KEMENTERIAN PENGAJIAN TINGGI
JABATAN PENDIDIKAN POLITEKNIK DAN KOLEJ KOMUNITI

POLITEKNIK
MALAYSIA
SULTAN SALAHUDDIN ABDUL AZIZ SHAH

LAPORAN PROJEK AKHIR

C&D INDICATOR SYSTEM

OLEH

MOHAMAD FATEHI BIN NORDIN　　　　　08DPB19F2011

PROGRAM DIPLOMA KEJURUTERAAN PERKHIDMATAN BANGUNAN
JABATAN KEJURUTERAAN AWAM
POLITEKNIK PREMIER SULTAN SALAHUDDIN ABDUL AZIZ SHAH
SHAH ALAM, SELANGOR

SESI I 2021/2022

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"Kami akui karya ini adalah hasil kerja kami sendiri kecuali nukilan dan ringkasan yang tiap-tiap satunya telah kami jelaskan sumbernya"

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"Saya akui bahawa saya telah membaca laporan ini dan pada pandangan saya laporan ini adalah memadai dari segi skop dan kualiti untuk penganugerahan Diploma Kejuruteraan Perkhidmatan Bangunan"

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In our best regards, we thank you.

ABSTRAK

Indicator adalah sesuatu yang dapat digunakan sebagai petunjuk atau standar dasar sebagai acuan dalam mengukur adanya perubahan pada suatu kegiatan atau kejadian. **COUNTER AND DURATION INDICATOR SYSTEM** adalah projek yang diinovasikan khusus hasil daripada penambahbaikan idea projek senior yang lepas untuk kegunaan di surau ekoran untuk mengelakkan daripada jangkitan wabak Covid-19. Idea untuk menginovasikan **COUNTER & DURATION INDICATOR SYSTEM** ini juga tercetus daripada hasil kajian lapangan dan penelitian kendiri yang mempunyai masalah kesesakan dan penungguan yang lama untuk menunggu giliran bagi seseorang atau sekumpulan yang mahu menggunakan bilik perbincangan di dalam sesebuah perpustakaan. Objektif utama penciptaan ini ialah untuk menghasilkan satu indikator yang boleh meminimumkan masa untuk digunakan oleh pengguna yang menggunakan bilik perbincangan. Selain itu produk ini juga dapat mengelakkan kawasan hadapan bilik perbincangan menjadi terlalu sesak serta pengguna tidak perlu terlalu lama untuk menunggu giliran. Ciri keistimewaan produk ini adalah untuk mudah dikendalikan dengan adanya ciri peringatan yang berbunyi apabila masa sudah habis. Metodologi kajian ini dijalankan melalui kerjasama sekumpulan dan kaji selidik yang dijalankan di lokasi perpustakaan yang dikaji. Hasil temu bual dan ujikaji di PERPUSTAKAAN DAERAH GOMBAK (PPAS) telah menjayakan projek ini. Berdasarkan kajian ini diharap dapat menambahbaik untuk memastikan penghasilan projek lebih kretif dan inovatif untuk penggunaan di masa hadapan. Beberapa cadangan untuk penambahbaikan daripada maklumbalas untuk kemasan dan saiz telah diambilkira. Kesimpulannya, produk inovasi **COUNTER & DURATION INDICATOR SYSTEM** ini diharap dapat membantu orang awam sebagai alat untuk amaran masa dan diharap projek ini dapat diteruskan untuk tujuan komersial pada masa akan datang.

KATA KUNCI: **alat amaran masa, kesesakan, bilik perbincangan**

ABSTRACT

An indicator is something that can be used as a guide or basic standard as a reference in measuring the changes in an activity or event. COUNTER AND DURATION INDICATOR SYSTEM is a specially innovated project as a result of the improvement of the idea of a previous senior project for use in the surau in order to prevent Covid-19 outbreak infection. The idea to innovate the COUNTER & DURATION INDICATOR SYSTEM also arose from the results of field studies and self -research that have problems with congestion and long waits to wait for a turn for a person or a group who wants to use a discussion room in a library. The main objective of this creation is to produce an indicator that can minimize the time for use by users using the discussion room. In addition, this product can also prevent the front area of the discussion room to be too crowded and users do not have to wait too long to wait their turn. The special feature of this product is that it is easy to operate with a reminder feature that sounds when the time is up. The methodology of this study was conducted through group collaboration and a survey conducted at the location of the library studied. The results of interviews and experiments at PERPUSTAKAAN DAERAH GOMBAK (PPAS) have made this project a success. Based on this study, it is hoped to improve to ensure the production of more creative and innovative projects for future use. Several suggestions for improvement from feedback for finish and size were considered. In conclusion, this innovative product COUNTER & DURATION INDICATOR SYSTEM is expected to help the public as a tool for time warning and hopefully this project can be continued for commercial purposes in the future.

KEYWORDS: **time warning tools, congestion, discussion rooms**

SENARAI KANDUNGAN LAPORAN AKHIR PROJEK DIPLOMA PERKHIDMATAN BANGUNAN

CHAPTER 1

INTRODUCTION

1.1   INTRODUCTION

In the modern day, we have been hit by the covid19 epidemic, which has harmed the economies of every country and threatened millions of individuals around the world. We've all developed a new standard by wearing face masks, using hand sanitizer, and keeping 1 metre apart. Shops and shopping malls have also imposed a limit on the number of visitors allowed to avoid the spread of Covid 19. However, each store or premise simply limits the number of individuals who can enter and does not limit how long a person can stay in the shop or premises, forcing others to wait outside for an extended period of time. So in our project, we have created a tool that can limit visitors to enter a premise and also can limit the time a person to be in the premise which is C&D detector system (counter & indicator duration detector system). This is an illustration of how the C&D system works. Each store will have a limit on the number of people who can enter; for example, if the store only allows 10 people in, this C&D will be at the front door with just 10 individuals. If a visitor wants to enter, the store staff will give them this C&D. Because the C&D is set for 30 minutes, the visitor can only stay for that amount of time. If the visitor has stayed longer than the 30 minutes set on the C&D, the C&D will sound to indicate that the visitor has stayed too long and that the employee of the premises must inform the visitor that the 30 minutes have expired. If the visitor has items that the employee wants to buy, the employee must take the visitor directly to the payment counter; if the visitor is not buying anything, the employee must bring the visitor to leave the premises immediately.

