Smart shopping cart

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Current Situation in Taiwan

Outline

- Motivation
- Process
- Expected results
- Materials
- Software 、 hardware
- Demonstration
- Future outlook
- Task Assignments


MOTIVATION

Materials

- *RFID-RC522*
- *RC522 induction tags*
- *HC-05(bluetooth module)*
- *OLED*
- *Arduino Uno*
- *A box(The appearance of the shopping cart)*

Smart shopping cart process

Start shopping

Scan the product

Display Information

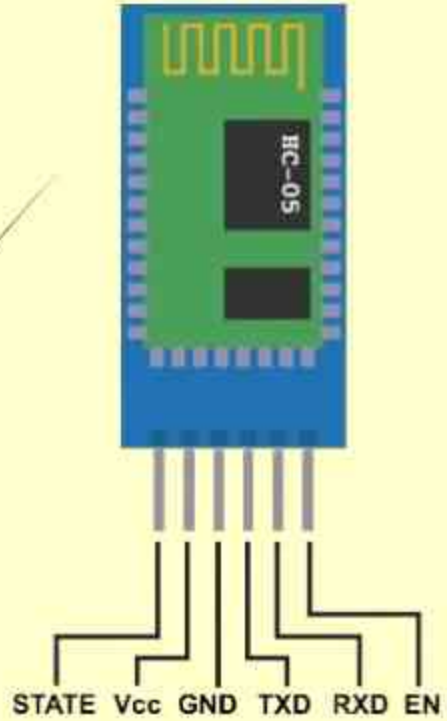
Software

Arduino

Laserbox

App Inventor

Bluetooth module HC-05



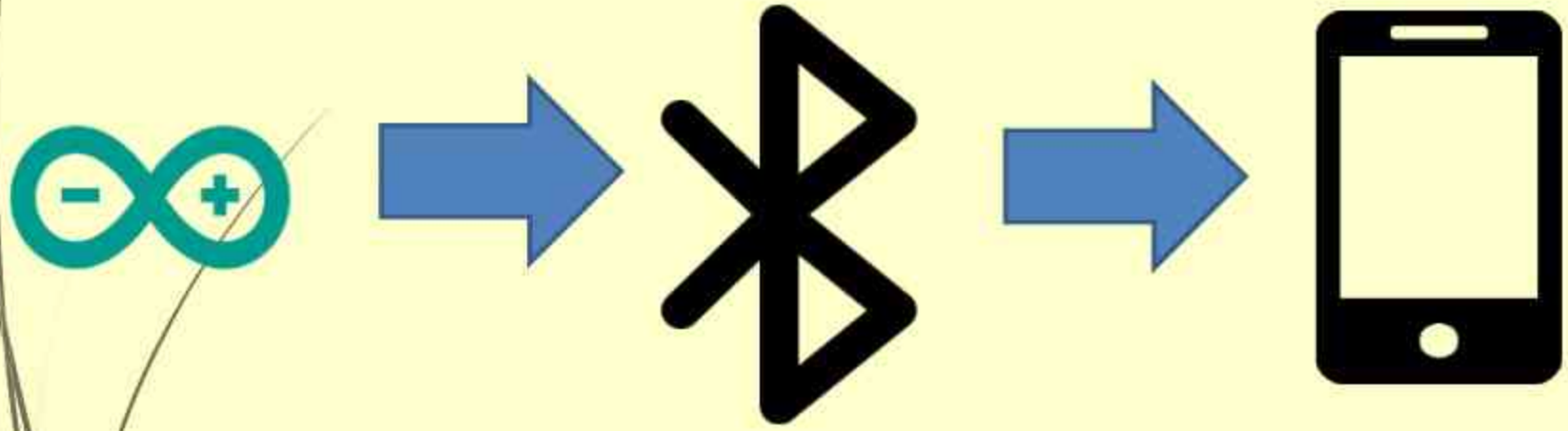
Divided into automatic connection mode and command response mode (ATmode)

HC-05(Bluetooth)

the actual circuit diagram

Why we use HC-05(Bluetooth)

