POLITEKNIK

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SHOPPING CART WITH BARCODE SCANNER

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JABATAN KEJURUTERAAN ELEKTRIK

SESI 2:2021/2022

SHOPPING CART WITH BARCODE SCANNER

NAME

PUTERI NUR QAMARINA BINTI
AZAMI

REGISTRATION NO

08DEP20F1037

This report submitted to the Electrical Engineering Department in
fulfillment of the requirement for a Diploma in Electrical Engineering

JABATAN KEJURUTERAAN ELEKTRIK

SESI 2:2021/2022

CONFIRMATION OF THE PROJECT

The project report titled Shopping Cart with Barcode Scanner has been submitted,

reviewed and verified as a fulfills the conditions and requirements of the Project

Writing as stipulated

Checked by:

Supervisor's name   : Puan Zarina Binti Md Amin

Supervisor's signature:

Date   :

Verified by:

Project Coordinator name   :

Signature of Coordinator   :

Date   :

"I acknowledge this work is my own work except the excerpts I have already explained to our source"

1. Signature   :

Name   : **PUTERI NUR QAMARINA BINTI AZAMI**

Registration Number : **08DEP20F1037**

Date   :

DECLARATION OF ORIGINALITY AND OWNERSHIP

 TITLE : SHOPPING CART WITH BARCODE SCANNER

 SESSION: SESI 2 2021/2022

1. I, **1. PUTERI NUR QAMARINA BINTI AZAMI 08DEP20F1037**

   is a final year student of **Diploma in Electronic Engineering in Communication , Department of Electrical, Politeknik Sultan Salahuddin Abdul Aziz Shah**, which is located at **Persiaran Usahawan, 40150 Shah Alam, Selangor**. (Hereinafter referred to as 'the Polytechnic').

2. I acknowledge that 'The Project above' and the intellectual property therein is the result of our original creation /creations without taking or impersonating any intellectual property from the other parties.

3. I agree to release the 'Project' intellectual property to 'The Polytechnics' to meet the requirements for awarding the **Diploma in Electronic Engineering (Communication)** to me.

 Made and in truth that is recognized by;
   a) **Puteri Nur Qamarina Binti Azami**   )   .
(Identification card No: (020312-14-0714)   ...………………………….
) **Puteri Nur Qamarina Binti Azami**

 In front of me, **Puan Zarina Binti Md Amin**   )   ...………………
 (740505-01-5712)   ) **Puan Zarina Binti Md Amin**
 As a project supervisor, on the date:

ACKNOWLEDGEMENTS

ABSTRACT

A supermarket or a hypermarket is a form where wide variety of product items is available. These product items can be food, beverages or any household product. The main purpose of supermarkets is to provide availability of all the products and save the time of the customers but sometimes customer gets frustrated while waiting in the queue at billing counter and sometimes they get confused while comparing the total price of all the products with the budget in the pocket before billing. To overcome these problems, we have designed a smart trolley using LCD display and Arduino. With this system, there is no need for customer to wait in the queue for the scanning for the product items for billing purpose. Supermarkets provide this for only those customers which having a token cart. When the customer inserts the token into trolley only then it will work as a smart trolley. Otherwise, it will work as a normal trolley. Supermarkets use this technique as a strategy to increase the number of customers.

ABSTRAK

Pasar raya atau pasar raya besar ialah satu bentuk di mana pelbagai jenis barangan produk tersedia. Barangan produk ini boleh berupa makanan, minuman atau sebarang produk isi rumah. Tujuan utama pasar raya adalah untuk menyediakan ketersediaan semua produk dan menjimatkan masa pelanggan tetapi kadangkala pelanggan berasa kecewa semasa menunggu dalam barisan di kaunter bil dan kadangkala mereka keliru semasa membandingkan jumlah harga semua produk dengan bajet dalam poket sebelum mengebil. Untuk mengatasi masalah ini, kami telah mereka bentuk troli pintar menggunakan paparan LCD dan Arduino. Dengan sistem ini, pelanggan tidak perlu menunggu dalam baris gilir untuk mengimbas item produk bagi tujuan pengebilan. Pasar raya menyediakan ini hanya untuk pelanggan yang mempunyai troli token. Apabila pelanggan memasukkan token ke dalam troli sahaja maka ia akan berfungsi sebagai troli pintar. Jika tidak, ia akan berfungsi sebagai troli biasa. Pasar raya menggunakan teknik ini sebagai strategi untuk menambah bilangan pelanggan.

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CHAPTER 1

INTRODUCTION

1.1 Introduction

This project is based on our research into the current needs that must be met in order to facilitate market facilities. The project we want to work on is to put barcode scanners in the market to boost the use of trolleys. Consumers will find it easier to purchase things on the market as a result of this.

1.2 Background Research

Its applications are expanding on a daily basis. Hand-held barcode scanners are used in a variety of industries. Instead, we'll use Arduino to create an automatic barcode scanner with a billing system. We execute several activities in our project, including scanning barcodes, dividing things one by one, and delivering them to the scanning sensor. The Total Number of Products Scanned or Billed is displayed on the LCD Display.

1.3 Problem Statement

In current situation, customer will not know for how much cost they have purchased the products and once they reach the counter if the total cost is very high at that time they need to remove some items. To avoid such conditions we attach a device which shows the total cost of items in the shopping cart at the time of purchase itself we can solve this kind of problems by set the limit which will also save the time of customers and the owners. At the end, the system will send notifications to phone and cosumers just show to counter and pay.

1.4   Research Objectives

The main objective of this Project is:

More specifically the principle objective of this research are:

1. To construct a system using barcode scanner that can set cost limit.
2. To develop a system using Arduino Uno to send notifications to phone through SMS.

1.5   Scope of Research

1. This project is focusing to consumers who are in supermarkets.
2. This project also can only be used on shopping cart only.
3. The main controller is using Arduino Uno.

1.6   Project Significance

The electronic shopping system intends to assist shopping in person that will minimize the time spent in shopping and the emergence of new technologies, such as barcode scanner and wireless network. Barcode scanner and wireless network, has LCD display to informs customer, the barcode reader to identifies product and update the bill. Aim to develop the shopping malls to solve the problem time spent in shopping mall, the processes faster, transparent and efficient. In addition, a barcode scanner was effective in my project to scan the price of an item and display it on an LCD display. By pressing the button, the customer can set a total price restriction, and when the total item reaches the limit, the buzzer will sound. My project's goal is to make it easier for customers to avoid becoming confused when shopping at a mall.

1.7   Chapter Summary

This chapter contains all of the procedures for our project, including the problem statement, study objectives, and study scope. This concept came to me via the internet, and it has now evolved into a human need. There's also background research on our topic in there.

