



**Mini Project Presentation**  
**on**  
**FOOD QUALITY DETECTOR**

**Project Team**

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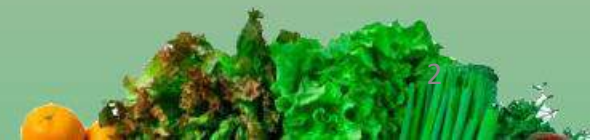
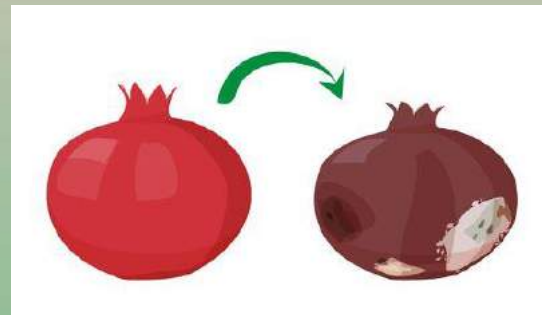
**Under the Guidance of**  
**Renuka V Tali**  
**(Asst. Professor)**





# INTRODUCTION

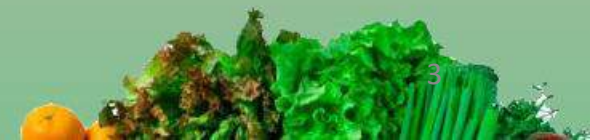
- In modern times the technology is being developed to ease in our day to day work.
- The quality of the food lies in its cleanliness & sustain for long time.
- The quality of the food should be monitored
- It will detect the gas that is released from the spoiled food & tell the user that the food is spoiled or not.





# Proposed Idea/Methodology

- The embedded system is based on microcontroller like Arduino UNO which is an prototyping board.
- The Arduino board is interfaced with gas sensors like MQ4 to distinguish gases.
- This senses the gases coming out from the rotten food.
- The results are viewed by the user through a LCD display.





# Hardware and software Requirements

THE COMPONENTS FOR THIS PROJECT ARE AS FOLLOWS

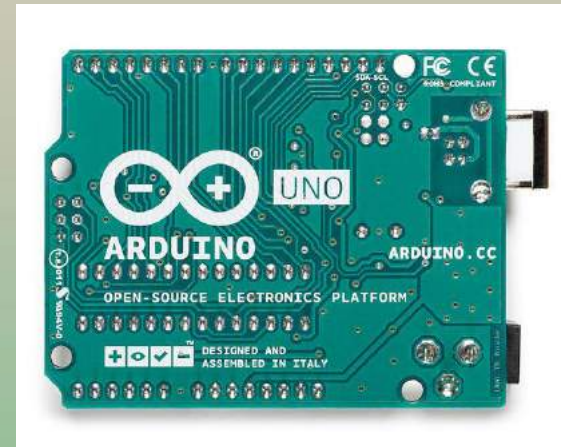
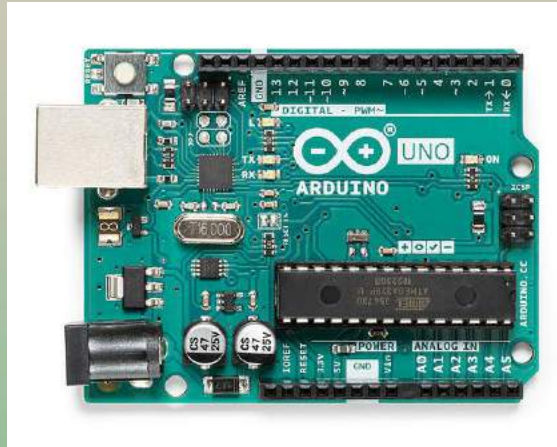
## Hardware Components & Software Requirement

1. ARDUINO UNO R3
  2. MQ4 GAS SENSORS
  3. 16\*2 LCD DISPLAY & I2C MODULE
  4. LEDs
  5. BREAD BOARD
  6. JUMPER WIRES
1. ARDUINO IDE



# 1. ARDUINO UNO R3

- The Arduino Uno R3 is a microcontroller.
- It has 20 digital input/output pins.
- Programs can be loaded on to it .
- The R3 is the third, and latest, revision of the Arduino Uno.