1.2   RESEARCH BACKGROUND

While inside the premises, people would spend a very random and inconsistent length of time. We conducted some study at local shopping malls and establishments to determine how long it takes for an individual to be in a store.

1.3   PROBLEM STATEMENT

the problem faced is the difficulty in terms of monitoring the use of space in a building.

1. The manager needs to manually check each room / space booked.

2. The customer is not sensitive to the time allotted.
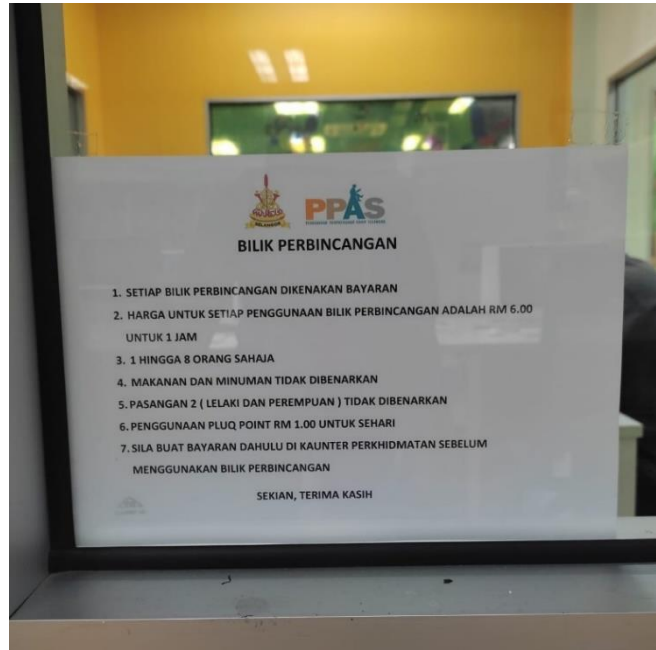
1.4   OBJECTIVE PROJECT

The goal of this research was to create an effective product to further reduce the transmission of Covid-19 infection. This product can be used in some premises that have congested conditions because many customers who enter the room take a long time and exceed the set time limit. So hopefully this product can solve the problem to achieve zero congestion conditions outside the premises. In this regard, we can present several objectives that have been identified that will lead to the achievement of this goal, among them is to minimize the time spent by customers to spend on the room in order to prevent the area in front of the room from becoming crowded. In addition, it can save customers time so that they do not have to wait long for their turn to enter the room.

1. Monitor user time limit
2. Avoid excessive time spent by users
3. Avoid congestion in front of a special room in the crowded library

1.5   RESEARCH QUESTIONS

1. How to design a C&D Indicator System?
2. How to use this product?
3. How long does it take a person to enter a premises?
4. Whether this product will be used in all situations?
5. Can this product solve the existing problem?
6. What system is used to make this product?

1.6   SCOPE

The problem of COVID-19 transmission is everywhere, especially in small area . This research focuses on enclosed room space. This product is carried out using the Arduino system which is the counter and duration method. The overall design of the structure uses Sketch-up and Thinker Cad. This product will run for 12 hours

1.7   IMPORTANCE OF RESEARCH

Research is important for project evaluation because it is to determine the strengths and weaknesses associated with product innovation. Without knowing them, we cannot release objectives and other important information related to our project. From our research, we can identify that social distance is very important nowadays and we can also see a handful of people who do not care about social distance. Things like this often happen in crowded places. We also went to observe in a place that is often crowded and crowded that is in the mall and we can also see this situation happening in front of the shops because people are waiting their turn to enter the store. So, for our project, we have decided to create a product that can limit the time a person has to be on the premises and can reduce congestion at the front of the store and the social distance between others is getting better.

1.8 DEFINITION OF TERMS / OPERATIONS

The Arduino UNO device & software will act as the "brain" of the system. It will be connected to the indicator. The Arduino UNO is used to set up the whole system, from time limiter to person limiter. From there, we can also manage and analyse the system in real-time monitoring. Every setting and information can also be set and change. If the store only allows 10 people and 30 minutes for each visitor, the number will be set in the software. Then, the indicator will indicate the time & number of persons that is tracked from the token used. The token acts as the "key" for visitor to enter the premise. It would sound if the customer stayed too long, over 30 minutes that has been set using Arduino UNO.

1.9 EXPECTED PROJECT FINDINGS/RESULTS

The project is expected to have a positive impact on the environmental health of a premise as well as public health. C&D Detector System is expected to be able to reduce close contact between a customer who is dealing in a premises. In addition, it can avoid excessive use of time by a customer. This can provide more opportunities for other visitors to enter the premises without waiting for a long period of time.

1.10 CHAPTER SUMMARY

In this chapter, the C&D Detector System is a very convenient and productivity device because it could limit the number of visitors & limit the time a person to be In a premise without need to make a contact with the other peoples. Furthermore, we use indicator and tokens to indicate the person & time limit for business premises. We also install the Arduino UNO software which is will be connect the indicator through it so we can manage and set up the person & time limit from time to time. This will make our C&D Detector System the productive system ever that can easily manage the visitors at the premises.

CHAPTER 2

LITERATURE REVIEW

2.1   INTRODUCTION

The usage of web based application is not an unusual thing in nowadays modern world which continues to develop everyday throughout the years. The usage of web applications are more preferred as they offer the users with great experiences and are considered as safer during the pandemic outbreak. The COVID-19 pandemic issue that have affected not only Malaysia but also countries across the globe causes changes to happen in our surrounding and daily practices.

Business premises are one of the organizations that has attempted to upsurge from the pandemic by implementing different alternatives to ensure the society are able to operate again while complying to the safety measure guidelines provided by the government. The implementation of C&D system is one of the latest alternative involving Arduino system which is used mainly in business premises to minimize the time consumed by customers to make purchases in shop premises. This will help to ensure that the waiting area in front of the premises to be less crowded due to people waiting in line to shop for their things. This vital steps are needed to prevent the shopping malls all across the country from getting too crowded. This is according to the social distancing requirement provided by the government to decrease the possibility of infection and also to decrease the number of cases.

