



**UNIVERSITI TEKNIKAL MALAYSIA MELAKA**

**PLANT HEADCOUNT & TRACKING SYSTEM**

This report is submitted in accordance with the requirement of the Universiti Teknikal Malaysia Melaka (UTeM) for the Bachelor of Electronic Engineering Technology (Industrial Electronic) with Honours.

by

**NOR FAZLIN BINTI AHMAD**

**B071510789**

**940416055292**

FACULTY OF ELECTRICAL AND ELECTRONIC ENGINEERING  
TECHNOLOGY

2018

**BORANG PENGESAHAN STATUS LAPORAN PROJEK SARJANA MUDA**

Tajuk: Plant Headcount & Tracking System

Sesi Pengajian: 2018

Saya **Nor Fazlin Binti Ahmad** mengaku membenarkan Laporan PSM ini disimpan di Perpustakaan Universiti Teknikal Malaysia Melaka (UTeM) dengan syarat-syarat kegunaan seperti berikut:

1. Laporan PSM adalah hak milik Universiti Teknikal Malaysia Melaka dan penulis.
2. Perpustakaan Universiti Teknikal Malaysia Melaka dibenarkan membuat salinan untuk tujuan pengajian sahaja dengan izin penulis.
3. Perpustakaan dibenarkan membuat salinan laporan PSM ini sebagai bahan pertukaran antara institusi pengajian tinggi.
4. \*\*Sila tandakan (X)

SULIT\*

Mengandungi maklumat yang berdarjah keselamatan atau kepentingan Malaysia sebagaimana yang termaktub dalam AKTA RAHSIA RASMI 1972.

- TERHAD\* Mengandungi maklumat TERHAD yang telah ditentukan oleh organisasi/badan di mana penyelidikan dijalankan.
- TIDAK TERHAD

Yang benar,

Disahkan oleh penyelia:

.....

.....

Nor Fazlin Binti Ahmad

MUHAMMAD IZZAT ZAKWAN BIN

MOHD ZABIDI

Alamat Tetap:

Cop Rasmi Penyelia

No 94, Jalan Pulasan 31,

Taman Kota Masai, 81700,

Pasir Gudang, Johor

Tarikh:

Tarikh:

\*Jika Laporan PSM ini SULIT atau TERHAD, sila lampirkan surat daripada pihak berkuasa/organisasi berkenaan dengan menyatakan sekali sebab dan tempoh laporan PSM ini

## DECLARATION

I hereby, declared this report entitled Plant Headcount & Tracking System is the results of my own research except as cited in references.

Signature: .....

Author : Nor Fazlin Binti Ahmad

Date:



## ABSTRAK

Pada masa kini, tidak ada sistem yang sesuai untuk memantau penyertaan kakitangan di beberapa organisasi. Terdapat beberapa organisasi yang masih menggunakan sistem asas kertas untuk menyimpan rekod kakitangan. Dengan penggunaan Jumlah Pekerja Kilang & Sistem Pengesanan, sistem berasaskan kertas tidak akan digunakan lagi. Jumlah Pekerja Kilang & Sistem Pengesanan ini berkenaan dengan penyelenggaraan butiran kehadiran kakitangan. Ia menjana kehadiran kakitangan berdasarkan kehadiran di kilang. Ia dikekalkan pada asas harian kehadiran mereka, sistem ini adalah perkakasan dan pembangunan perisian. Bahagian perisian boleh menguruskan rekod pangkalan data untuk sistem pengurusan kehadiran staf yang lebih selamat. Tujuannya adalah untuk memastikan jabatan keselamatan dapat mengesan kakitangan dan mengira bilangan kakitangan ketika kejadian dahsyat berlaku di kilang. Selain itu, bahagian perkakasan dalam sistem ini bertindak sebagai pengimbas kehadiran dengan menggunakan Arduino Uno sebagai mikrokontroler dan pengimbas RFID .