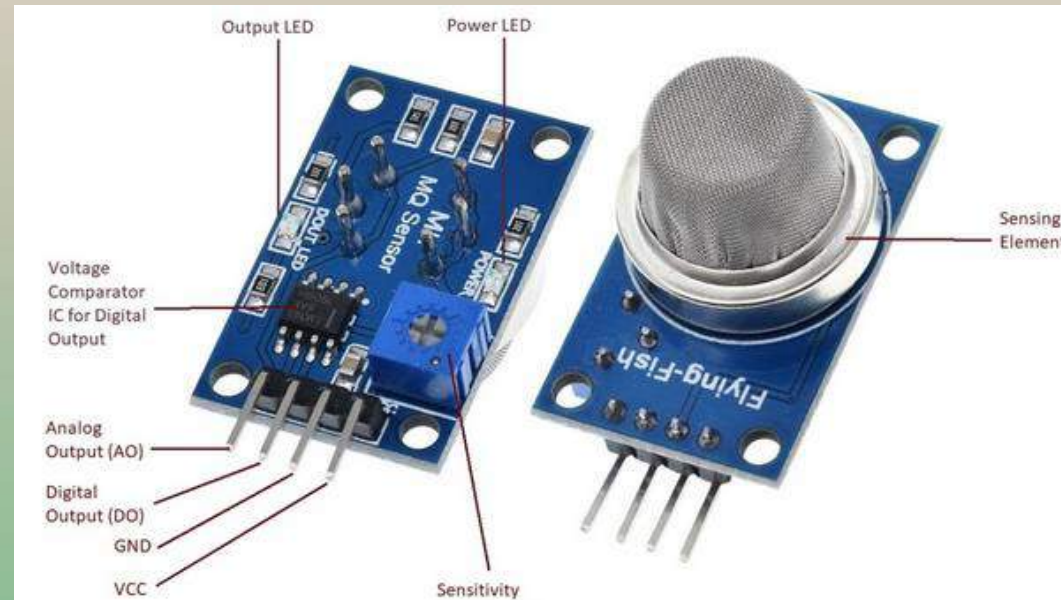






## 2. MQ4 GAS SENSOR

- MQ4 Methane Gas Sensor detects the concentration of methane gas in the air and outputs its reading as an analog voltage.
- 300 ppm to 10,000 ppm.