The bridge between Arduino and App Inventor



Program

```
SoftwareSerial BT(6, 7);// recieve pin, tosend pin
```

Define bluebooth TX , RX pin

```
void setup() {
  BT.begin(9600);
  Serial.begin(9600);
```

Set the baud rate connection between the Bluetooth module and the computer

Receive data

```
void loop() {
  byte cmmd[20];
  char c;
  int insize;
```

Declare a CMMD array,size 20

```
if ((insize = (BT.available())) > 0)
{
  if (BT.available())
  {
    c = BT.read();
    cmmd[pos++] = (byte)c;
    //Serial.write(pos);
    if (pos > 0 && cmmd[pos - 1] == '$')
    {
      towrite = pos - 1;
      pos = 0;
    }
```

```
if (towrite > 0)
{
  cmmd[towrite + 1] = 0;
  Serial.write((char*)cmmd);
  writeBlock(sector, block, cmmd);
  pos = 0;
  towrite = 0;
  for (int d = 0; d < 20; d++)
  {
    cmmd[d] = 0;
  }
}
```

Clear the data in cmmd array

OLED

IIC clock line

IIC data line

OLED Program

```
u8g2.begin();
```

Getting the OLED to work

```
void display(char*data){
u8g2.setFont(u8g2_font_samim_16_t_all); //字型
 u8g2.firstPage();
 do {
  u8g2.setCursor(10,40);
   u8g2.print(data);
   //u8g2.drawStr(0,40,data);
 } while ( u8g2.nextPage() );
}
```

Let OLED display the data readed by RFID

How to send data

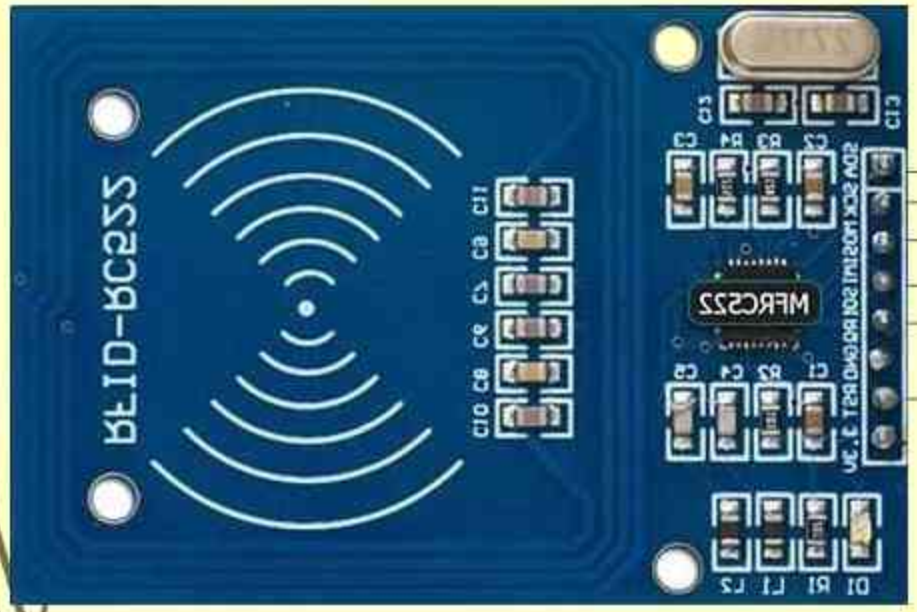
```
writeBlock(sector, block,blockData);
readBlock(sector, block, buffer);
BT.print((char*)buffer);
display(buffer);
Serial.print(F("Read block: "));
for (byte i = 0 ; i < 16 ; i++) {
  Serial.write (buffer[i]);
}
Serial.println();
```

Choose which area to read

Display the data

Let OLED show

RFID(Radio Frequency IDentification)