Therefore, this paper will elaborate further on the implementation of C&D system which helps the business premises in Malaysia to operate and serve their customers effectively and at the same time comply to the government requirements during pandemic.

2.1.1 CURRENT SITUATION

Limiting the capacity store levels are one of the main issue that should be taken into account during this pandemic. This is to ensure that the infectious rate remained low during this pandemic thus all stores are able to operate as usual. According to Tray-Sys (2020), one of the many effective ways to monitor and to limit the store capacity levels are by establishing an occupancy counter which is also known as people counter. The establishment of occupancy counter is considered easier and effective as it do not require any physical manual counting from the workers themselves as the system implement a technology function which enable it to track customers going in and out of the store (Tray-Sys, 2020).

This type of technology usually involves infrared, thermal or video-based system. Infrared system involves the usage of sensor which respond as the customers passed through which then also add to the occupancy count of the store (Tray-Sys, 2020). Another technology involved is by implementing the thermal people counter which functions by detecting the multidimensional movement of people passing through the store entrance. On the other hand, video occupancy counter functions by detecting the people passing through at once then provide needed data to the store owners. Occupancy counter is important and should be implemented in all premises as it provide accurate monitoring on the current number of people visiting the stores at one time. Furthermore, it helps greatly in contributing to the government's continuous effort in surviving the pandemic issue through.

Wireless Call system is another great initiative that might help to limit the number of customers visiting the shopping premises at one time. Wireless Call system is a simple system that is used to control and ease the calling system service in most of the restaurant nowadays but is also useful in helping to control the number of people vising their favourite stores nowadays. Wireless Call system mainly consists of infrared transmitters, the client and the services of which design includes the infrared signal receiver and data transmission module design (Zhu, Zhou, Tan & Peng, 2010). Zhu, Zhou, Tan & Peng, the IR infrared remote control transmitter serves 8 buttons which all are according to the eight kinds of common service restaurant. However, even though the system is mostly applied in restaurant premises only, it is also applicable for other types of premises depending on ways the system is applied and implemented.

The design of the service software also includes design bureau which starts by waiting for the data to be received as when the DR pin reached 1, the microcontroller will take place and then information will be received. Next, the microcontroller will received the data and then display related information on the LCD. However, it was also noted by Zhu, Zhou, Tan & Peng (2010) that the best communication between the clients should be within 60 metres range only as the signal is the strongest within this range. Provided below is the pictures of the related technology implemented for the current study. There are two buzzels that we can exemplify that are already used by the premises at the present time that is restaurant Taco Bell.

2.2 CONCEPT OF C & D DETECTOR SYSTEM

2.2.1 C&D INDICATOR SYSTEM

C&D detector system is a system which focuses on the business premises particularly targeting on helping to ease the customers on shopping processes while at the same time helps to minimize the risk of infections which is harmful. In C&D detector system, Arduino system is implemented to ensure the main objectives of the project are able to be achieved. Arduino system is described as an open-source podium which used primarily to build electronic projects (Karmakar, Suthar, Vadwala & Pandy, 2018). Arduino system involves both physical programmable circuit board that is also known as microcontroller as well as a portion of software or Integrated Development Environment (IDE) which works together on running the system (Karmakar, Suthar, Vadwala & Pandy, 2018). The system runs by code writing which was uploaded and into the system then the physical board.

Arduino system is different from the previous programmable circuit boards as it do not need a separate piece of hardware which is also known as programmer that is used to load new code onto the board (Karmakar, Suthar, Vadwala & Pandy, 2018).

2.2.2 DETECTOR SYSTEM

Nowadays technology is most often considered as a significant tool in overcome challenges in life particularly in making human daily life way easier. This is due to the fact that automatic tools are greatly needed in most of the work in today's world without bothering the users in executing other tasks. The detector system used at the present time falls under a term called as artificial intelligence (AI) which used broadly in different fields and aspects of life.

According to Lakhiar, Gao, Syed, Chandio, Buttar & Qureshi (2018), the term AI is a broad discipline which is firstly introduced in 1956 as the "science and engineering of making

intelligent machines". This system has been implemented in various field such as information theory, computer science, linguistics, cybernetics as well as neurophysiology and psychology (Lu, Chen & Zheng, 2012). It is also highlighted by Lee (2000) that AI tools contributes in predicting the behaviour of nonlinear system while also controlling the variables to help increase the condition of operation in the environment of the system as well. In the present study, the detector system is focusing primarily on its usage during the pandemic period in helping to ease the people to do shopping easily without having to wait long and at the same time, decrease the risk of COVID-19 spreading among the people.

2.2.3 C&D DETECTOR SYSTEM

The C&D detector system included in the system is focusing mainly on the Arduino system as the primary core to help the system serve its own function properly. Arduino system is described as an open source of microcontroller with characteristics such as able to be programmed easily, erased and also reprogrammed in a short amount of time (Louis, 2016). Arduino platform is firstly established in 2005 with the main aims to provide an inexpensive and easy ways for particular people such as students and professionals to build devices that are able to interact with their own surrounding with the help of sensors and actuators (Louis, 2016).

This system is able to receive and inputs and control the outputs in different types of electronic devices. Simultaneously, the system has the ability to receive and send out information all over the internet while supported by broader types of Arduino shields.

2.4   SECURITY IN BUILDING

Security is a vital element in every building particularly in a shopping mall where most of the customers spend hours of their time finding things they need or sometimes simply walking around for leisure purposes. In other words, safety and security are two important elements that need to be focused in every shopping centres as both of them are related closely to both tenants and consumers (Pitt & Musa, 2009). This is mainly due to the fact that as shopping malls continues to develop better in most of the cities all around the world, these places automatically became one of the gathering places for the public regardless of their age and ethnicity. Therefore, there is a clear need for these places to be easily accessible and secure from any hazard which can harm the consumers.

According to Overstreet and Clodfelter, 1995 (as mentioned in Pitt & Musa, 2009), shopping centres also has become one of the prominent hub for the teenage to do their social activities which directly leads to higher risk of security problems as well as violent crimes such as gun battle between gangs such as those occurred in a shopping mall in Los Angeles. Shoplifting is another frequent problem happened in shopping malls followed by trespassing as the second highest issue (Pitt & Musa, 2009). Every shopping malls have their own ways and systems to overcome these issues in order to prevent it from going up to a more alarming rate. One of the prevention steps taken is by installing a closed-circuit television technology (CCTV) systems that works by identifying and recording any incidents.