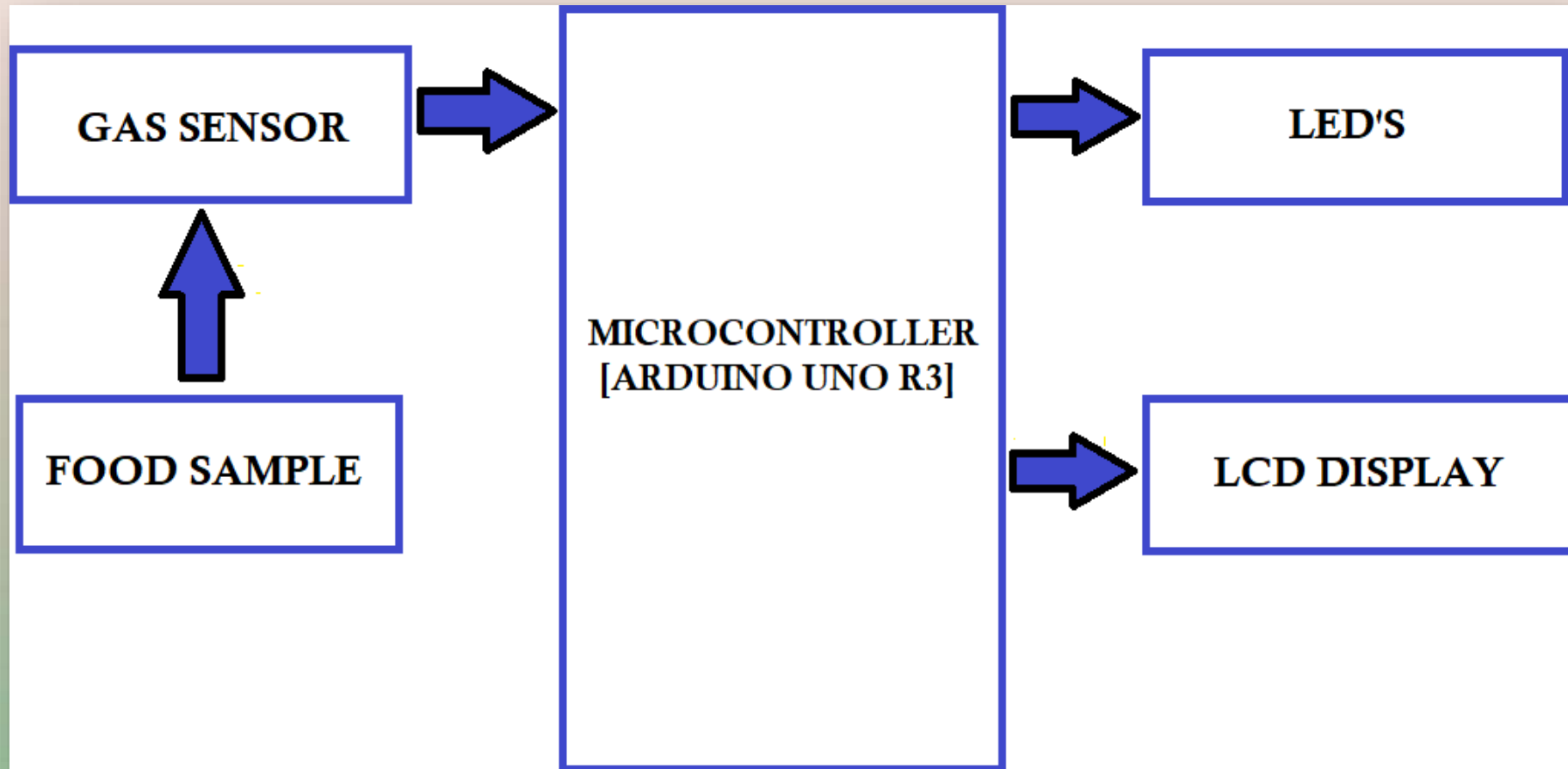
### 3. 16\*2 LCD & I2C BUS

- In LCD 16×2, the term LCD stands for Liquid Crystal Display that uses a plane panel display technology.
- 16 Columns & 2 Rows so it can display 32 character.
- Each LCD character is displayed in 5X7 pixel matrix.
- I2C Module is used to convert I2C serial data to parallel data for the LCD display.





# BLOCK DIAGRAM







# WHY MQ4 Sensor ?

Products	Gas Emitted
• Channa	• <b>Methane</b>
• Banana	• Ethylene ,Formaldehyde & <b>Methane</b>
• Cowpeas	• <b>Methane</b>
• Apple	• Ethylene ,Formaldehyde & <b>Methane</b>
• Onion	• Sulfoxides <b>Methane</b> (small amount)
• Coriander	• <b>Methane</b>
• Green Gram	• <b>Methane</b>
• Rice	• <b>Methane</b>

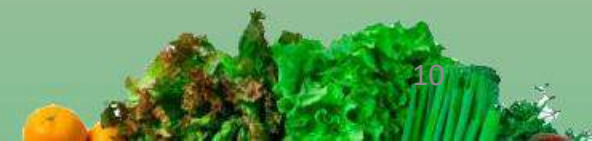
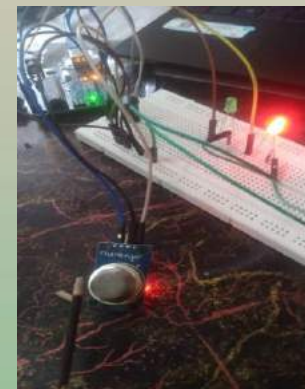
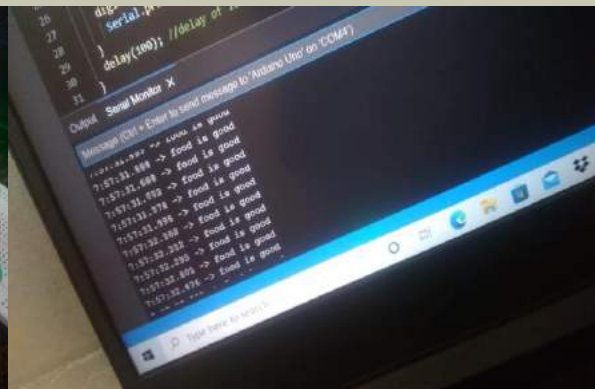
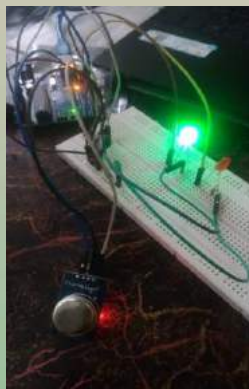