SDA

SCK

MOSI

MISO

IRQ

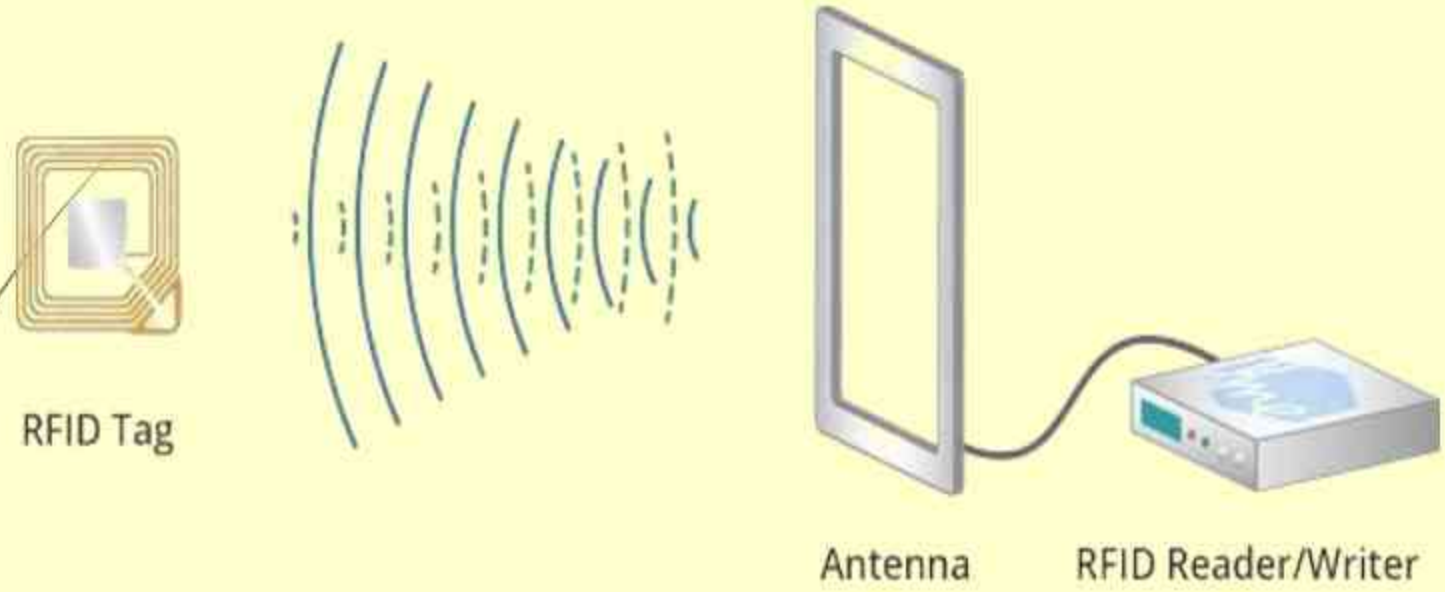
RST

SPI interface

RFID

Here is the actual circuit diagram

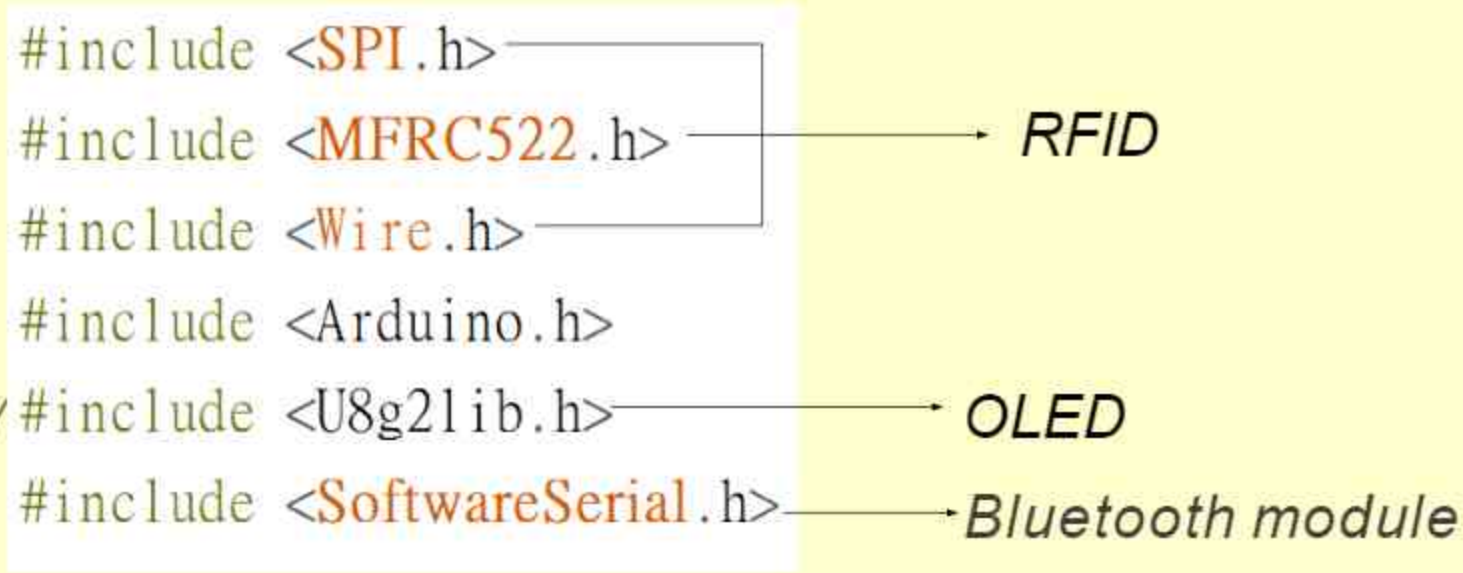
How RFID works



Why do we use RFID?

Arduino library

```
#include <SPI.h>
#include <MFRC522.h>
#include <Wire.h>
#include <Arduino.h>
#include <U8g2lib.h>
#include <SoftwareSerial.h>
```



Program

```
#define RST_PIN      9
#define SS_PIN       10
```

reset and select

```
MFRC522 mfrc522(SS_PIN, RST_PIN);
```

Create MFRC522 object

```
byte sector = 15;
byte block = 1;
byte blockData[16] = "soap 15$";
```

You can write data like this

Specify the "sector" for reading and writing, possible values: 0~15

Specify the "block" for reading and writing, possible values: 0~3

Sector and block

The location is allocated at the time of manufacture