COVID-19 issue is one of the main problem nowadays it affected not only the people in Malaysia but human beings generally all over the world. Therefore, it also became one of the most concerned issue as the public spend most of their time in shopping malls which leads to the increasing risk of getting infected by the COVID-19 viruses. COVID-19 viruses can spread easily from an individual to another individual in a short amount of time predominantly if they gather together in one space in a short period of time. Consequently, an efficient management system needs to be established to prevent or to cut shorter the amount of time spend by the public in the shopping centres to ensure lower risk of COVID-19 infection among the consumers. Hence, the researcher come up with C & D system as one of the effective system used to prevent further spreading of COVID-19 viruses while allowing the shopping premises to continue its services.

2.5   PAST RESEARCH

Limited information are found by the researcher regarding C&D System after reviewing the study conducted by previous researcher with almost none of it are presenting elaboration focusing about the system used specifically in shopping malls. Furthermore, the present C&D system are focusing in pandemic environment which makes it even more challenging for the researcher to find information as only little research have been conducted.

2.5.1 PAST RESEARCH ON THE USE OF ARDUINO SYSTEM

Figure : Arduino UNO

Arduino Uno is a microcontroller board based on the ATmega328P (datasheet). It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator (CSTCE16M0V53-R0), a USB connection, a power jack, an ICSP header and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with AC-to-DC adapter or battery to get started. You can tinker with your Uno withoutworrying too much about doing something wrong, worst case scenario you can replace the chip for a few dollars and start over again. "Uno" means one in Italian and was chosen to mark the release of Arduino Software (IDE) 1.0. The Uno board and version 1.0 of Arduino Software (IDE) were the reference versions of Arduino, now evolved to newer releases. The Uno board is the first in a series of USB Arduino boards, and the reference model for the Arduino platform; for an extensive list of current, past or outdated boards see the Arduino index of boards. A previous study focusing on the use of Arduino system in particularly in shopping aspect was conducted by Nithiavathy, Shree, Kumar and Raghul in 2021. This study is not completely identical with the current study but the core objective of the study is the same which is to help decreasing the time spend by the customers in the shopping mall premises.

In the research, they proposed a system using Arduino which was programmed in a shopping trolley based on the concept of the establishment of an automated billing system while shopping. This system should be implemented with RFID support within other IOT technology which also require all items included in malls should be equipped with a special RFID tag. Every products included in the trolley will be automatically calculated as the customer roams around in the shopping malls finding things they need. The total of the products picked by the customers are automatically summed up so lesser time are needed at the check-

out counter as their total have been calculated so they only need to pay their bills and leave the premises. Therefore, other customers do not need to queue and wait for a longer time to pay their products which also helps in preventing the premises to be further crowded.

Another previous study was conducted by Rupali & Kripa in 2015 (Nithiavathy, Shree, Kumar and Raghul, 2021) which is called as RFID Smart Shopping Cart Strategy is also referred to as the Product Automatic RFID Reading Name which helps to reduce the long distance reading issue. In this study, the RFID tag is also equipped with the capacity for READ & WRITE. The shopping time for customers in the premises can be shortened as the total sum of the products bought by the customers are calculated after the product is put in the cart. Thus, it is able to help in reducing the time duration spend by the customers in the premises while at the same time minimizes time at the checkout counter.

2.5.2 LCD 16x2 DISPLAY
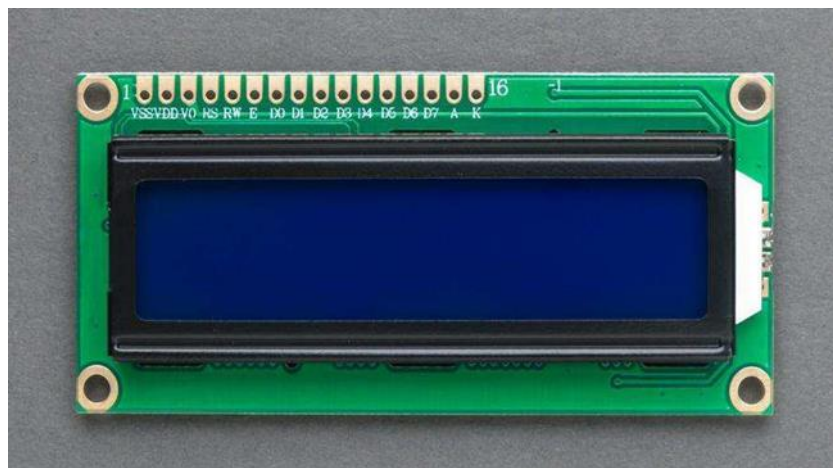
Figure : LCD 16x2 Display

An LCD (Liquid Crystal Display) screen is an electronic display module and has a wide range of applications. A 16x2 LCD display is very basic module and is very commonly used in various devices and circuits. A 16x2 LCD means it can display 16 characters per line and there are 2 such lines. In this LCD each character is displayed in 5x7 pixel matrix. The 16 x 2 intelligent alphanumeric dot matrix display is capable of displaying 224 different characters and symbols. This LCD has two registers,namely, Command and Data. Command register stores various commands given to the display. Data register stores data to be displayed. The process of controlling thedisplay involves putting the data that form the image of what you

want to display into the data registers, then putting instructions in the instruction register. In your Arduino project Liquid Crystal Library simplifies this for you so you don't need to know the low-level instructions. Contrast of the display can be adjusted by adjusting the potentiometer to be connected across VEE pin.

2.6   CONCLUSION

In conclusion, the C&D system proposed by the researcher are a system mainly focusing on the usage of the Arduino system as the core to help in ensuring the shopping routine is doable during this pandemic while decreasing the waiting time to shop in every premises. Shorter waiting time leads to lower risk of the COVID-19 spreading as the duration for each customers to be exposed with other people while shopping is lesser. Further elaboration on the system are presented and elaborated thoroughly in the next chapter

CHAPTER 3
METHODOLOGY

3.1 CHAPTER INTRODUCTION

The systematic, theoretical analysis of the procedures used in a field of research is known as methodology. It entails a theoretical examination of a corpus of method and concepts linked with a field of study. We have described the flow procedure of our counter and duration indicator project in this methodology. The flow process is briefly described to provide additional information about the process and processes involved in our project. To fulfil the stated goals, the project must be completed in a step-by-step manner.