# INTERFACING PINS

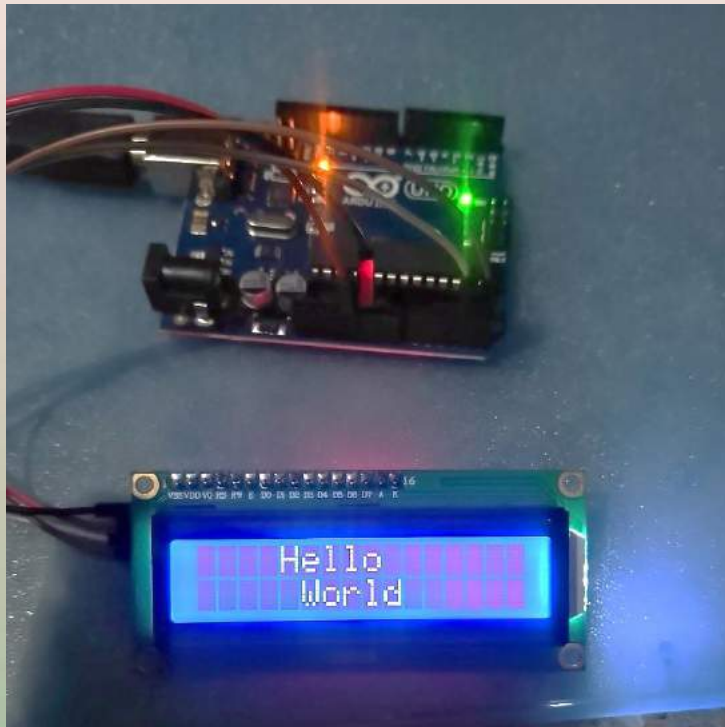
## 1. MQ4 with Arduino UNO R3

MQ4 pins	Arduino uno R3
A0	A0
VCC	5V
GND	GND
D0	NO connection





## 2. 16\*2 LCD & I2C Module



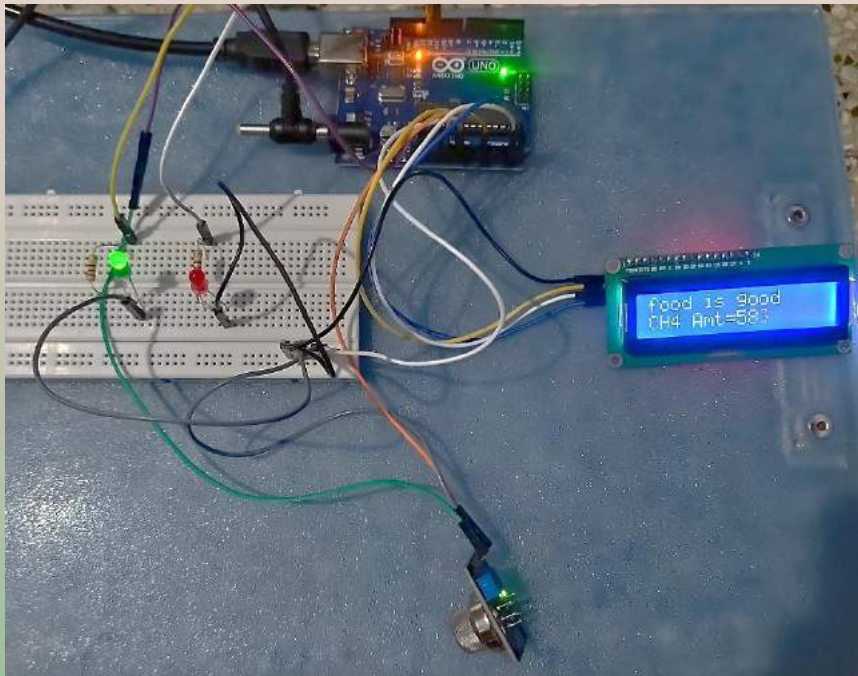
I2C Pins	Arduino board Pins
VCC	5V
GND	GND
SDA	A4
SCL	A5





# Testing

## FOR FRESH FOOD



```
15  lcd.clear();
16  Serial.begin(9600);
17  pinMode(red, OUTPUT); //sets the re
18  pinMode(green, OUTPUT); //sets the gr
19  pinMode(gasA0, INPUT); //sets the ga
20  }
21
```