Quote:https://swf.com.tw/?p=941

Warning

```
if (_sector == 0 && _block == 0) {

  Serial.println(F("First block is read-only."));
  return;
}
```

It is wrong to write the data in the block 0 (because that block is an identifier)

Error message for writeblock

```
void writeBlock(byte _sector, byte _block, byte _blockData[]) {
  if (_sector < 0 || _sector > 15 || _block < 0 || _block > 3) {

    Serial.println(F("Wrong sector or block number."));
    return;
  }
```

If it is within the defined block and sector values, an error will be displayed

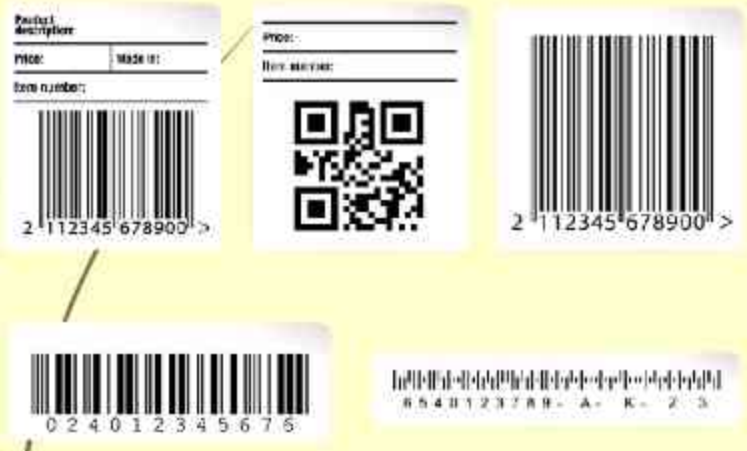
```
void readBlock(byte _sector, byte _block, byte _blockData[])  {
  if (_sector < 0 || _sector > 15 || _block < 0 || _block > 3) {

    Serial.println(F("Wrong sector or block number."));
    return;
  }
```