Figure : Flow Chart
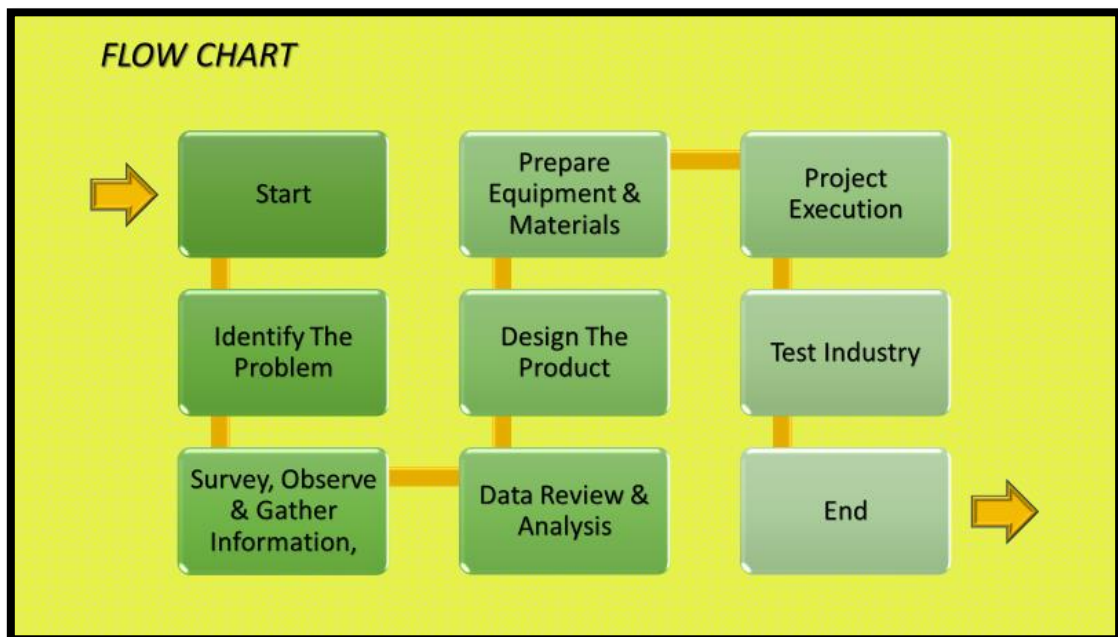
3.2 PROCESS FLOW CHART

The process of creating, planning, and analysing the project to identify the best strategy to complete it successfully will be discussed in this chapter. To meet the specified goals, the project must be completed step by step and in accordance with the process flow. Before beginning a project, it is necessary to organise the group and plan the project. The project should be implemented according to the methods that were previously planned. Not only that, but group members must execute their work as assigned by the group leader and assist one another in order to improve performance. They must also cooperate with one ano
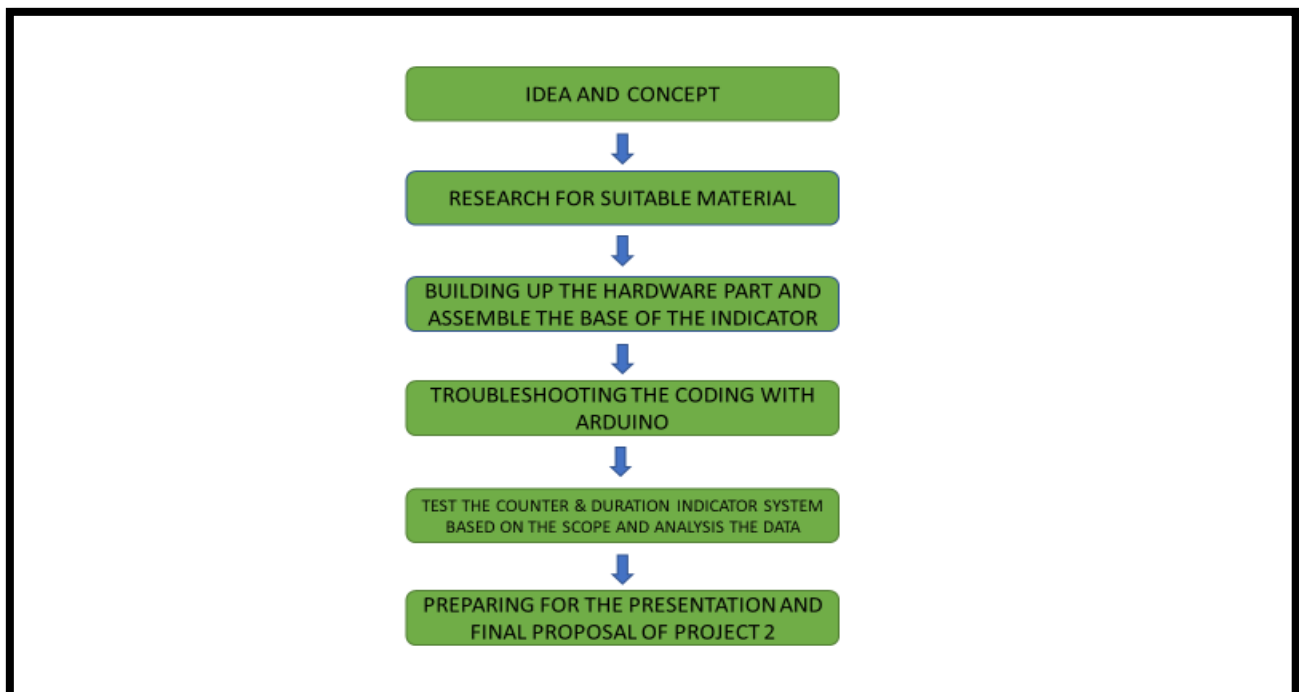
Figure : Flow chart

3.2.1 MATERIALS AND EQUIPMENT

MATERIALS :