Output Serial Monitor x

Message (Ctrl + Enter to send message to 'Arduino Uno' on 'COM

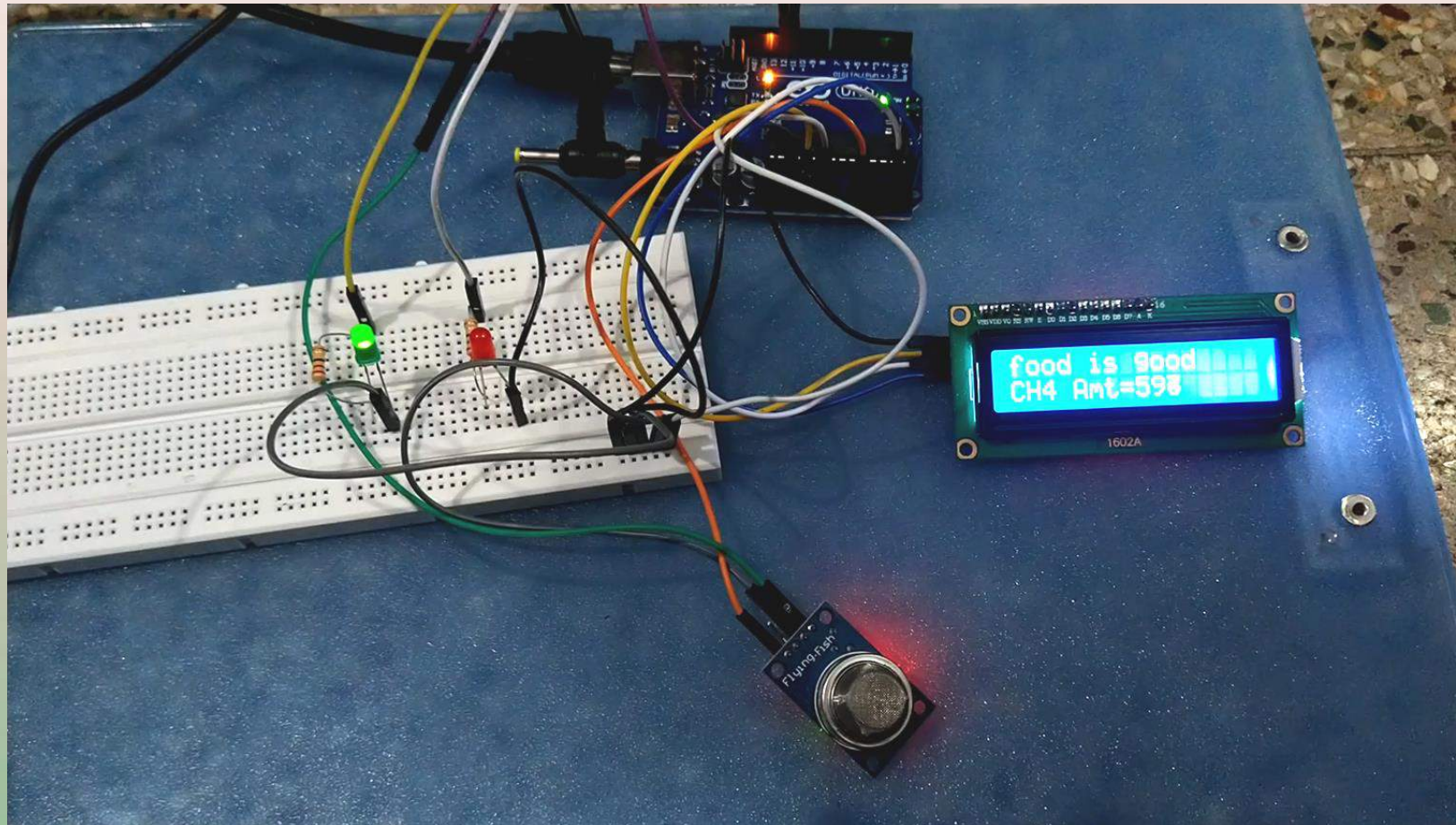
```
592
food is good
588
food is good
591
food is good
594
food is good
---
```