CHAPTER 2

LITERATURE REVIEW

1.8 Introduction

The majority of operations these days are automated, yet when it comes to billing, we must wait in a long line since the billing system lacks automation. We can cut the time it takes to bill products and save manpower by using an automatic barcode scanning system. We are gradually reducing the primary work, but the scanning and billing processes continue to rely on the main power. We're going to use the Arduino to control things in this approach. Now, Arduino is a developing prototyping tool that performs a variety of tasks in our project; it is the brains behind it. We can control the motor operation using Arduino, and we can also show product information in a computer system.

1.9 Shopping Cart with Barcode Scanner (Literature Review Topic 1)

The project is being used to conduct this research. The following articles cover the operation and application of barcode scanning as well as the Arduino's performance capabilities.

1.9.1 Previous Research (Subtopic Literature Review Topic 1)

Instead of an employee manually entering product information, barcodes save time and money because they can be read by a scanner, either a handheld device or one built into a checkout station. The barcode system is a time-consuming process, which causes long queues. The method of this project is attached to the product is an electronic RFID passive tag that contains product information. When the product comes into contact with an RFID reader module, electromagnetic waves are used to read the RFID tag. Electromagnetic waves generate induction and power the RFID tag. In response, the RFID tag wirelessly transmits data to the RFID reader via radio waves.

1.9.1.1 Electronic shopping using barcode scanner

The electronic shopping system intends to assist shopping in person that will minimize the time spent in shopping and the emergence of new technologies, such as barcode scanner and wireless network. Barcode scanner and wireless network, has LCD display to informs customer, the barcode reader to identifies product and update the bill. Aim to develop the shopping malls to solve the problem time spent in shopping mall, the processes faster, transparent and efficient. (Megha R. Mane Nilam G. Amane Sunita D. Patil Archana L. Lakesar) Sunita D. Patil Archana L. Lakesar)

1.9.1.2 Automatic Barcode Scanner with Billing System Using Arduino

Implement automatic barcode scanner with billing system using Arduino. To performing multiple operations which are used for Scanning the barcodes, splitting the products one by one and it sending to the scanning sensor. Using the Arduino for controlling purpose. Sensor was sense the product barcodes and send the product details Barcode Enabled Event Management System for Logistics and Consumables Management. Later barcode readers began to use USB connectors rather than the keyboard port. Every field depending the automation for all work, based on our project we implemented the automation for automatic barcode scanning with billing system we avoided the waiting time for billing and more over we don't need to use more worker in billing section. Our system takes less time for the scanning comparing to hand held method. (Dhamodharan.T Prakash.S Vasantha Kumar.R)

1.9.1.3 QR Code Scanning app for Mobile Devices

The bar code labels are read with a scanner, which measures reflected light and interprets the code into numbers and letters that are passed on to a computer. In order to have a bar code that was small in size, easy to read and capable of holding both a large. The purpose of the package android camera is to merge several classes which ensure that it

will be compatible with the Google Glass™ camera. The package Qr scan opens camera and take picture. Decode the images to see if is a valid QR scan. The Google Glass TM will be on sale on market the people will have a better version of the device that we used mainly due to technology evolution so the auto focus will be resolved and the user will not be needed to get close. (Mircea Moisoiu, Andrei Negrău, Robert Győrödi, Cornelia Győrödi, George Pecherle)

1.9.1.4 Smart Trolley using Smart Phone and Arduino

People purchase different items and put them in trolley. After completion of purchases, one needs to go to billing counter for payments. At billing counter the cashier prepare the bill using bar code reader which is very time consuming process and results in long queue at billing counter. There demand for quick and easy payment of bills in shopping malls. The Automated Shopping Trolley is a Smart Trolley which integrates with Barcode Scanners, Arduino, GSM module, Weighing Sensor in it. The scanned items by the customer which will automatically log into the database and thereby can generate bill for items purchased. The weighing sensor 5 which will check the weight of the items send to the database. This project report reviews and exploits the use of barcode technology which are used for product identification.

1.9   Main component of this project

The main component for this project are important to make sure the project will be created. Arduino uno is the heart of project because of all of data will be save into that. Besides that, another component is LCD display, power supply and barcode scanner.

1.9.2   Arduino Uno

The Arduino Uno is an open-source microcontroller board based on the Microchip ATmega328P microcontroller and developed by Arduino. The board is equipped with sets of digital and analog input/output pins that may be interfaced to various expansion boards (shields) and other circuits. The board has 14 digital I/O pins (six capable of PWM output), 6 analog I/O pins, and is programmable with the Arduino IDE.

1.9.3   Barcode Scanner

A barcode scanner is an optical scanner that can read printed barcodes, decode the data contained in the barcode and send the data to a computer. Like a flatbed scanner, it consists of a light source, a lens and a light sensor for translating optical impulses into electrical signals. Additionally, nearly all barcode readers contain decoder circuitry that can analyze the barcode's image data provided by the sensor and send the barcode's content to the scanner's output port.

1.9.4   LCD Display 20x4

A 20x4 LCD means it can display 20 characters per line and there are 4 such lines. In this LCD each character is displayed in 5x7 pixel matrix. This LCD has two registers, namely, Command and Data. This is standard HD44780 controller LCD.

1.10   Chapter Summary

This section focuses on two main sections. The first is the development of fine motor skills in a project shopping cart with a barcode scanner. The item must be scanned with a barcode scanner before the Arduino can be connected to the LCD display. The second portion delves into the technical

aspects, including payment options. After the amount of the items is displayed on the LCD, the customer can choose to pay by card or cash.

CHAPTER 3

RESEARCH METHODOLOGY

1.11 Introduction

To realize this Project as a product that ready to use with safety characteristic, a very comprehensive plan is undertaking. A methodical approach procedure is done so that the Project can be completed in time. This include collecting data of shopping cart at the mall, our research, circuit design testing and verification.

1.12 Project Design and Overview.

As mention in the previous chapter, the designed controller is using a closed-loop system with Arduino as the main controller. The design of the controller circuit using Arduino realizes using Proteus Software and then convert to PCB circuit and will make our process of project.
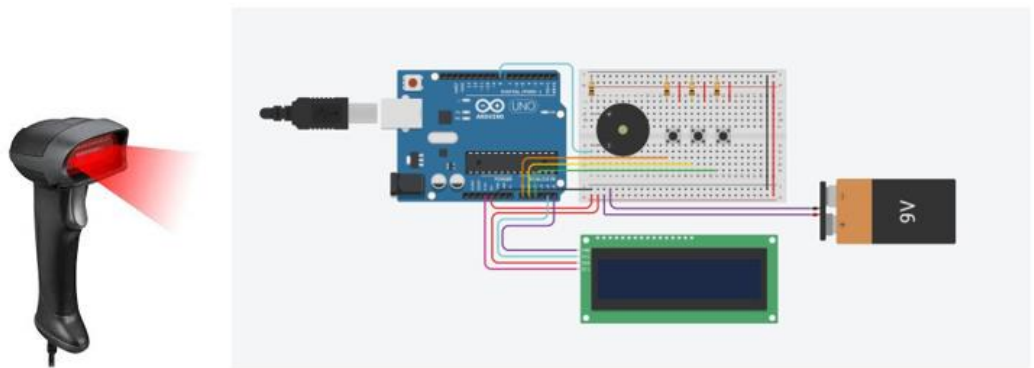
(Figure 3.1 Project Design and Overview)