FOR C&D DETECTOR SYSTEM

1. ARDUINO KIT
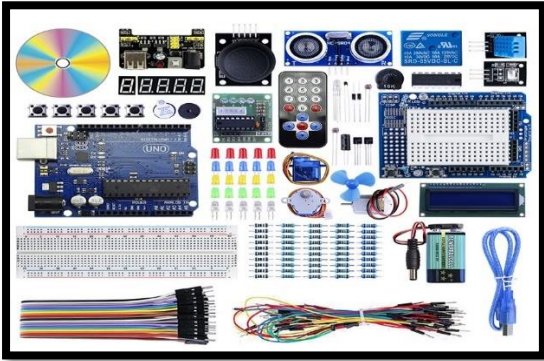
2. PLASTIC POLYCARBONATE
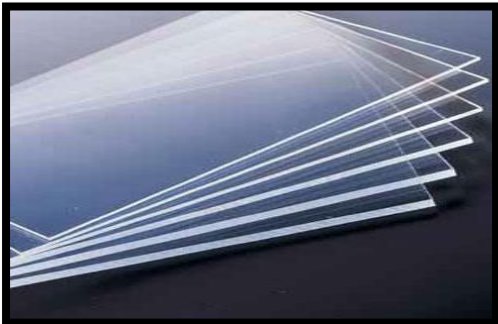
3. CENSORED

4. BUZZER
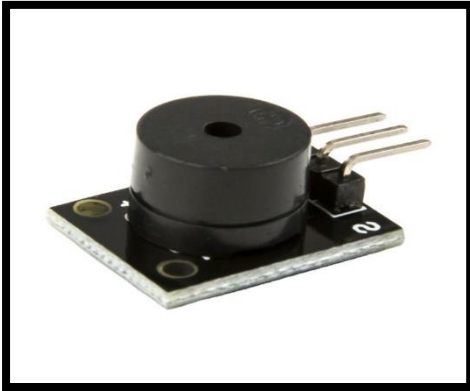
5. MINI LCD

6. MINI LED LIGHT

FOR COUNTER SYSTEM

1. PLASTIC POLYCARBONATE
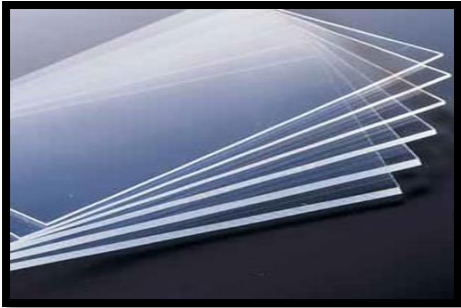
2. CENSORED

3. MINI LED LIGHT

EQUIPMENT

1. SKRU DRIVERS

2. CUTTER

3. TEST PEN

4. SOLDERING IRON

5. GLUE GUN

3.2.2 PROJECT COST ESTIMATES

BIL	BAHAN	KUANTITI	HARGA/SEUNIT (RM)	KOS (RM)
1	ARDUINO KIT	1	RM 70	RM 70
2	PLASTIC POLYCARBONATE SIZE 210MM X 300MM	2	RM 74	RM 148
3	CENSORED	2	RM 4	RM 8
4	BUZZER	1	RM 5	RM 5
5	MINI LCD	1	RM 13	RM 13
6	MINI LED LIGHT	4	RM 0.10	RM 0.40
JUMLAH				**RM 244.44**

3.2.3 RESEARCH DESIGN

After making some research, we make a few new design for our project. Then we choose the most suitable and the best new design for our final project. This step is necessary to make sure that our group can complete the project successfully with a good finishing and function very well.

Figure : Front View Indicator Design

3.2.4 BLOCK DIAGRAM OF C&D INDICATOR SYSTEM

```
                        ┌─────────────┐
                        │   Sensor    │
                        └─────────────┘
                       ╱               ╲
          ┌─────────────┐           ┌─────────────┐
          │     In      │           │     Out     │
          └─────────────┘           └─────────────┘
                  ╲                   ╱
                   ┌───────────────────┐
                   │   Transmitting    │
                   │   and Receiving   │
                   └───────────────────┘
                             │
                   ┌───────────────────┐
                   │     Duration      │
                   └───────────────────┘
                             │
                   ┌───────────────────┐
                   │     Process       │
                   └───────────────────┘
                             │
                   ┌───────────────────┐
                   │     Execution     │
                   └───────────────────┘
```
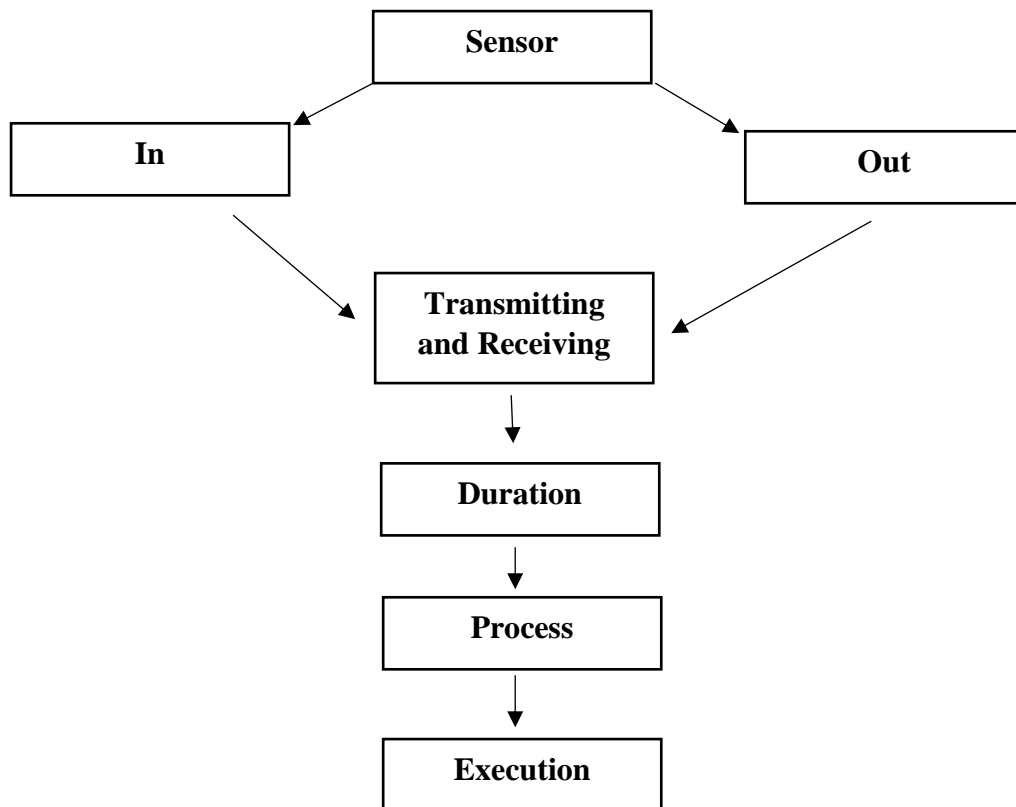
3.3 CHAPTER SUMMARY

In this chapter, a review and the processing of the Counter & Duration Indicator System has been explained clearly. It is all about how this project will work once the project is done. We also obtained the main design of our project with a better explanation of how it works.