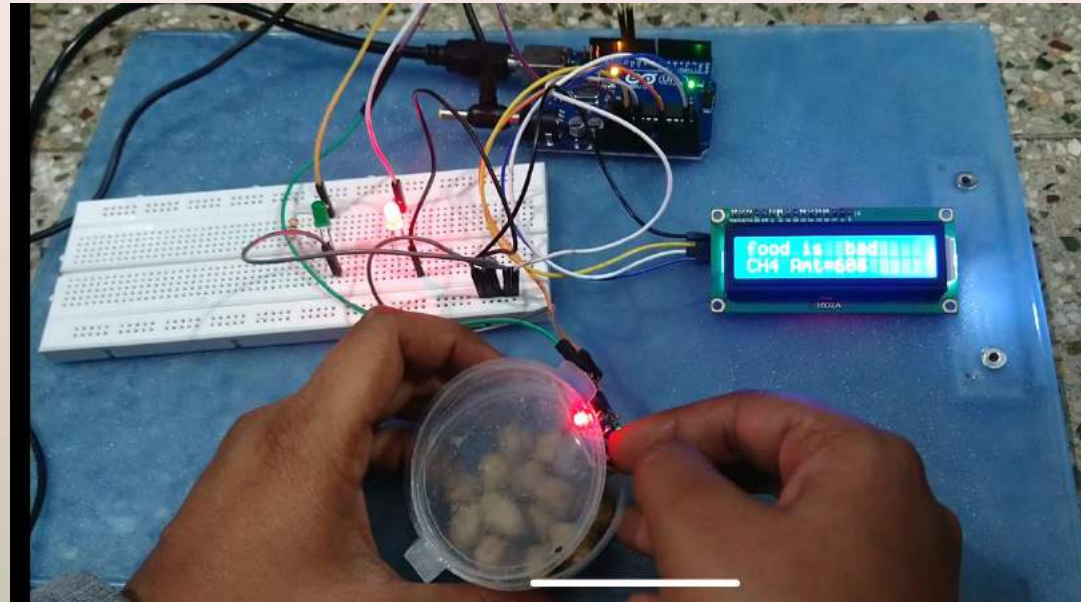


## FOR FRESH FOOD



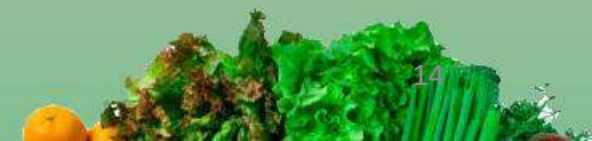


## FOR SPOILED FOOD



```
17  pinMode(red, OUTPUT);    //sets t
18  pinMode(green, OUTPUT); //sets t
19  pinMode(gasA0, INPUT);  //sets t