1.12.1 Block Diagram of the Project

Input	Process	Output
Barcode Scanner	Arduino UNO	Arduino Buzzer
Set Limit		LCD Display
		Notification: Total Price
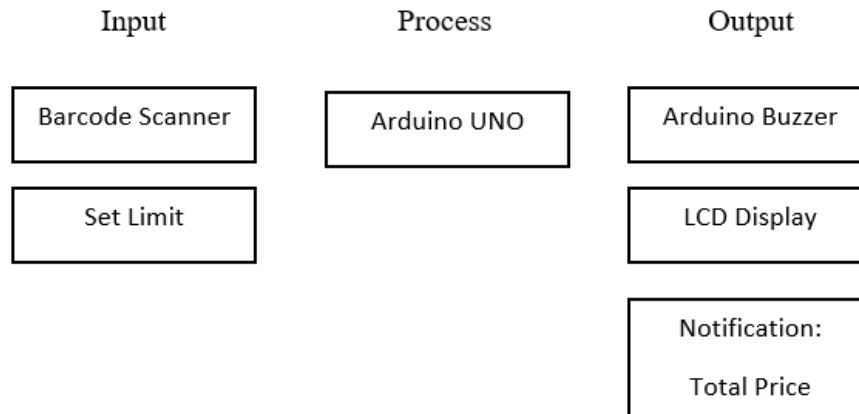
(Figure 3.2 Block Diagram)

1.12.2 Flowchart of the Project 1

(Figure 0. shows the circuit diagram of the whole system. It is shows that first step is set the limit and scan the barcode have been put at the item using barcode scanner. Next, if the total price more than total below; then the buzzer will sound and notification will pop up. After the total price are display by LCD and customer will pay at the counter.
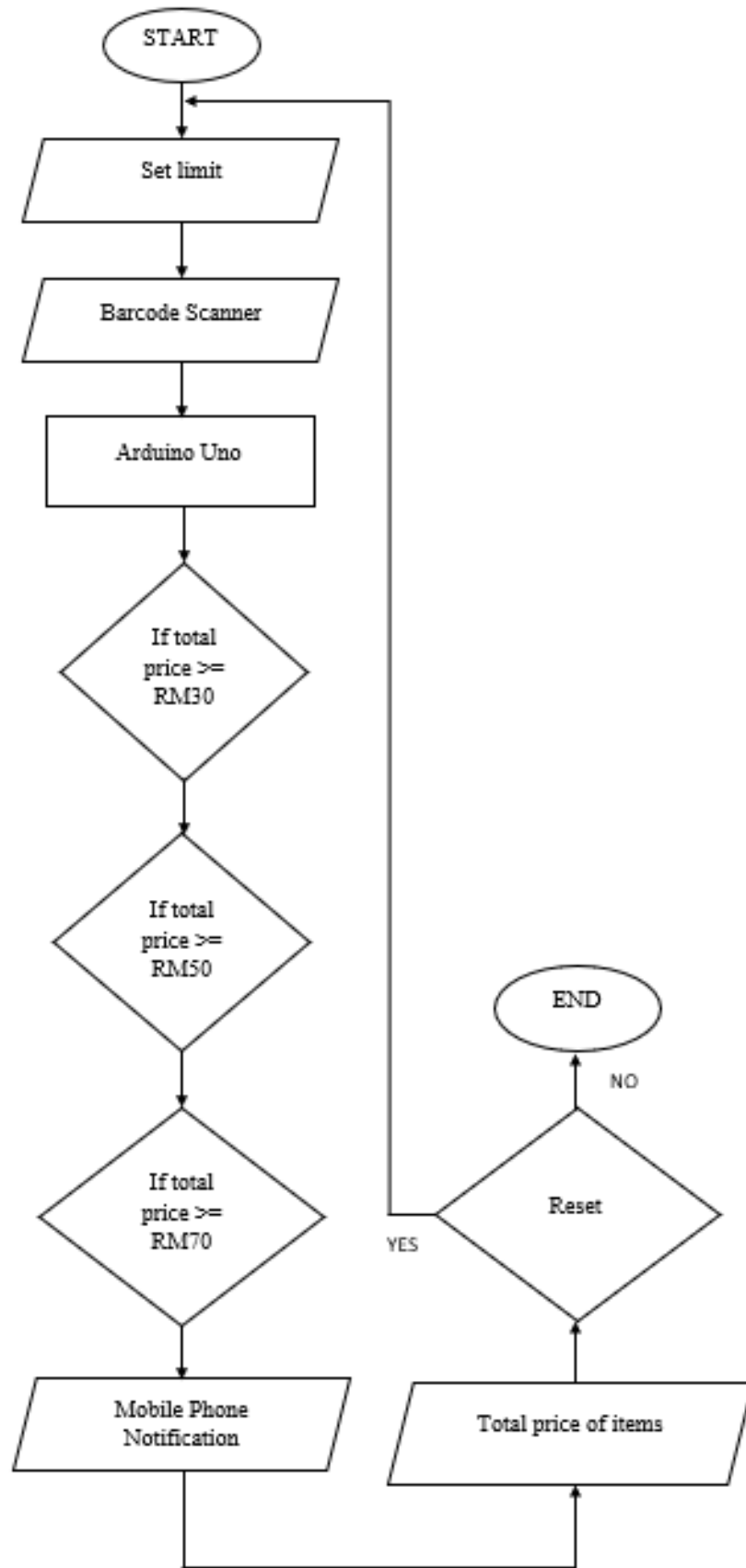
(Figure 0.3: Flow chart of operation of the system)

1.12.3 Project Description

The majority of operations these days are automated, yet when it comes to billing, we must wait in a long line since the billing system lacks automation. We can cut the time it takes to bill products and save manpower by using an automatic barcode scanning system. We are gradually reducing the primary work, but the scanning and billing processes continue to rely on the main power. We're going to use the Arduino to control things in this approach. Now, Arduino is a developing prototyping tool that performs a variety of tasks in our project; it is the brains behind it. We can control the motor operation using Arduino, and we can also show product information in a computer system.

1.13 Project Hardware

As mention in previous chapter, the design controller is using Arduino. Then, the barcode scanner will scan barcode. The output will display at LCD display.