## **ABSTRACT**

Nowadays, there is no appropriate system to monitor the staff's participation at a few organizations. There are some organizations that still utilize the paper-base system to store the records of the staffs. With the usage of Plant Headcount & Tracking System, paper-based system will be killed. Plant Headcount & Tracking System deals with the maintenance of the staff's attendance details. It is generates the attendance of the staff on basis of presence in plant. It is maintained on the daily basics of their attendance, these system is hardware and software development. The software part can manage database record for staff attendance management system which more secure. The purpose is to make sure the security department can trace the staff and count how many staff in plant when any terrible incident happen in plant. The hardware part in this system act as attendance scanner by using Arduino Uno as microcontroller and RFID Reader.

## **DEDICATION**

This report is dedicated to my beloved parents, my siblings and my friends, who always support me during this final year project work. Last but not least, my final year report group mates who were always with me to complete my final year project research.



## ACKNOWLEDGEMENTS

First and foremost, I would like to grab this chance to express my sincere gratitude to my supervisor, Sir Muhammad Izzat Zakwan Bin Mohd Zabidi from the Faculty of Engineering Technology, Universiti Teknikal Malaysia Melaka (UTeM) for his essential guidance, support and encouragement towards the completion of the final year project report.

Special thanks to UTeM for giving fund required to complete this project. In addition, I would like to thank Dr Satrya Fajri Pratama, the staff from Faculty of Information and Communication Technology (FTMK) sincerely.

Last but not least, I would like to thank my beloved parents, siblings and my friends for providing mental support throughout this final year project. Thanks to everyone who have been a significant part for the realization of this project.

## TABLE OF CONTENTS

	<b>PAGE</b>
TABLE OF CONTENTS	x
LIST OF TABLES	xiii
LIST OF FIGURES	xiv
LIST OF APPENDICES	xvi
<b>CHAPTER 1 INTRODUCTION</b>	<b>1</b>
1.1 Introduction	1
1.2 Background Study	1
1.3 Problem Statement	2
1.4 Objectives	4
1.5 Scope of Project	4
<b>CHAPTER 2 LITERATURE REVIEW</b>	<b>5</b>
2.1 Introduction	5
2.2 Hardware Used	6
2.2.1 Arduino Uno	6
2.2.2 RFID Reader	7
2.2.3 RFID Tags	8
2.3 Previous Related Project	9

2.3.1	Employee Tracking and Monitoring System Using Android	9
2.3.2	A Smart, Location Based Time and Attendance Tracking System Using Android Application	10
2.3.3	Embedded Computer-Based Lecture Attendance Management System	11
2.3.4	Attendance Management System (AMS): Comparison of TWO Different Approaches	12
2.3.5	Design of an RFID based Student/Employee Attendance System	13
2.3.6	Integrated and Efficient Attendance Management System based on Radio Frequency Identification (RFID)	15
2.3.7	RFID and IOT for Attendance Monitoring System	15
<b>CHAPTER 3</b>	<b>METHODOLOGY</b>	<b>17</b>
3.1	Introduction	17
3.2	Project Development	17
3.3	Project Block Diagram	20
3.4	Project Flowchart	20
3.5	Project Diagram	22
3.6	Estimated Cost	23
3.7	Circuit Development	24
3.7.1	Prototype on Breadboard	24
3.8	Coding Development	24

3.8.1	Coding in Arduino IDE	24
3.8.2	Connecting to MySQL from command prompt	25
3.8.2.1	Creating Users and Databases	26
3.8.2.2	Table of Contents	26
3.8.2.3	Arduino and Java	27
3.8.2.4	Eclipse Software	28
3.8.2.5	Internet Address	29
<b>CHAPTER 4</b>	<b>RESULT AND DISCUSSION</b>	<b>30</b>
4.1	Introduction	30
4.2	Discussion of Project	35
<b>CHAPTER 5</b>	<b>CONCLUSION &amp; RECOMMENDATION</b>	<b>37</b>
5.1	Conclusion	37
5.2	Recommendation	37
5.3	Limitation	38
<b>REFERENCES</b>	<b>39</b>	
<b>APPENDIX</b>	<b>42</b>	

## LIST OF TABLES

<b>TABLE</b>	<b>TITLE</b>	<b>PAGE</b>
Table 3.1	Estimating cost of project	23
Table 4.1	Result of Project	30