20  }
21

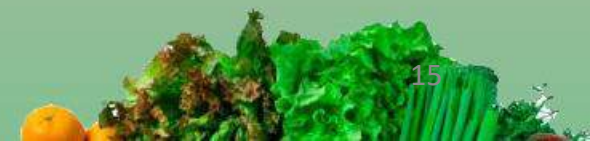
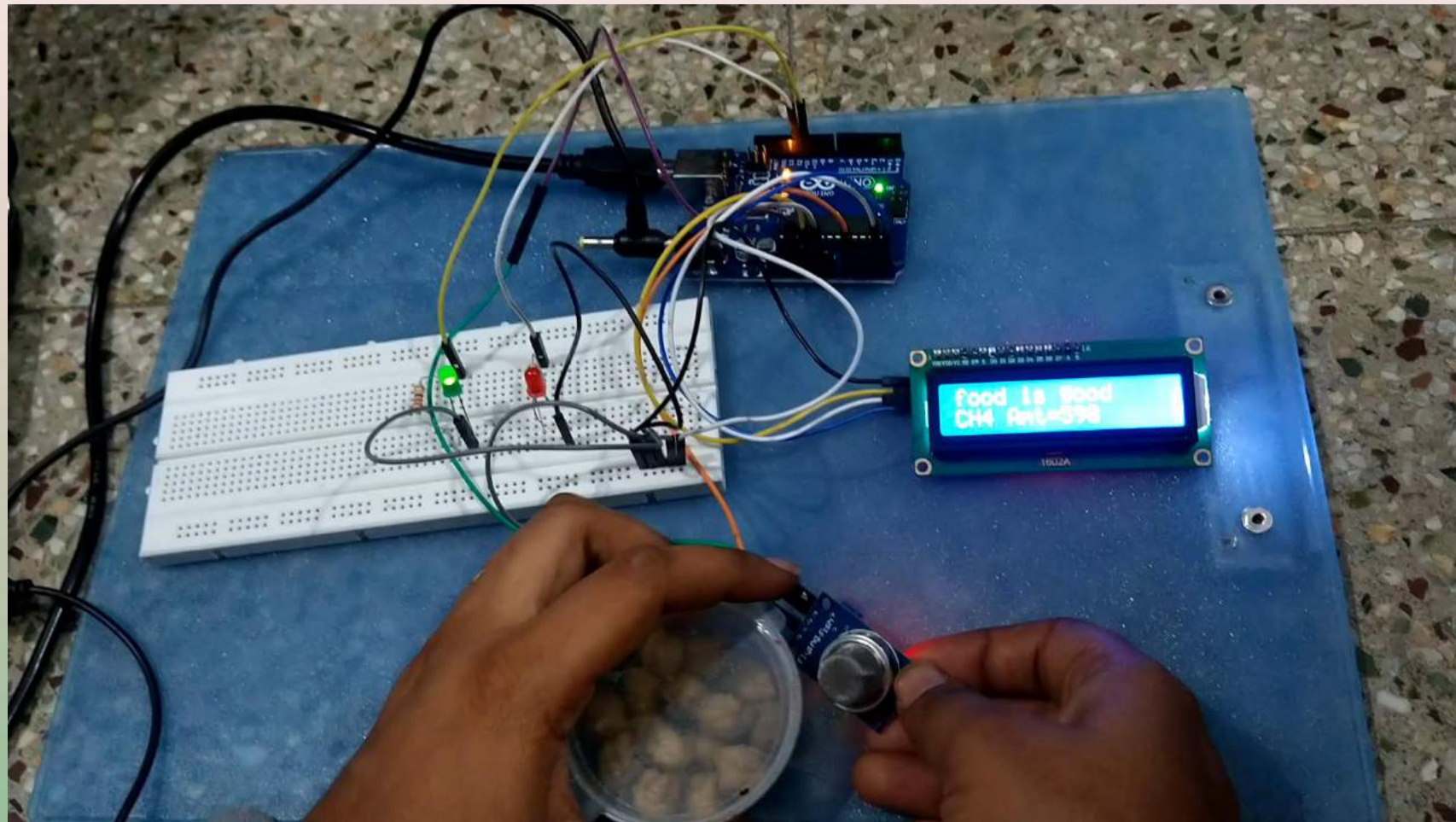
Output  Serial Monitor x
| Message (Ctrl + Enter) |
604
food is Bad
607
food is Bad
609
food is Bad
605
food is Bad
```