1.13.1 Schematic Circuit

(Figure 0. shows the overall circuit diagram of this project.
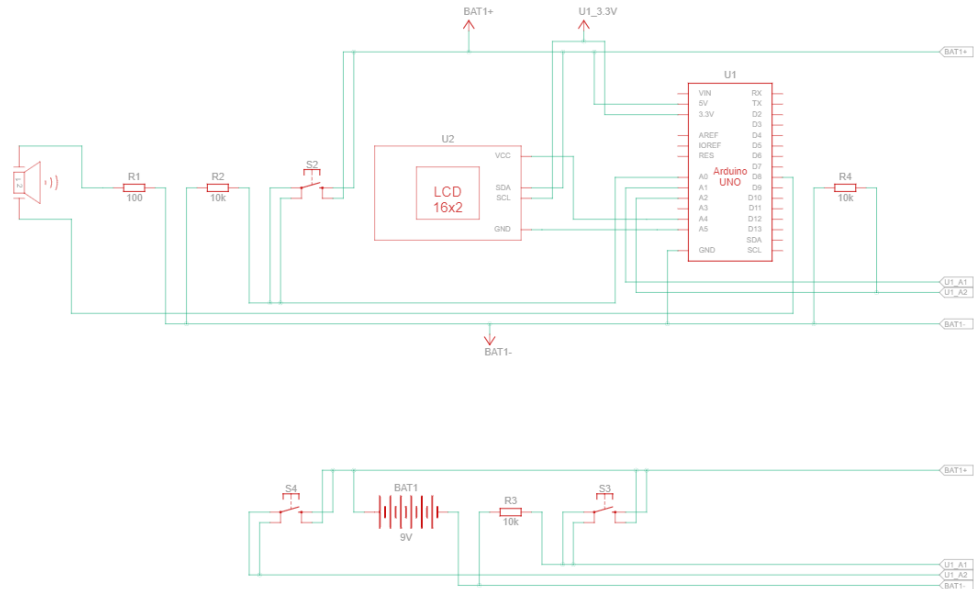
(Figure 0.4: Circuit Diagram)

1.13.2 Description of Main Component

The main component for this project are important to make sure the project will be created. Arduino uno is the heart of project because of all of data will be save into that. Besides that, another component is LCD display, power supply and barcode scanner.

1.13.2.1 Arduino Uno

The Arduino Uno is an open-source microcontroller board based on the Microchip ATmega328P microcontroller and developed by Arduino. The board is equipped with sets of digital and analog input/output pins that may be interfaced to various expansion boards (shields) and other circuits. The board has 14 digital I/O pins (six capable of PWM output), 6 analog I/O pins, and is programmable with the Arduino IDE.

1.13.2.2 Barcode Scanner

A barcode scanner is an optical scanner that can read printed barcodes, decode the data contained in the barcode and send the data to a computer. Like a flatbed scanner, it consists of a light source, a lens and a light sensor for translating optical impulses into electrical signals. Additionally, nearly all barcode readers contain decoder circuitry that can analyze the barcode's image data provided by the sensor and send the barcode's content to the scanner's output port.

1.13.2.3 LCD Display 20x4

A 20x4 LCD means it can display 20 characters per line and there are 4 such lines. In this LCD each character is displayed in 5x7 pixel matrix. This LCD has two registers, namely, Command and Data. This is standard HD44780 controller LCD.

1.13.3 Circuit Operation
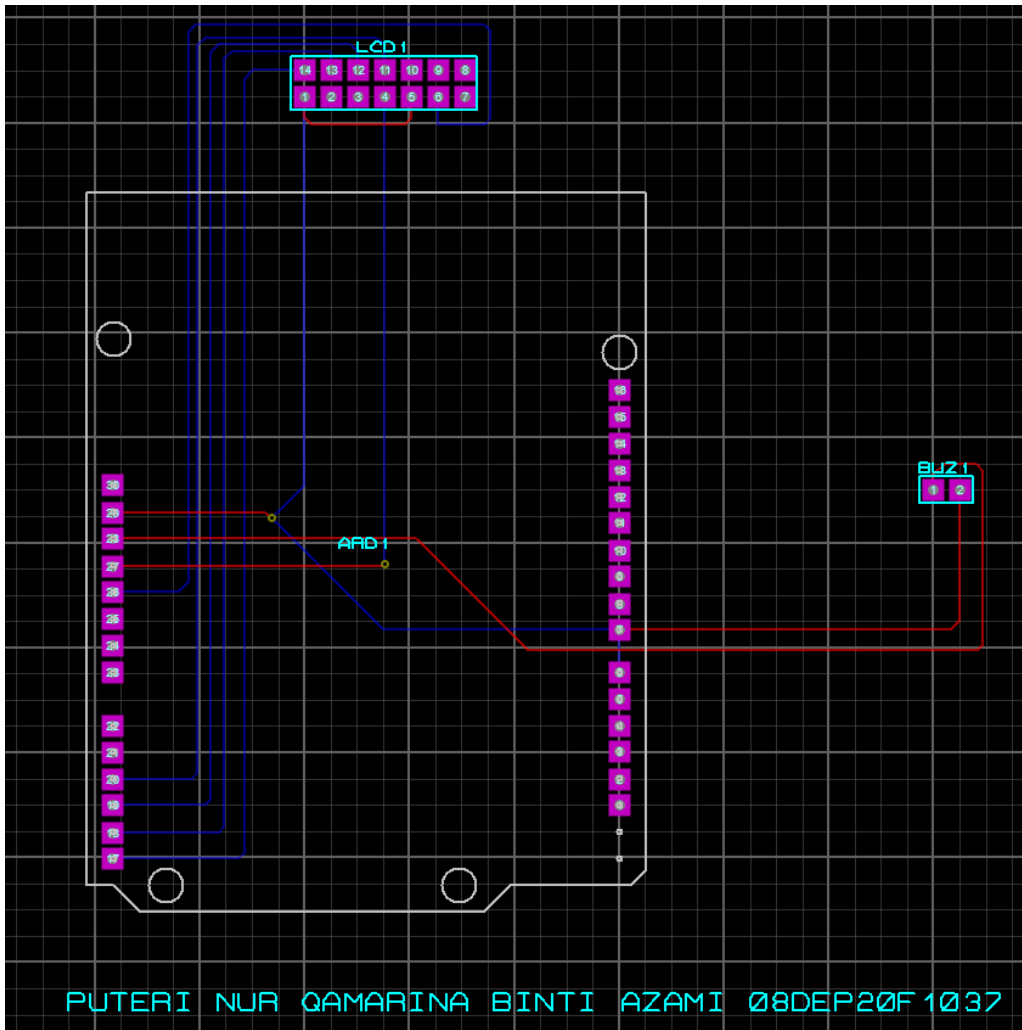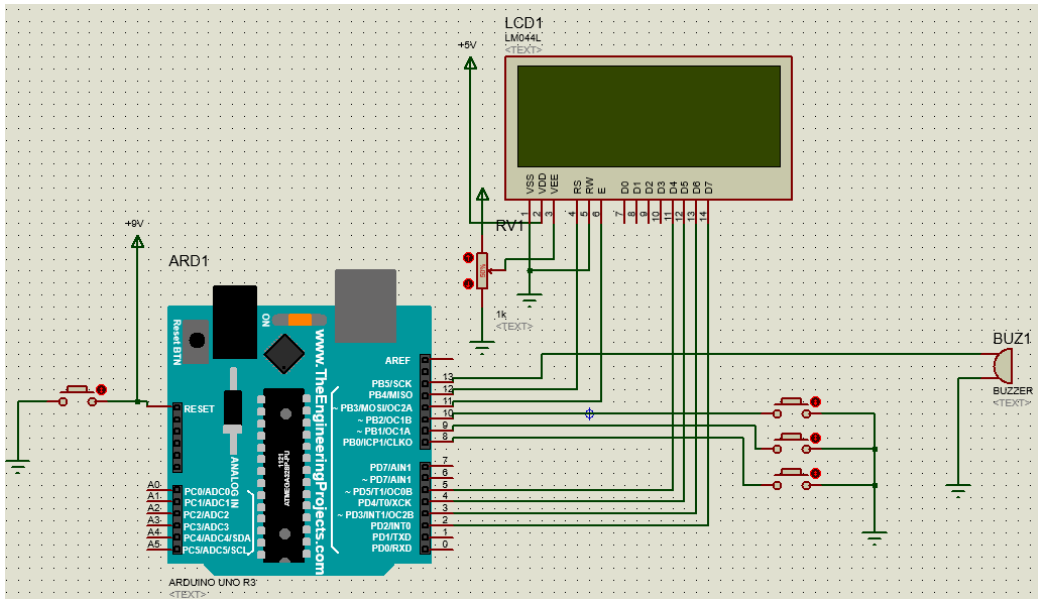
1.14 Project Software

```
contoh_coding_2
#include <hidboot.h>
#include <hiduniversal.h>
#include <Wire.h>
#include <LiquidCrystal_I2C.h>


LiquidCrystal_I2C lcd(0x27,20,4);


String DataBarcode; bool x = false;

float price;
float total;
const int buttonPin = A0;
int buttonState = 0;
int i=0;    //item
int it=0;   //item total


//
//item 1
String name1 ="Arduino uno";
float Price1 =23.00;
//
//item 1
String name2 ="Arduino nano";
float Price2 =18.00;
//
//item 1
String name3 ="Arduino mega";

float Price3 =25.00;
//
//item 1
```