Same as writeblock

Label V.S induction tags

Label



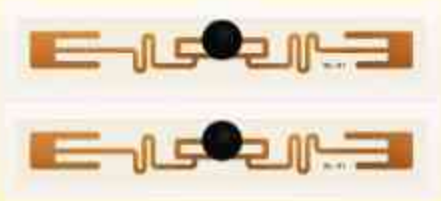
RFID-induction tags

Item

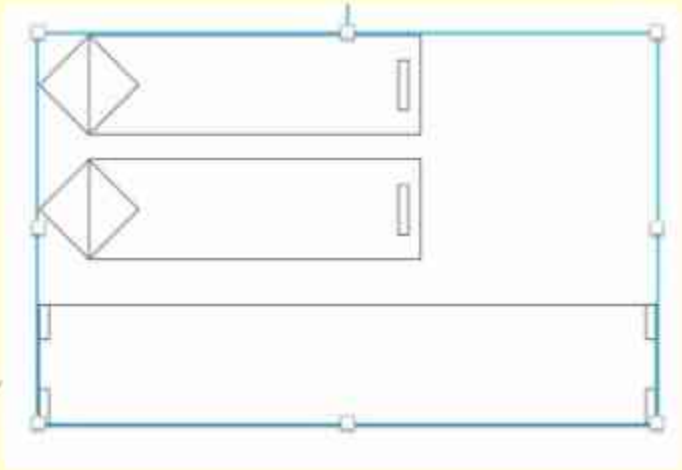
RFID-induction tags

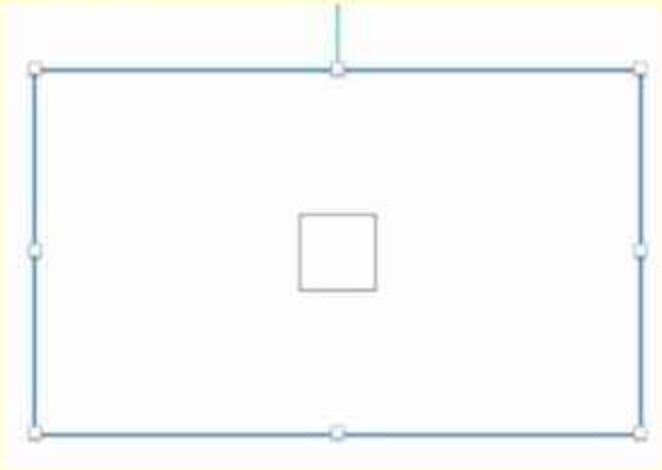
Key fob

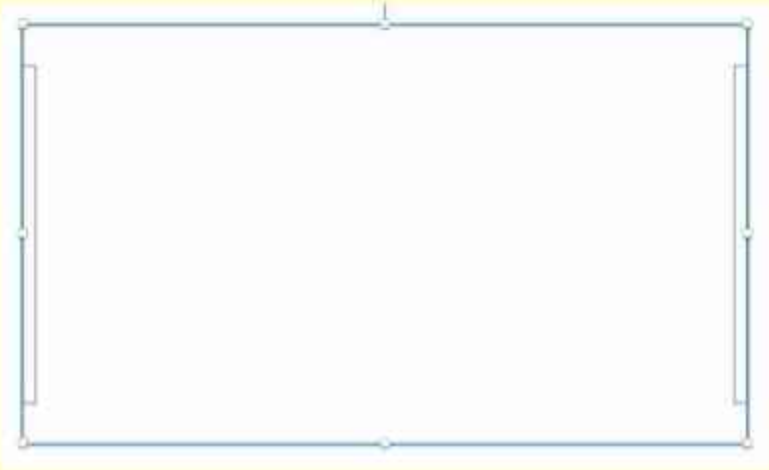
Tabbed



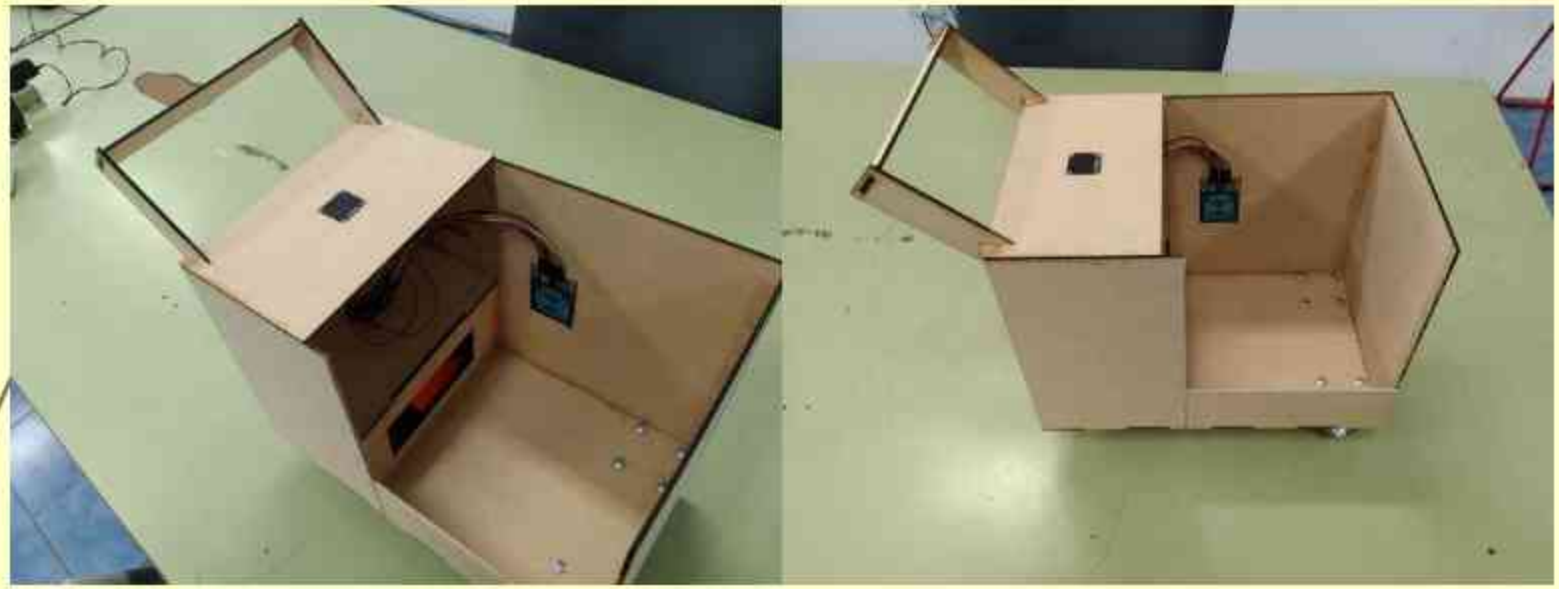
Laserbox







Shopping cart