## FOR SPOILED FOOD





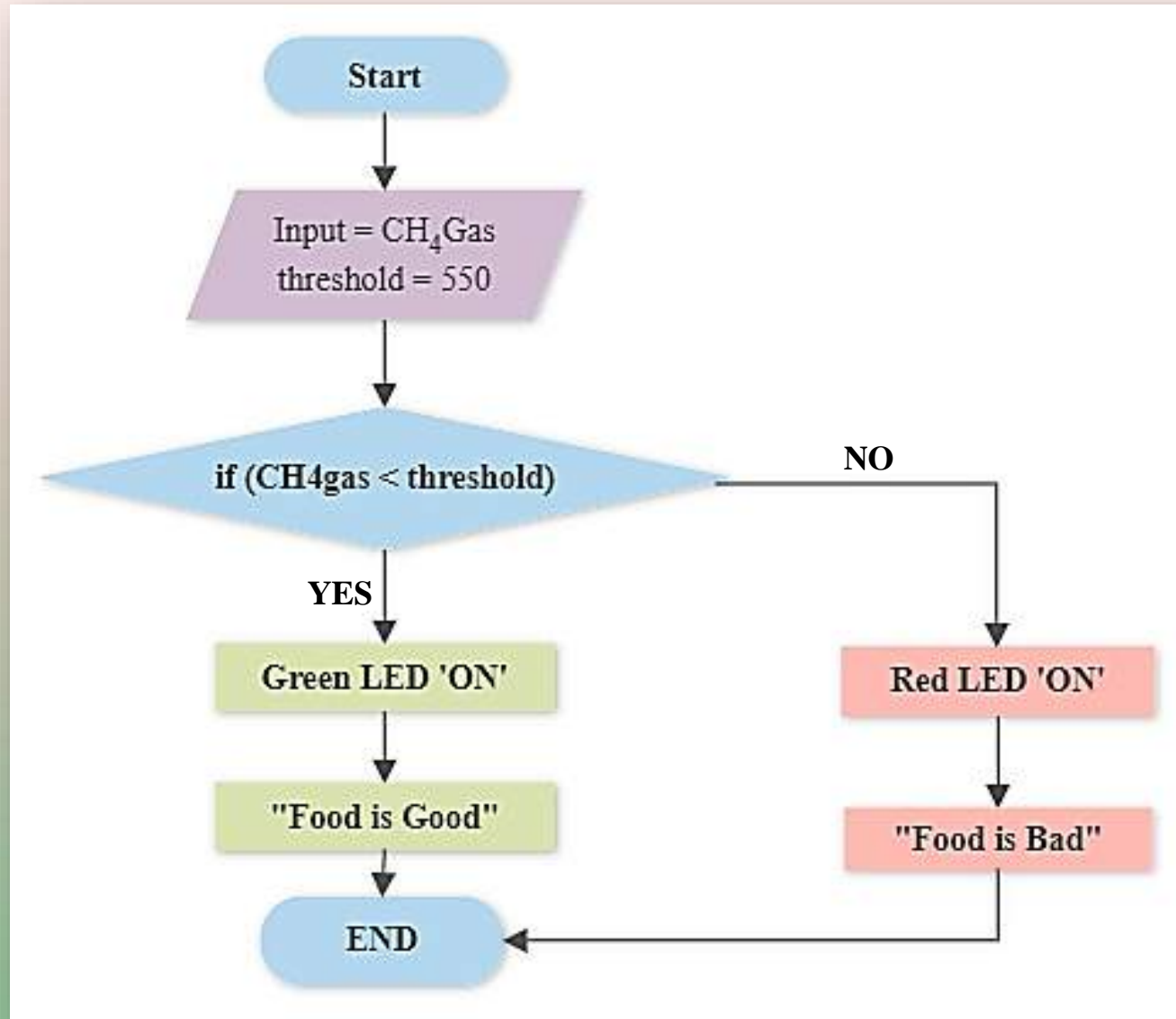
# THRESHOLD

FOOD SAMPLES	AMOUNT OF CH <sub>4</sub>
Banana	416
Onion	482
Channa	543
Custard Apple	448
Coriander Leaves	409
Jamun Fruit	439





# Flowchart





# Advantages

- Monitors the quality of food.
- Helps in decreasing of food waste.
- Not disruptive to production.
- Prevent faulty goods and services being sold.
- Improved reputation for quality → increase sales in businesses.







# Applications.

The food quality monitoring system is applicable in areas such as:

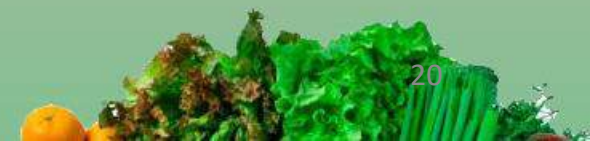
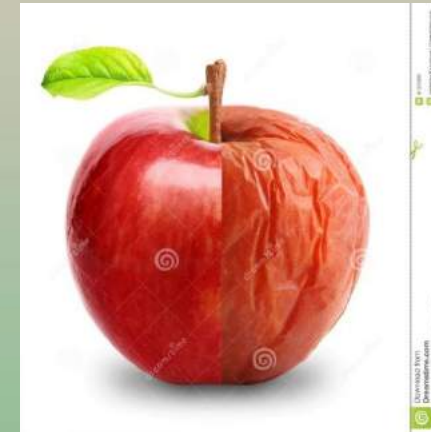
- Supermarket warehouse
- Food production industry
- Food shipment containers
- Manufacturing of fruit jam and fruit juice





# Limitations

- 1) It senses only methane gas, where some foods may emit other gases.
- 2) The process of inspecting the goods costs time and money.







# Work completion status

- Literature survey ☒
- Hardware interfacing and testing ☒
- Implementation ☒
- Report ☒





# References

1. Popa, Alexandru, Mihaela Hnatiuc, Mirel Paun, Oana Geman, D. Jude Hemanth, Daniel Dorcea, Le Hoang Son, and Simona Ghita. "An intelligent IoT-based food quality monitoring approach using low-cost sensors." *Symmetry* 11, no. 3 (2019): 374.
2. Ping, Hua, Jihua Wang, Zhihong Ma, and Yuanfang Du. "Mini-review of application of IoT technology in monitoring agricultural products quality and safety." *International Journal of Agricultural and Biological Engineering* 11, no. 5 (2018): 35-45.
3. Bouzembrak, Yamine, Marcel Klüche, Anand Gavai, and Hans JP Marvin. "Internet of Things in food safety: Literature review and a bibliometric analysis." *Trends in Food Science & Technology* 94 (2019): 54-64.
4. Ying, Fu, and Li Fengquan. "Application of internet of things to the monitoring system for food quality safety." In *2013 Fourth International Conference on Digital Manufacturing & Automation*, pp. 296-298. IEEE, 2013.





*Thank You*