Done compiling.

```
Sketch uses 18706 bytes (57%) of program storage space. Maximum is 32256 bytes.
Global variables use 1062 bytes (51%) of dynamic memory, leaving 986 bytes for local variables. Maximum is 2048 bytes.
```

96   Arduino Uno on COM3

New

```
contoh_coding_2
//item 1
String name4 ="Arduino mini";
float Price4 =15.00;
//
//item 1
String name5 ="lcd 16x2";
float Price5 =13.00;
//


class KbdRptParser : public KeyboardReportParser
{
void PrintKey(uint8_t mod, uint8_t key);


protected:
void OnControlKeysChanged(uint8_t before, uint8_t after);


void OnKeyDown (uint8_t mod, uint8_t key);
void OnKeyUp (uint8_t mod, uint8_t key);
void OnKeyPressed(uint8_t key);
};


void KbdRptParser::PrintKey(uint8_t m, uint8_t key)
{
MODIFIERKEYS mod;
*((uint8_t*)&mod) = m;
}
```

Done compiling.

```
Sketch uses 18706 bytes (57%) of program storage space. Maximum is 32256 bytes.
Global variables use 1062 bytes (51%) of dynamic memory, leaving 986 bytes for local variables. Maximum is 2048 bytes.
```

96   Arduino Uno on COM3

Upload

```
contoh_coding_2
void KbdRptParser::OnKeyDown(uint8_t mod, uint8_t key)
{

PrintKey(mod, key);
uint8_t c = OemToAscii(mod, key);


if (c) OnKeyPressed(c);
}


void KbdRptParser::OnControlKeysChanged(uint8_t before, uint8_t after) {


MODIFIERKEYS beforeMod;
*((uint8_t*)&beforeMod) = before;


MODIFIERKEYS afterMod;
*((uint8_t*)&afterMod) = after;
}


void KbdRptParser::OnKeyUp(uint8_t mod, uint8_t key)
{
//Serial.print("UP ");
//PrintKey(mod, key);
}


void KbdRptParser::OnKeyPressed(uint8_t key)

//Serial.print((char)key); if (key == 0x0D)
{
```

Done compiling.

```
Sketch uses 18706 bytes (57%) of program storage space. Maximum is 32256 bytes.
Global variables use 1062 bytes (51%) of dynamic memory, leaving 986 bytes for local variables. Maximum is 2048 bytes.
```

96   Arduino Uno on COM3

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```
contoh_coding_2
x = true;

}


USB Usb;
HIDUniversal Hid(&Usb);


KbdRptParser Prs;


void setup()
{
Serial.begin(115200);
lcd.init();
lcd.backlight();
pinMode(buttonPin, INPUT);
pinMode(11,OUTPUT);
Serial.println("Start");

if (Usb.Init() == -1) Serial.println("OSC did not start.");

delay( 200 );

Hid.SetReportParser(0, &Prs);
lcd.setCursor(0,0);
lcd.print("Item: ");
lcd.setCursor(0,1);
lcd.print("Price: RM");
lcd.print(price);
lcd.setCursor(0,2);
lcd.print("Cart Total: ");
lcd.print(it);
lcd.setCursor(0,3);
```

Done compiling

Sketch uses 18706 bytes (57%) of program storage space. Maximum is 32256 bytes.
Global variables use 1062 bytes (51%) of dynamic memory, leaving 986 bytes for local variables. Maximum is 2048 bytes.

```
contoh_coding_2
lcd.setCursor(0,3);
lcd.print("T Price: RM");
lcd.print(total);

}


void loop()
{
buttonState = digitalRead(buttonPin);
if (buttonState == HIGH)
{
lcd.clear();
it=0;
total=0;
price=0;
lcd.setCursor(0,0);
lcd.print("Item: ");
lcd.print("");
lcd.setCursor(0,1);
lcd.print("Price: RM");
lcd.print(price);
lcd.setCursor(0,2);
lcd.print("Cart Total: ");
lcd.print(it);
lcd.setCursor(0,3);
lcd.print("T Price: RM");
lcd.print(total);
}

Usb.Task();
if (x){

  Serial.println(DataBarcode);
```

Done compiling

Sketch uses 18706 bytes (57%) of program storage space. Maximum is 32256 bytes.
Global variables use 1062 bytes (51%) of dynamic memory, leaving 986 bytes for local variables. Maximum is 2048 bytes.

Verify

```
contoh_coding_2
Usb.Task();
if (x){

  Serial.println(DataBarcode);

{

if(DataBarcode=="423587635241")
{
lcd.clear();
price=Price1;
i=1;
lcd.setCursor(0,0);
lcd.print("Item: ");
lcd.print(name1);
lcd.setCursor(0,1);
lcd.print("Price: RM");
lcd.print(Price1);
}
if(DataBarcode=="123456789012")
{
lcd.clear();
price=Price2;
i=1;
lcd.setCursor(0,0);
lcd.print("Item: ");
lcd.print(name2);
lcd.setCursor(0,1);
lcd.print("Price: RM");
lcd.print(Price2);
}
if(DataBarcode=="675342579812")
{
lcd.clear();
```

Done compiling

Sketch uses 18706 bytes (57%) of program storage space. Maximum is 32256 bytes.
Global variables use 1062 bytes (51%) of dynamic memory, leaving 986 bytes for local variables. Maximum is 2048 bytes.

96   Arduino Uno on COM3

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contoh_coding_2