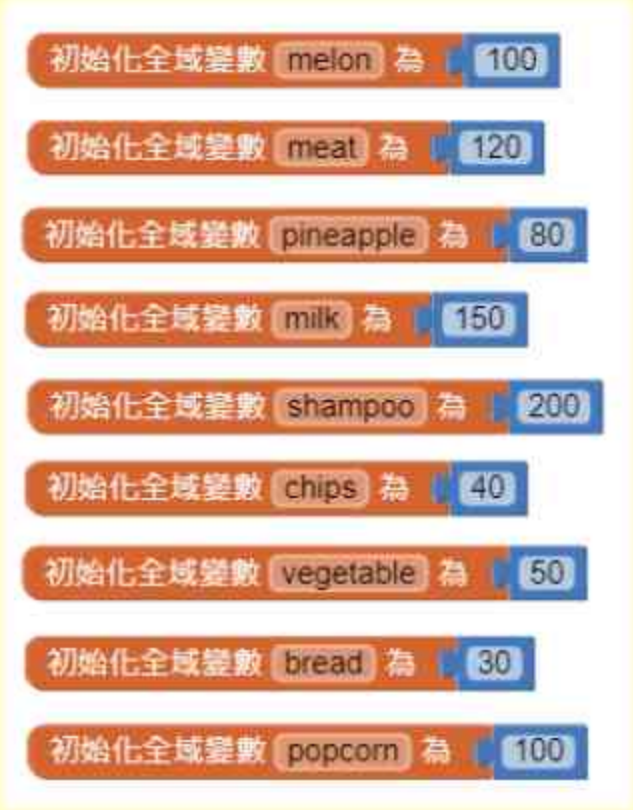
App inventor

Find the figures we want in the string

Get money


12:22
Screen1
選擇您的購物車
資訊: money=500$
你的卡片金額: 500
總金額: 0
卡片原始金額: 500
加值:
您買過的商品
結帳
退出
已連結購物車

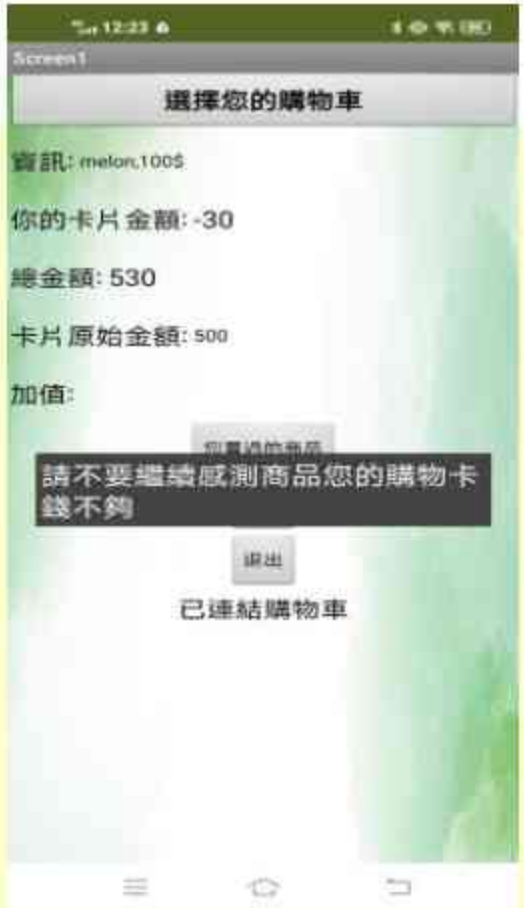
Product price



Display the amount of goods

Display price 、
add amount

Remind users that money is not enough



Warning message

Top-up


如果
文字比較
商品
文字
=
bonus,100$
則
設置 全域 初始金額 為
取得 全域 初始金額
+
100
設 加值標籤 . 文字 為
100$
如果
文字比較
商品
文字
=
bonus,50$
則
設置 全域 初始金額 為
取得 全域 初始金額
+
50
設 加值標籤 . 文字 為
50$
如果
文字比較
商品
文字
=
bonus,10$
則
設置 全域 初始金額 為
取得 全域 初始金額
+
10
設 加值標籤 . 文字 為
10$


12:24
Screen1
選擇您的購物車
資訊: bonus,100$
你的卡片 金額: 70
總金額: 530
卡片原始金額: 500
加值: 100$
您買過的商品
結帳
退出
已連結購物車

