated student attendance management system and to develop and evaluate the effectiveness of the application for managing the information as mentioned

in the Chapter I. In this chapter, will be published an information regarding the topics related about the project and the problems related to this project is studied and analyzed.

2.2 Related Work

This section is about to explain in details about the related work or previous work that is related to this project. It will include several technologies that have been used for the attendance management system. Other than that, this section will define several keyword that been used in this project.

2.2.1 Domain

The domain of the project is ICT in Computer System Technology focusing on mobile application development. Mobile application is now being a growth technology as people nowadays choose to simplify form any manual or old process to the something new that provide more systematic and less human intervention in any aspect of their daily life and choose the mobile application rather than a desktop or laptop computers. For example the mobile application that combine with the Bluetooth technology can produce an effective software for student attendance system. Bluetooth is one of the wireless technology that able to communicate with other devices in the distance of 100 meter. In this chapter will explaining about an overview what is Bluetooth technology and introduction to some concept and technology that involve in this mobile application will be elaborated.

The issue that can be discover is about the process while taking the attendance in every institute or college which is using the manual process that can be time consuming