```
lcd.clear();
price=Price3;
i=1;
lcd.setCursor(0,0);
lcd.print("Item: ");
lcd.print(name3);
lcd.setCursor(0,1);
lcd.print("Price: RM");
lcd.print(Price3);

}
if(DataBarcode=="987653426712")
{
lcd.clear();
price=Price4;
i=1;
lcd.setCursor(0,0);
lcd.print("Item: ");
lcd.print(name4);
lcd.setCursor(0,1);
lcd.print("Price: RM");
lcd.print(Price4);
}
if(DataBarcode=="786534278512")
{
lcd.clear();
price=Price5;
i=1;
lcd.setCursor(0,0);
lcd.print("Item: ");
lcd.print(name5);
lcd.setCursor(0,1);
lcd.print("Price: RM");
lcd.print(Price5);
```

Done compiling

```
Sketch uses 18706 bytes (57%) of program storage space. Maximum is 32256 bytes.
Global variables use 1062 bytes (51%) of dynamic memory, leaving 986 bytes for local variables. Maximum is 2048 bytes.
```

96   Arduino Uno on COM3

---

contoh_coding_2

```
}
}

total=total+price;
it=it+i;
lcd.setCursor(0,2);
lcd.print("Cart Total: ");
lcd.print(it);
lcd.setCursor(0,3);

lcd.print("T Price: RM");
lcd.print(total);

int (total);

if (total > "RM 30.00"); {
    tone(11,200);
    delay(500);
    noTone(11);
    delay(500);
    Serial.println(total);

if (total > "RM 50.00");
    tone(11,200);
    delay(500);
    noTone(11);
    delay(500);
    Serial.println(total);

if (total > "RM 70.00");
    tone(11,200);
    delay(500);
    noTone(11);
    delay(500);
    Serial.println(total);
```

Done compiling

```
Sketch uses 18706 bytes (57%) of program storage space. Maximum is 32256 bytes.
Global variables use 1062 bytes (51%) of dynamic memory, leaving 986 bytes for local variables. Maximum is 2048 bytes.
```

96   Arduino Uno on COM3

Verify

contoh_coding_2

```
lcd.setCursor(0,3);

lcd.print("T Price: RM");
lcd.print(total);

int (total);

if (total > "RM 30.00"); {
    tone(11,200);
    delay(500);
    noTone(11);
    delay(500);
    Serial.println(total);

if (total > "RM 50.00");
    tone(11,200);
    delay(500);
    noTone(11);
    delay(500);
    Serial.println(total);

if (total > "RM 70.00");
    tone(11,200);
    delay(500);
    noTone(11);
    delay(500);
    Serial.println(total);
}
Serial.println(total);

x = false;
DataBarcode = "";
//a++;
}
}
```
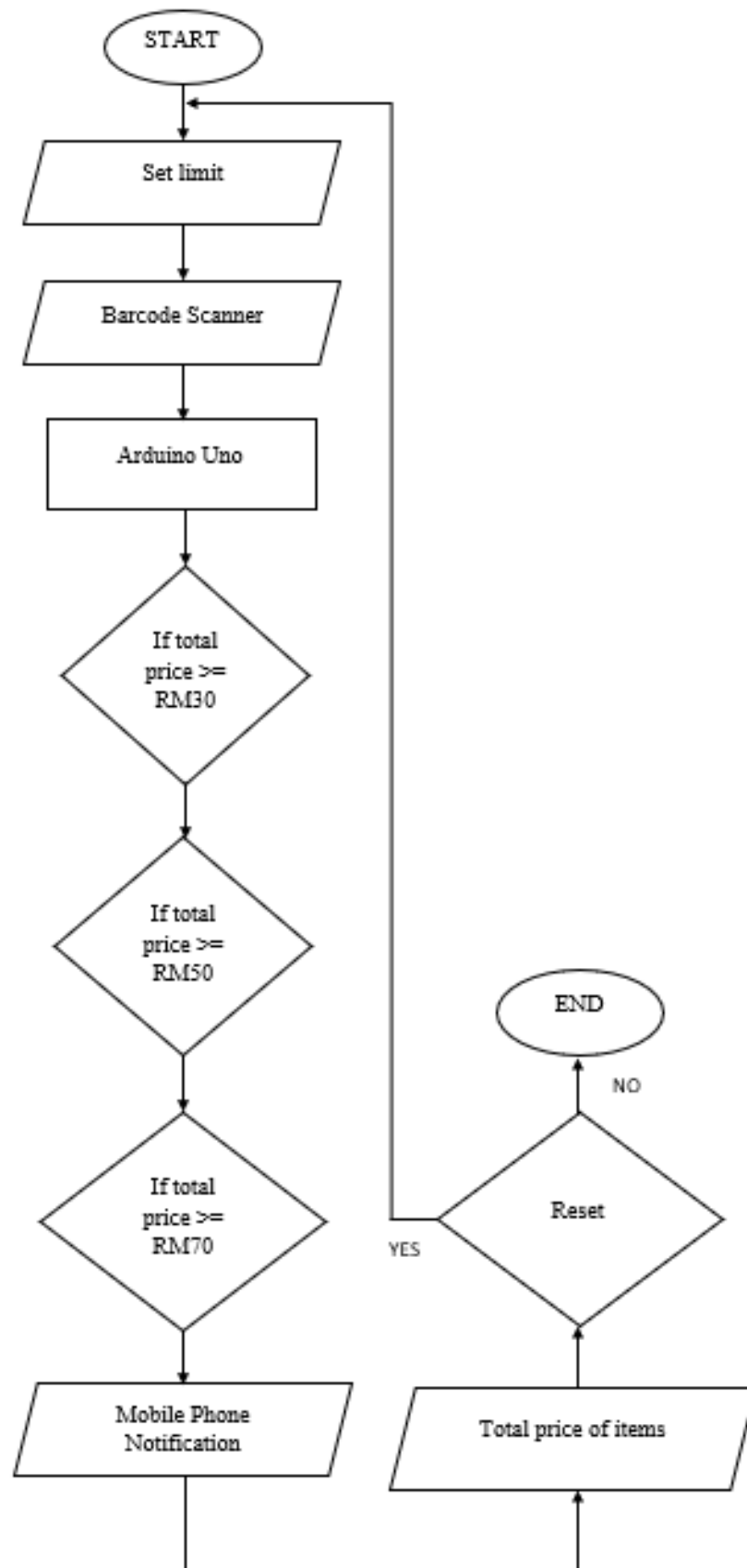
Done compiling