## LIST OF FIGURES

<b>FIGURE</b>	<b>TITLE</b>	<b>PAGE</b>
Figure 2.1	Image of Arduino Uno	7
Figure 2.2	Image of RFID Reader	8
Figure 2.3	Image of RFID Tags	9
Figure 2.4	The flow of the system	10
Figure 2.5	Interface for log attendance	12
Figure 2.6	Connection of components	14
Figure 2.7	Participation list each subject and class for instructor	16
Figure 3.1	Project Development FYP1	18
Figure 3.2	Project Development FYP2	19
Figure 3.3	Project Block Diagram	20
Figure 3.4	Project Flowchart	22
Figure 3.5	Project Diagram	23
Figure 3.6	Prototyping on Breadboard	24
Figure 3.7	Arduino IDE	25
Figure 3.8	Creating user and database	26
Figure 3.9	Staff table	26

Figure 3.10 Department table	27
Figure 3.11 Attendance table	27
Figure 3.12 RXTXcomm.jar	27
Figure 3.13 Eclipse Software	28
Figure 3.14 GUI Application	28
Figure 4.1 Staff Attendance System Menu	30
Figure 4.2 Staff Registration frame	31
Figure 4.3 List of Departments	31
Figure 4.4 Registration of new staff	31
Figure 4.5 Staff Table in database	32
Figure 4.6 Staff Attendance	32
Figure 4.7 Instruction to swipe card	32
Figure 4.8 Attendance list in database	33
Figure 4.9 Email received	33
Figure 4.10 Attendance Status	34
Figure 4.11 Attendance status in each department	34
Figure 4.12 Attendance status will reduce once staff sign out	34

## LIST OF APPENDICES

APPENDIX	TITLE	PAGE
	Appendix 1 Main Frame	42
	Appendix 2 Staff Registration Dialog	423
	Appendix 3 Staff Attendance Dialog	48
	Appendix 4 Attendance Status Dialog	51
	Appendix 5 Email Sender	52
	Appendix 6 Notifier	53



# CHAPTER 1

## INTRODUCTION

### 1.1 Introduction

This chapter aim on creating the system of this project and it include detailed of Plant Headcount & Tracking System. It consists of all the requirements that want to be attaining on the end of the associated project. The task background will be described briefly. Consequently, the structure of the whole project may be exactly visualized.

### 1.2 Background Study

In this day and age, security is vital perspective for the working experts. It is the organization's most extreme duty to mind of its representative's security (Pethakar et al., 2012). Sima and Ahmad (2013), the RFID is an innovation that apply radio waves to exchange information from an electronic tag, called RFID label connected to a question, through a reader to identify and following the protest. The RFID is as of now used to track and follow the unfortunate casualties in a calamity circumstance. Information can be gathered continuously and be promptly accessible to crisis staff and spares time by the RFID. Emergency administration groups, healing facilities and crisis faculty, approach information through a PC database.

RFID innovation has been broadly executed everywhere throughout the world and its effect on our day by day life is exceptionally assorted and monstrous (Li et al., 2006). Those differing territories of RFID application incorporate logistic tracking, observing and support of items, item security and data, and instalment process. Today

numerous administrations around the globe in both created and creating nations are trying to apply it for different regions from following fabricated products, cash, and patients to securing safety of installment systems.

RFID based solution that helps the company track the exact amount of work performed by each staff member, and then compensate that individual accordingly. Besides, another approach of RFID is to monitor employee, to track time and attendance. This has been finished with punch cards for quite a long time, and a few organizations have changed to RFID on the grounds that it is mechanized and doesn't expect specialists to hold up in line.

### **1.3 Problem Statement**

Currently there are still the method that companies use to control the flow of people coming in and out is very lacking. Individuals (workers or visitors) can go in and out of the organization's premises with insignificant supervision. Imperative records, for example, time of entry or exit are not appropriately overseen or recorded. The attendance system additionally has without a doubt the capability of wasting valuable time since the workers need to arrange and sit tight to count up transcribed time cards or punch clock cards physically.