CHAPTER 4

RESULTS

4.1   Introduction

This chapter will review the research data in order to determine consumer perceptions of the product's readiness for production. The general findings and analysis are presented in the form of tables, graphs, and statements to simplify and explain the significant findings. To show that all study questions have been addressed, this section is organised according to a hierarchy of study questions.

4.2   Descriptive data

4.12   Through interviews

We conducted an interview with Mr. Kamal, a special room user at the library, during which he tried the products that our group members had made. Mr. Kamal also agreed that our group's products might be employed at this library and elsewhere for special room users. He's also a friendly and light-hearted individual who shares ideas with us to help us improve the products we makeHe is also a person who is generous with his expertise and pleasant to be around. He explained the ARDUINO system, which we utilise. We took advantage of the opportunity to ask him questions regarding the system as he explained it to us. He is also a student majoring in information technology, so he told us about some other systems that we might use to further our knowledge and understanding of the system we use. The RFID system is one of them, and we utilise it to stop time by touching the sensor there.

QUESTION 1

We inquire about the applicability of our products from the general public, students, and lecturers. According to the cart below, the majority of respondents agree that the products we designed are appropriate for use in special library rooms.

Chart 1: Shows the results of question one

QUESTION 2

According to the cart below, all respondents agreed that our product may assist the library in managing user time according to the time established by each user.

Chart 2: Shows the results of question two

QUESTION 3

The majority of responders believe that the warning sound made by the items we created does not disturb other customers who utilise special areas in the library, as shown in the cart below.
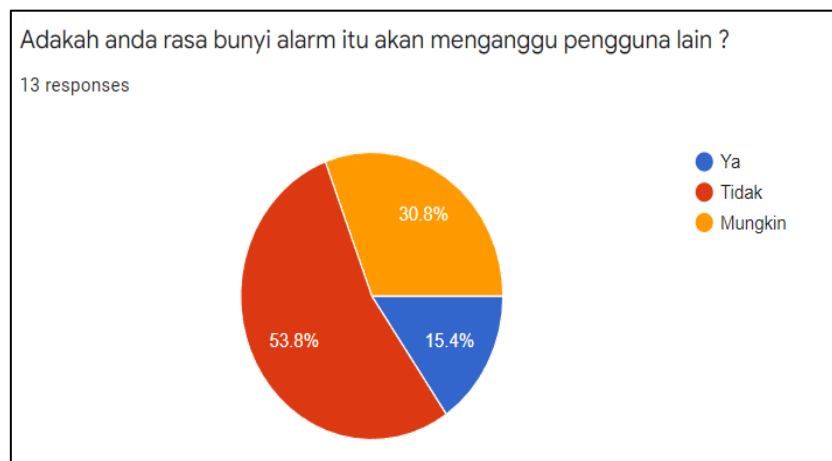
Chart 3: Shows the results of question three

QUESTION 4

According to the cart below, 92.3 % of respondents believed our solution can track users' time in a designated library room.

Chart 4: Shows the results of question four

QUESTION 5

According to the graph below, 92.3% of respondents stated our products were enjoyable to use, while 7.7% claimed they were difficult to use.

Chart 5: Shows the results of question five

QUESTION 6

The study displays the responses from respondents as to why our products are pleasant or tough for consumers, based on the statement below.

Menyusahkan - 1) pelajar yang hadir ke perpustakaan memerlukan masa yang lama untuk berada di dalam perpustakaan, jadi kalau pelajar perlu sering memperbaharui masa mereka di dalam perpustakaan, benda ni boleh menyusahkan mereka.
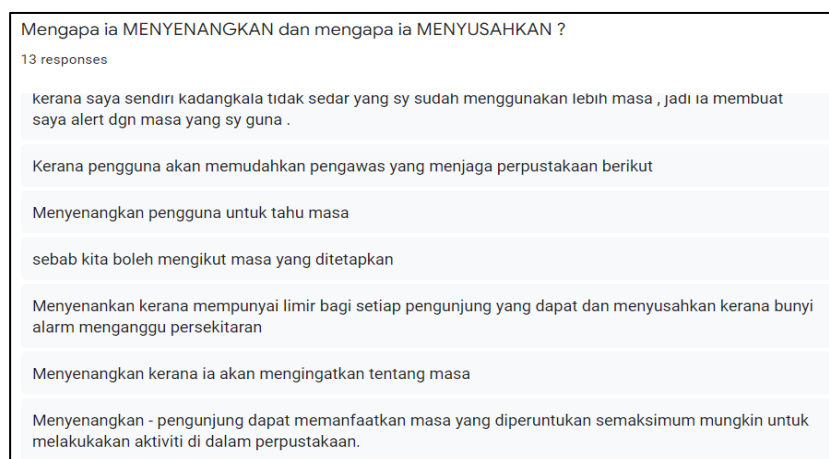
Menyenangkan kerana tanpa pengawasan dari pihak perpustakaan

mempermudahkan untuk membantu pihak perpustakaan untuk monitor berapa lama di perpustakaan

Menyenangkan

memudahkan seseorang pekerja tidak perlu menegur mereka yang sudah habis waktu

Mantap

Tidak tahu

Explanation 1: Shows the results of question six

QUESTION 7

The study illustrates the reasons why all respondents are satisfied with our product based on the statement below.