```
Sketch uses 18706 bytes (57%) of program storage space. Maximum is 32256 bytes.
Global variables use 1062 bytes (51%) of dynamic memory, leaving 986 bytes for local variables. Maximum is 2048 bytes.
```

96   Arduino Uno on COM3

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1.14.1 Flowchart of the System

```
                    ┌─────────┐
                    │  START  │
                    └────┬────┘
                         │
                    ┌────▼─────┐
                    │ Set limit│
                    └────┬─────┘
                         │
                ┌────────▼────────┐
                │ Barcode Scanner │
                └────────┬────────┘
                         │
                ┌────────▼────────┐
                │  Arduino Uno    │
                └────────┬────────┘
                         │
                    ┌────▼────┐
                    │ If total│
                    │price >= │
                    │  RM30   │
                    └────┬────┘
                         │
                    ┌────▼────┐
                    │ If total│
                    │price >= │
                    │  RM50   │
                    └────┬────┘
                         │
                    ┌────▼────┐
                    │ If total│        YES
                    │price >= │──────────────┐
                    │  RM70   │              │
                    └────┬────┘              │
                         │                   │
            ┌────────────▼──────────┐   ┌────▼────┐
            │ Mobile Phone          │   │  Reset  │── NO ──► END
            │ Notification          │   └────┬────┘
            └───────────────────────┘        │
                                    ┌─────────▼──────────┐
                                    │ Total price of items│
                                    └─────────────────────┘
```

START → Set limit → Barcode Scanner → Arduino Uno → If total price >= RM30 → If total price >= RM50 → If total price >= RM70 → Mobile Phone Notification

Reset: YES → back to Set limit; Total price of items → Reset → NO → END

1.14.2 Description of Flowchart

It is shows that first step is set the limit and scan the barcode have been put at the item using barcode scanner. Next, if the total price more than total below; then the buzzer will sound and notification will pop up. After the total price are display by LCD and customer will pay at the counter.

1.15 Prototype Development

This project aims to create a solution that will improve the shopping experience for both customers and store owners. The proposed approach consists of automated invoicing for a consumer while they are shopping, which is primarily based on barcode technology and backed by other simple technologies. Instead of RFID tags, merchandise in shopping malls and supermarkets are labelled with barcodes. The shopping carts come with a barcode scanner, a push button, a buzzer, and an LCD, and the system will be controlled by an Arduino board.

1.15.1 Mechanical Design/Product Layout

Figure 0.1 shows the design of the product Shopping Cart with Barcode Scanner

Figure 0.1: View of the Project

The Shopping Cart with Barcode Scanner is made up of a modern barcode scanner from today's shopping scenario, feedback systems that provide product weight and imagery to eliminate inconsistencies, a cloud-based database, and integrated technology to tie everything together. The technique allows the customer to add and remove products as needed during the shopping process, instantly updating the bill and reflecting inventory changes.

1.16 Sustainability Element in The Design Concept

In this sub-topic student should elaborate on the design criteria of their Project either environmental design criteria, social design criteria use of sustainable design tool or economic design criteria. Also explain contribution to the society of the Project proposed.

1.17 Chapter Summary

This chapter explains how the project will running and what the component are use. Block diagram and the flowchart are make for explain the process for project shopping cart with barcode scanner. The schematic diagram shows project to complete.

CHAPTER 4

PROJECT MANAGEMENT AND COSTING

1.18 Introduction

In this chapter, costing of project can show by the table below. The project involves the cost of purchasing components and materials through its implementation. The list and price of component are shown.

1.19 Gant Chart and Activities of the Project

No	TASK NAME	IMPLEMENTATION	DURATION (DAYS)	COST (RM)	WEEK 1 (07.03.2022 – 13.03.2022)	WEEK 2 (14.03.2022 – 20.03.2022)	WEEK 3 (21.03.2022 – 27.03.2022)	WEEK 4 (28.03.2022 – 03.04.2022)	WEEK 5 (04.04.2022 – 10.04.2022)	WEEK 6 (11.04.2022 – 17.04.2022)	WEEK 7 (18.04.2022 – 24.04.2022)	WEEK 8 (25.04.2022 – 01.05.2022)	MID TERM BREAK (02.05.2020 - 08.05.2022)	WEEK 9 (09.05.2022 – 15.05.2022)	WEEK 10 (16.05.2022 – 22.05.2022)	WEEK 11 (23.05.2022 – 29.05.2022)	WEEK 12 (30.05.2022 – 05.06.2022)	WEEK 13 (06.06.2022 – 12.06.2022)	WEEK 14 (13.06.2022 – 19.06.2022)	FINAL EXAM ( )	SEMESTER BREAK
1	RESEARCH PROPOSAL	PLAN	28	0	▨	▨	▨	▨													
		ACTUAL	28	0	▦	▦	▦	▦													
2	PROJECT BRIEFING	PLAN	7	0	▨																
		ACTUAL	7	0	▦																
3	CONSTRUCTION OF OBJECTIVES	PLAN	14	0		▨	▨														
		ACTUAL	42	0		▦	▦	▦	▦	▦	▦										
4	CONSTRUCTION OF BLOCK DIAGRAM	PLAN	14	0		▨	▨														
		ACTUAL	28	0		▦	▦	▦	▦												
5	FINALIZE RESEARCH PROPOSAL	PLAN	56	0							▨	▨		▨	▨	▨	▨	▨	▨		
		ACTUAL	35	0											▦	▦	▦	▦	▦		
6	VISUAL RESEARCH	PLAN	98	0	▨	▨	▨	▨	▨	▨	▨	▨		▨	▨	▨	▨	▨	▨		
		ACTUAL	42	0	▦	▦	▦					▦		▦							
7	PRODUCT MARKET STUDIES	PLAN	21	0	▨	▨	▨														
		ACTUAL	42	0	▦	▦	▦	▦	▦	▦											
8	DESIGN BRIEFING	PLAN	35	0							▨	▨		▨	▨	▨					
		ACTUAL	21	0										▦	▦	▦					
9	SKETCHES AND DRAW	PLAN	28	0				▨	▨	▨	▨										
		ACTUAL	14	0		▦	▦														
10	INVESTIGATION REPORT	PLAN	35	0				▨	▨	▨	▨	▨									
		ACTUAL	49	0			▦	▦	▦	▦	▦	▦		▦	▦						
11	FINAL PROPOSAL	PLAN	21	0													▨	▨	▨		
		ACTUAL	35	0											▦	▦	▦	▦	▦		
12	IDEA DEVELOPMENT	PLAN	21	0	▨	▨	▨														
		ACTUAL	14	0	▦	▦															
13	FINALIZE IDEA	PLAN	14	0	▨	▨															
		ACTUAL	14	0	▦	▦															

(▨ = PLAN, yellow bar; ▦ = ACTUAL, green bar)

1.20 Milestone

1.21 Cost and Budgeting

No.	Component and materials	The unit price	Quantity	Total
1	Barcode Scanner	RM 48.00	1	RM 48.00
2	Arduino Uno	RM 23.66	1	RM 23.66
3	USB Host Shield	RM 39.81	1	RM 39.81
4	Serial LCD Display 2004 20x4	RM 23.66	1	RM 23.66
5	Arduino Buzzer	RM 2.76	1	RM 2.76
6	9V Battery	RM 2.50	1	RM 2.50
7	9V Clip Type B	RM 2.76	1	RM 2.76
8	Push Button	RM 1.00	5	RM 5.00
9	PCB Board	RM 1.50	1	RM 1.50
10	Other materials	RM	-	-
			Total:	**RM 149.65**
	List of other costing			

1	Transportation	RM	-	-
2	Postage	RM	-	RM 22.50
3	Craft Work	RM	-	-
4	Internet	RM	-	-
5	Application	RM	-	-
			Total:	**RM 22.50**
			Overall total	**RM 172.15**

1.22 Chapter Summary

The overall cost to complete the project is RM172.15, based on the predicted costs. Based on the research, it is feasible to implement and attain. The project took more than a month to complete. This project's development is difficult and time-consuming.

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APPENDICES

APPENDIX A- DATA SHEET

APPENDIX B- PROGRAMMING