list purchased items

melon,100$

chips,40$

vegetable,50$

chips,40$

shampoo,200$

melon,100$

Check out & *Send data to arduino*

End interface

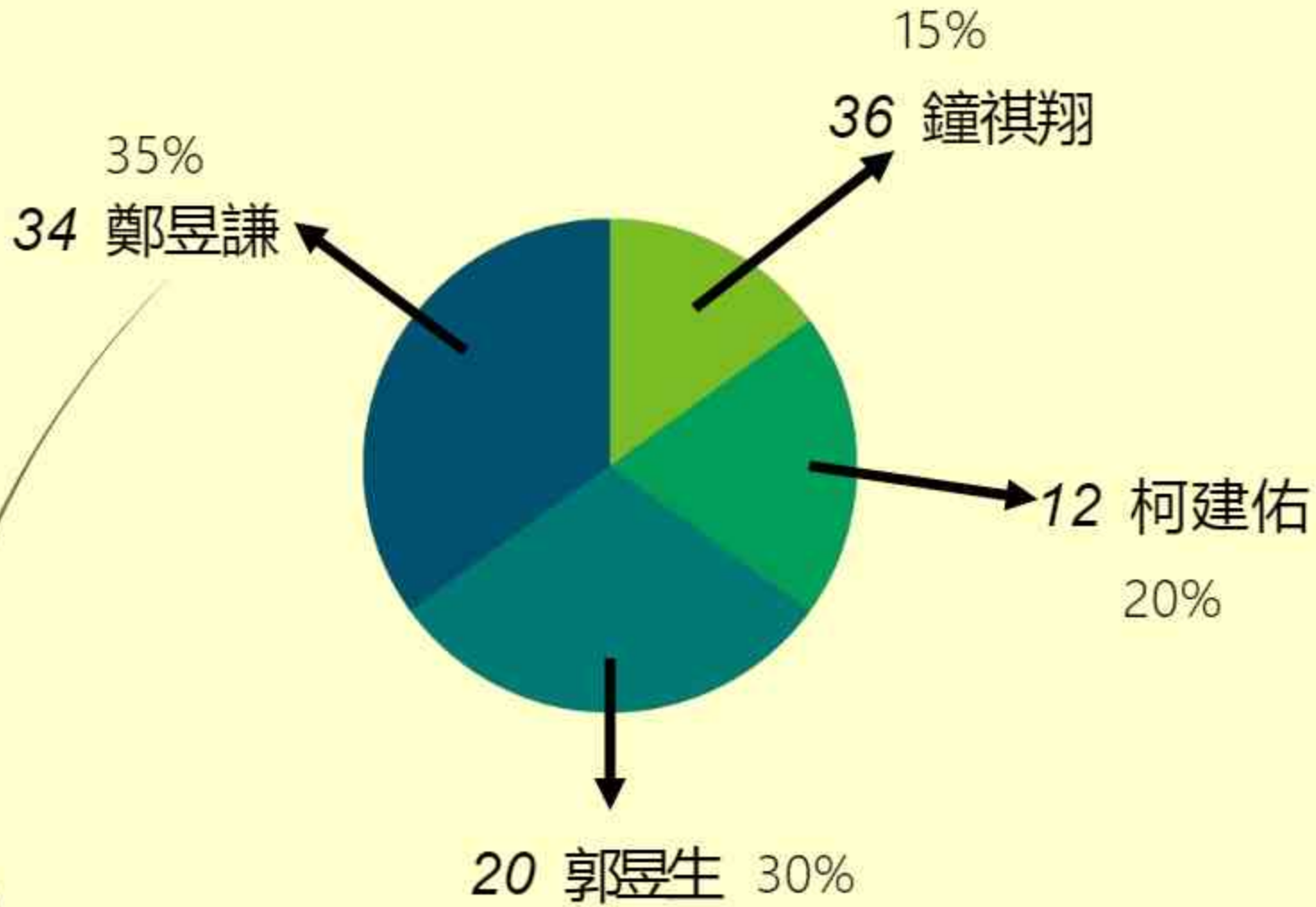
End shopping

A Demonstration Video

Future outlook

- *Add refund function*
- *Can be combined with voice function to find products*
- *Appearance Beautification*

Task Assignments



References

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- HC-05:https://swf.com.tw/?p=712
- OLED:https://lingshunlab.com/book/arduino/arduino-

uno-use-loed-display-i2c-ssd1306

- IFTTT:https://www.techbang.com/posts/10353-network-service-automation-application-ifttt-get-fb- maps-pchome-199-skills


Q&A


THANK
YOU!