Lately, a number of high-profile accidents in the industrial space have raised public and regulatory concerns, over the potential for ecological effect, as well as over the safety of employees. At the point when the inconceivable occurs, one key to providing employees with the best chance for survival is knowing where they are. The most important thing is to have an overview of all personnel as soon as possible, because if company are missing anyone, they need to start looking for the employee.

Identify who they are and where they're supposed to be, so the search process can be done in the right area. That is one motivation behind why Plant Headcount & Tracking System intended to enhance employee safety have been getting a more serious look recently by numerous multinational industrial companies.

Besides, depending on state and local laws, the issue emerges when worker decline to take their breaks following 12 hours working. Overtime can be helpful for the two representatives and organizations. It gives the organization the adaptability to cover unexpected absence and changes demand without contracting more staff and it gives workers additional salary at an exceptional rate. However, extra time or overtime has its drawbacks as well. While numerous representatives will cheerfully take as much extra time as is accessible, there is developing logical proof that depending excessively on overtime can prompt various issues for an activity.

Furthermore, considered at the core of operational and expository business system, database management system favourable circumstances assumes a very important role in not simply the working of an association but rather in its security too. The database management system points of interest in the prior period expected information to be organized with the goal that it could help in the way that it was gotten to and put away. This means information which was put away in database records were connected to important information through pointers specifically various levelled and system databases. Without precise employee records, it turns into a bad dream for supervisors to screen profitability and execution levels of a representative. What's more, absence of such urgent data can present issues with regards to business development and improvement of individual worker. In this way, everybody in an association profits from up-to-date and accurate employee records.

## **1.4 Objectives**

The objectives of this research are:

- To design a Plant Headcount & Tracking System using Arduino Uno as the micro-controller.
- To build a system that uses RFID technology to maintain the attendance at real-time that can be monitored on database server.
- To set daily worker hours limit for quality work.

## **1.5 Scope of Project**

The built system will manage the process of attendance that will be save in specific database. Once the staff punch in their RFID card, it will directly save the details of the staff in the database, it contains the time when staff punch in and punch out. These system also will display the working hour of each staff every time he or she touch the RFID card to the RFID reader.

This system also gives the admin a convenience if there is a danger in the workplace. Example, fire at work. This system can ensure that the number of workers in the plant is quite the same as the number of staffs who check in. In addition, this system can track workers if the hazard occurs by knowing which department they are located.

## CHAPTER 2

### LITERATURE REVIEW

#### 2.1 Introduction

In this chapter, a guide and relevant topic about Plant Headcount & Tracking System will be discussed and reviewed. The guide to write this thesis are mainly from references book, research journal and online conference article.

According to (Pandey et al, 2018) declared that in this present period of digitization, the focus of making digital or simply system is important. The point of their undertaking work is to decrease human activities in checking the participation of the employees or students by utilizing an easy to understand what's more, mechanized method for participation section that can be recorded utilizing an electronic enroll. This will spare time and furthermore help to distinguish employees or students with participation setbacks. Additionally detail of any employee or student can be gotten inside a couple of snaps whenever. This paper designs a framework which indicates a use of RFID and database record sections. RFID is one of the piece of Automatic ID Technology and it is quick and solid for indentifying any question. Their framework takes out tedious technique for manual participation and in addition keeps up record of information passages which can be utilized for future authoritative reason.

Rahman et al (2016), the paper perceives that there are as of now an assortment of genuine and pondered employments of RFID in the working environment. RFID innovation can be utilized to track devices, gear or stock, to screen access to offices or secure regions, or to screen examples of movement (Ashish et al, 2013). RFID

frameworks can likewise be intended to improve security and well being. While a few employments of RFID may offer advantages to workers, RFID in the working environment additionally raises imperative protection worries for representatives. For instance, it is regularly individuals who are utilizing the apparatuses and gear and moving the stock, so by augmentation, their developments also, efficiency might be under more noteworthy examination.