```
#include <hidboot.h>

#include <hiduniversal.h>

#include <Wire.h>

#include <LiquidCrystal_I2C.h>




LiquidCrystal_I2C lcd(0x27,20,4);




String DataBarcode; bool x = false;




float price;

float total;

const int buttonPin = A0;

int buttonState = 0;

int i=0;    //item

int it=0;   //item total




//

//item 1

String name1 ="Arduino uno";
```

```
float Price1 =23.00;
//
//item 1
String name2 ="Arduino nano";
float Price2 =18.00;
//
//item 1
String name3 ="Arduino mega";
float Price3 =25.00;
//
//item 1
String name4 ="Arduino mini";
float Price4 =15.00;
//
//item 1
String name5 ="lcd 16x2";
float Price5 =13.00;
//




class KbdRptParser : public KeyboardReportParser
{
void PrintKey(uint8_t mod, uint8_t key);
```

```
protected:

void OnControlKeysChanged(uint8_t before, uint8_t after);

void OnKeyDown (uint8_t mod, uint8_t key);

void OnKeyUp (uint8_t mod, uint8_t key);

void OnKeyPressed(uint8_t key);

};




void KbdRptParser::PrintKey(uint8_t m, uint8_t key)

{

MODIFIERKEYS mod;

*((uint8_t*)&mod) = m;

}




void KbdRptParser::OnKeyDown(uint8_t mod, uint8_t key)

{


PrintKey(mod, key);

uint8_t c = OemToAscii(mod, key);
```

```cpp
if (c) OnKeyPressed(c);

}


void KbdRptParser::OnControlKeysChanged(uint8_t before, uint8_t after) {


MODIFIERKEYS beforeMod;

*((uint8_t*)&beforeMod) = before;



MODIFIERKEYS afterMod;

*((uint8_t*)&afterMod) = after;

}



void KbdRptParser::OnKeyUp(uint8_t mod, uint8_t key)

{

//Serial.print("UP ");

//PrintKey(mod, key);

}



void KbdRptParser::OnKeyPressed(uint8_t key)


//Serial.print((char)key); if (key == 0x0D)
```

```
{

x = true;


}



USB Usb;

HIDUniversal Hid(&Usb);


KbdRptParser Prs;



void setup()

{

Serial.begin(115200);

lcd.init();

lcd.backlight();

pinMode(buttonPin, INPUT);

pinMode(11,OUTPUT);

Serial.println("Start");


if (Usb.Init() == -1) Serial.println("OSC did not start.");


delay( 200 );
```

```
Hid.SetReportParser(0, &Prs);

lcd.setCursor(0,0);

lcd.print("Item: ");

lcd.setCursor(0,1);

lcd.print("Price: RM");

lcd.print(price);

lcd.setCursor(0,2);

lcd.print("Cart Total: ");

lcd.print(it);

lcd.setCursor(0,3);

lcd.print("T Price: RM");

lcd.print(total);


}



void loop()

{

buttonState = digitalRead(buttonPin);

if (buttonState == HIGH)

{

lcd.clear();

it=0;
```

```
total=0;

price=0;

lcd.setCursor(0,0);

lcd.print("Item: ");

lcd.print("");

lcd.setCursor(0,1);

lcd.print("Price: RM");

lcd.print(price);

lcd.setCursor(0,2);

lcd.print("Cart Total: ");

lcd.print(it);

lcd.setCursor(0,3);

lcd.print("T Price: RM");

lcd.print(total);

}


Usb.Task();

if (x){


  Serial.println(DataBarcode);


{


if(DataBarcode=="423587635241")
```

```
{
lcd.clear();
price=Price1;
i=1;
lcd.setCursor(0,0);
lcd.print("Item: ");
lcd.print(name1);
lcd.setCursor(0,1);
lcd.print("Price: RM");
lcd.print(Price1);
}
if(DataBarcode=="123456789012")
{
lcd.clear();
price=Price2;
i=1;
lcd.setCursor(0,0);
lcd.print("Item: ");
lcd.print(name2);
lcd.setCursor(0,1);
lcd.print("Price: RM");
lcd.print(Price2);
}
if(DataBarcode=="675342579812")
```

```
{

lcd.clear();

price=Price3;

i=1;

lcd.setCursor(0,0);

lcd.print("Item: ");

lcd.print(name3);

lcd.setCursor(0,1);

lcd.print("Price: RM");

lcd.print(Price3);


}
if(DataBarcode=="987653426712")

{

lcd.clear();

price=Price4;

i=1;

lcd.setCursor(0,0);

lcd.print("Item: ");

lcd.print(name4);

lcd.setCursor(0,1);

lcd.print("Price: RM");

lcd.print(Price4);

}
```

```
if(DataBarcode=="786534278912")

{

lcd.clear();

price=Price5;

i=1;

lcd.setCursor(0,0);

lcd.print("Item: ");

lcd.print(name5);

lcd.setCursor(0,1);

lcd.print("Price: RM");

lcd.print(Price5);

}

}


total=total+price;

it=it+i;

lcd.setCursor(0,2);

lcd.print("Cart Total: ");

lcd.print(it);

lcd.setCursor(0,3);


lcd.print("T Price: RM");

lcd.print(total);
```

```
int (total);


if (total >  "RM 30.00"); {

  tone(11,200);

  delay(500);

  noTone(11);

  delay(500);

  Serial.println(total);


if (total > "RM 50.00");

  tone(11,200);

  delay(500);

  noTone(11);

  delay(500);

  Serial.println(total);


if (total > "RM 70.00");

  tone(11,200);

  delay(500);

  noTone(11);

  delay(500);

  Serial.println(total);

}

Serial.println(total);
```

```
x = false;

DataBarcode = "";

//a++;

}

}
```

APPENDIX C- PROJECT MANUAL/PRODUCT CATALOGUE