Adakah anda berpuas hati dengan produk kami ? (mengapa YA dan mengapa Tidak)
13 responses

Ya

ya kerana produk ini membantu sy utuk alert dgn masa yg sy gunakan

Ya..kerana ianya salah satu produk yang memudahkan kerja pengguna

Ya. kerana orang ramai tidak perlu menunggu lama

Ya kerana dapat mengehadkan kemasukan pengunjung ,

Secara kesuluruhan, ya. Berpuas hati kerana sistem ini jarang digunakan.

ya

ya kerana dapat membantu mereka untuk tidak membuang masa

Ya sebab saya suka

Explanation 2: Shows the results of question seven

QUESTION 8

The study reveals all of the proposals and ideas from respondents that our products can be used elsewhere, as stated in the statement below.

Adakah anda rasa produk kami boleh digunakan ditempat lain ? (YA atau TIDAK , dimana ?)
13 responses

Ya

ya , di dobi . Jadi jika sy mendobi saya tidak perlu tunggu di tempat itu , hanya membawa indicator tersebut shj

Ya,di Hospital untuk kegunaan pelawat

Ya. Dobi basuh baju

Ya , mall yang terlampau crowded macam klcc times square pavillion

Ya. Di kedai makan (cafe), di pasaraya, di pesta buku,

ya

Ya, Seperti di Sekolah.. Seperti menanda kehadiran Murid.. Dengan itu Cikgu boleh tahu nama Murid yang Hadir ke Sekolah

Explanation 3: Shows the results of question eight

QUESTION 9

According to the graph below, 46.2% of survey respondents intend to improve our products. In addition, 53.8% of respondents believed our products did not need to be improved.

Adakah produk kami perlu ditambah baik ?
13 responses

● Ya
● Tidak

46.2%

53.8%

Chart 6: Shows the results of question nine

QUESTION 10

The survey reveals some ideas from all respondents to improve our goods, as stated in the statement below.

Darisegi kemasan produk
Perlu membesarkan objek tersebut kerasa terlalu kecil
tidak ada
Tukar bunyi alarm kepada yang lebih soft sebab kalau letak kat library dia tak menganggu pengguna yang sedang menelaah buku
Design
1) sistem peringatan yang dikeluarkan. Selain dari bunyi, mungkin peringatan seperti paparan di skrin atau getaran (vibration) tanpa bunyi untuk memberi peringatan kepada pengguna.

2) lokasi produk diguna pakai. Boleh digunakan di perpustakaan, tapi di tempat tertentu sahaja seperti bilik perbincangan, bilik belajar kendiri atau mana-mana kawasan yang memerlukan pengawasan yang khusus. |
| Tidak |

Explanation 4: Shows the results of question ten

4.3   DEMOGRAPHIC PROFILE OF RESPONDENTS

A total of 13 respondents were randomly selected in this study. All these respondents were aged between 19-35.

Age of respondent	Number of respondents
19-20	7
21-25	3
22-29	1
30-35	2

4.4   FINDINGS

Based on the findings of a questionnaire that included 13 respondents between the ages of 19 and 35, it appears that the goal for the construction of the C & D Indicator System has been met, as well as the approval of the parties concerned. As a result, this C&D Indicator System must be developed in the existing and future market to benefit a wide range of stakeholders.

4.5   SUMMARY OF CHAPTER

Finally, the survey done is quite useful in the development of new products, such as this C&D Indicator System. As a result, conducting this questionnaire is a step that any party who wants to design or produce a new product should take.

CHAPTER 5

RECOMMENDATIONS AND CONCLUSIONS

5.1 INTRODUCTION

This indicator has been completed by us as a whole to be able to monitor the time of each user of this special room of the library. In addition, we have also managed to achieve our objective of being able to consume the time used by each user who wants to use a special room in the library such as a discussion room. However, there are some new problems we have found from the last design of this C&D Indicator System.

5.2 DISCUSSION

There were some last debates when the C&D Indicator System production project began to further refine its production. After the indicator was fully placed, the group members observed that various design and materials needed to be changed owing to a variety of variables. One of the improvements made is that the RFID board's position must be entered again so that it does not stand out as much. In addition, the LCD screen on our indicator has to be somewhat larger so that we can see the time more clearly.

5.3 RECOMMENDATIONS

This Counter & Duration Indicator System has successfully met every objective that has been set. However, there are still some improvements that can be made to further enhance the function of this indicator. The proposed improvement is to change the size of the indicator to a smaller size as well as improve in terms of the finish. In addition, the warning sound coming out of the indicator should be slowed down a little more. This is because to avoid interference from other users in the library. Finally, a usage guide should be made to make it easier for users who want to use the discussion room.

5.4 CONCLUSION

After several processes that have been carried out in stages including the testing process, the project was confirmed to work well. This Counter & Duration Indicator System can monitor the usage time of the discussion room in the library without the supervision of the invigilator on duty. Therefore, the use of this indicator is more flexible without contradicting the main objective. In conclusion, this project, the Counter & Duration Indicator System, is able to benefit users from various groups.

5.5 SUMMARY OF CHAPTER

In conclusion through this chapter, some proposed reforms on the Counter & Duration Indicator System can be added to better complete this project. Therefore, the project will be able to achieve the zero defect level that has been set in the Quality Control specifications.

GHANT CHART

ACTIVITY	SEPTEMBER	OCTOBER				NOVEMBER				DECEMBER			JANUARY	
	W1	W2	W3	W4	W5	W6	W7	W8	W9	W10	W11	W12	W13	W14
REGISTRATION WEEK	██													
PROJECT BRIEFING	██													
IDEA PRESENTATION		██	██											
DISCUSSION WITH SUPERVISOR ASSISTANCE				██										
IDENTIFY THE PROJECT TITLE, OBJECTIVE, PROBLEM & SCOPE					██	██								
DOING FIELD OBSERVATION & SURVEY					██									
DESIGN & MODELLING THE STRUCTURE & SYSTEM						██								
PREPARE PROJECT PROPOSAL						██	██							
PRESENT PROJECT PROPOSAL (1)								██						
PREPARE NEEDED EQUIPMENTS & MATERIALS									██					
PROJECT EXECUTION										██	██	██		
REVIEW & PREPARE PROJECT PROPOSAL												██		
PRESENT PROJECT PROPOSAL (2)													██	
SUBMISSION														██

REFERENCES :
██ PLANNED PROGRESS
██ ACTUAL PROGRESS

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