## **2.2 Hardware Used**

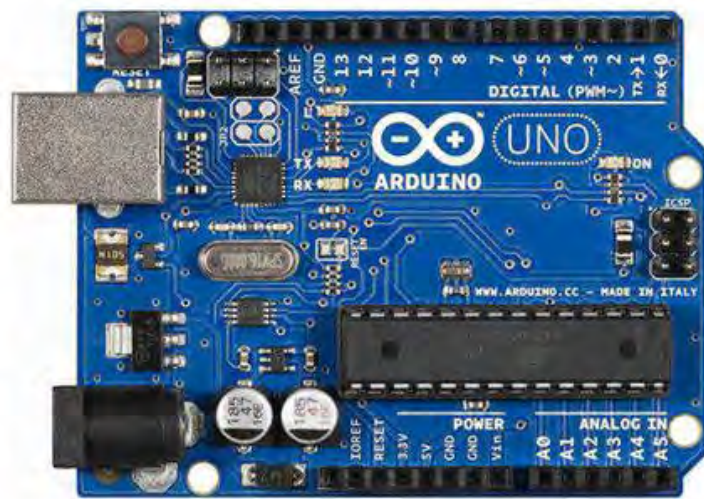
This part will consist of the look at of all hardware as a way to use in Plant Headcount & Tracking System which includes Arduino Uno, RFID Reader and RFID Tags.

### **2.2.1 Arduino Uno**

From the past works, Bawa and Patil (2013), it was seen that Arduino has been utilized for different tasks going from the easy to the complex logical instruments. This open source stage has been profited by the commitments of overall users like understudies, software engineers, experts, researchers, and so on, which helped it to be more significant with information and hence encourage the users.

Arduino programming is an open source programming or IDE (Integrated Development Environment) which is effortlessly accessible and exceptionally adjustable according to the prerequisite. The adaptability idea of Arduino offers a considerable measure of decisions for sources of info both of the shape simple and additionally computerized, and furthermore it's comparing yields.

The aggregate number of pins utilized in it is fourteen, which fill in as info or yield, out of which six can be utilized as simple yields, six as simple data sources, one 16 MHz quartz crystal, one USB (Universal Serial Bus - (1 on board in figure 1)) connector port, a power connector port, an ICSP (In-Circuit Serial Programming) header and a button to reset the functionalities. It has every one of the parts to help the microcontroller, to get the association with the PC with a USB link or by giving force by an AC to DC connector or with the assistance of a battery.



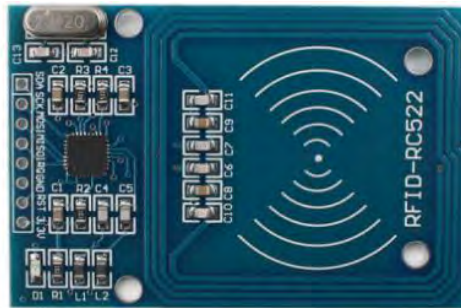
**Figure 2.1 Image of Arduino Uno**

### **2.2.2 RFID Reader**

According to Dawes (2004), RFID is a robotized distinguishing proof and information accumulation innovation, that guarantees more exact and opportune information passage. RFID isn't really another innovation; it just immediately increased more consideration as of late in light of the fact that of its present minimal effort and advances in other processing fields that open up more application area. RFID consolidates radio recurrence and microchip advancements to make a brilliant system that can be utilized to distinguish, screen, secure and do object inventory. At their least

difficult, RFID system utilize modest chips called —tags that contain and transmit some bit of recognizing data to an RFID reader, a gadget that thus can interface with PCs.

The capacity of RFID frameworks to convey exact and precise information about labeled things will enhance proficiency and bring other advantages to business network and shoppers alike in the not inaccessible future (Bardaki et al, 2012)



**Figure 2.2 Image of RFID Reader**

### **2.2.3 RFID Tags**

RFID tagging is an ID system that utilizes little radio frequency identification proof gadgets for ID and following purposes. A RFID tagging system incorporates the label itself, a read/compose gadget, and a host system application for information gathering, handling, and transmission. According to Pardal (2010), a tag is made by: Integrated circuit (IC); Antenna; Connection between the IC what's more, the reception apparatus; Substrate on which the radio wire dwells. A tag can be ensured to persevere through unpleasant conditions that other recognizable proof advances, like standardized tags (Hunt et al, 2007)