SMART WATER SUPPLY AND MANAGEMENT SYSTEM

FINAL REVIEW

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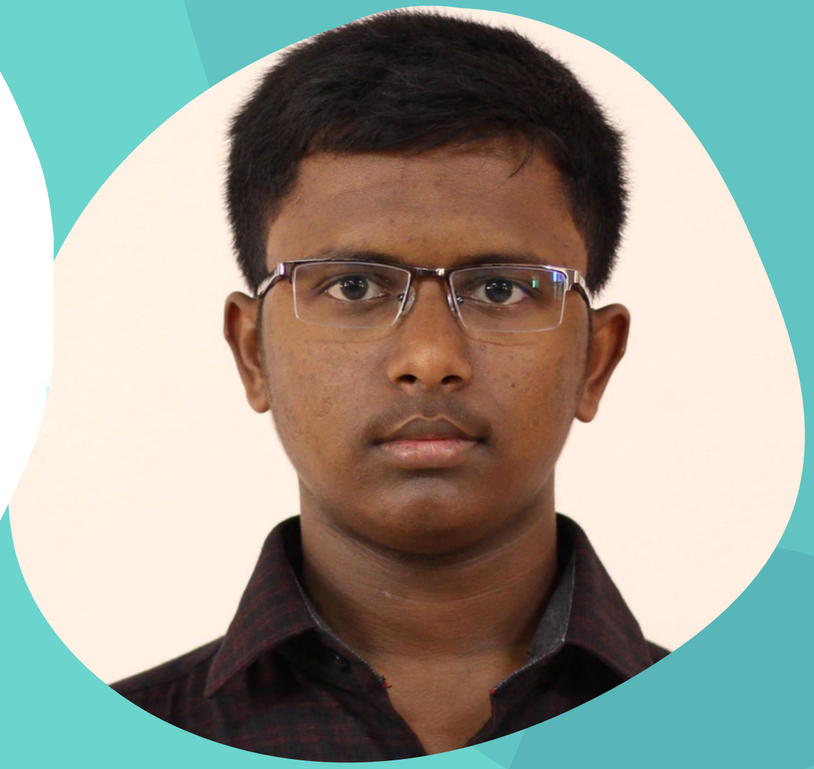


PRABHU B

19BCY10139

SPECIAL THANKS TO

DR. UJJAL HALDER

OUR MAIN TOPICS TODAY

Objective

Project Modules

Video Demonstration

Responsibility of Each Team Member

AIM OF THE PROJECT

To design and enhance the existing water management system that would manage and suffice the need of the water in Urban areas.

OBJECTIVE 1

To fulfill the need of water in urban areas, ensuring sustainability and security.

OBJECTIVE 2

To create a mechanism that would detect the cause of leakage and water shortage in the supply system

OBJECTIVE 3

To develop a system that is capable of recycling water.

OBJECTIVE 4

To find a way to stop wastage of water.

DETAILS ABOUT EXISTING PROJECTS AVAILABLE

1.Listening devices

Both electrical and mechanical geophones are used to listen to buried water pipelines from the surface. These devices are accurate and highly sensitive so that they can detect the exact location of the leak, and are also cheap to purchase and easy to set up.

2.Gravity Analog TDS Sensor

Gravity Analog TDS Sensor is an Arduino-compatible TDS sensor/Meter Kit for measuring the TDS value of water. It can be applied to domestic water, hydroponic and other fields of water quality testing.

3. TDS meter

A TDS meter is basically an electrical charge (EC) meter whereby two electrodes equally spaced apart are inserted into water and used to measure charge. The result is interpreted by the TDS meter and converted into a ppm figure.

PROJECT MODULES

Water Level Indication

Checking the Purity of Water

Reach of Water to the Destination

Leakage Detection

Rainwater Harvesting

Recycling water

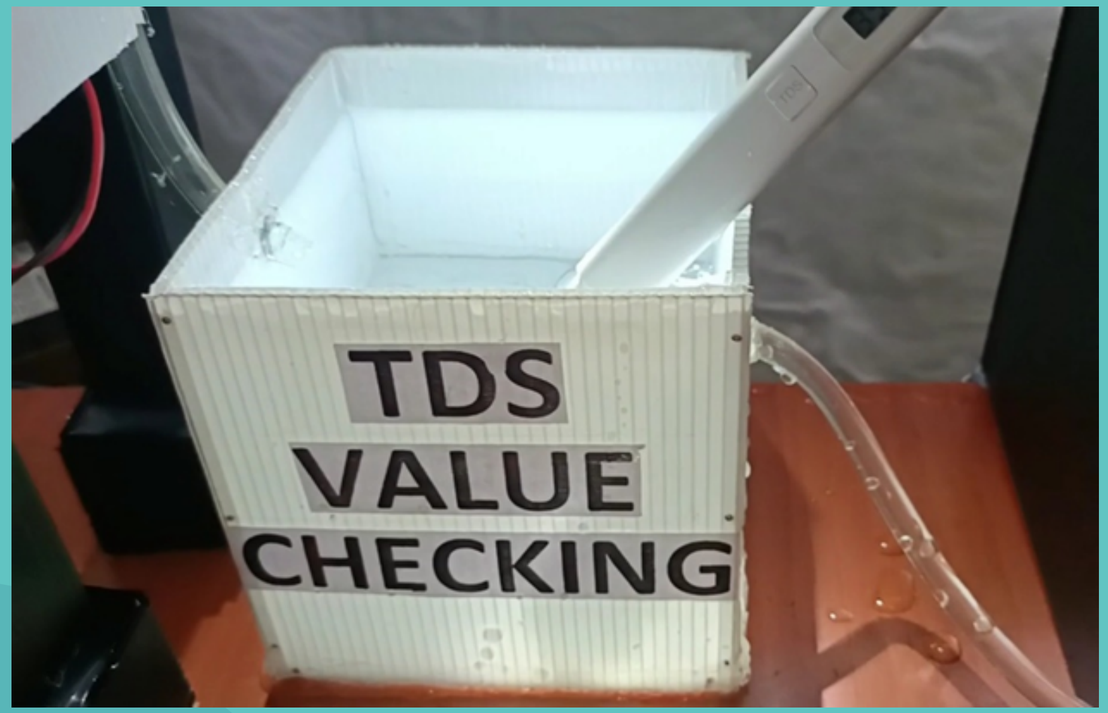
WATER LEVEL INDICATION

This Water level identification system is used to measure and identify the water level.

What is water level indication?
It is an indicator which is used to indicate the quantity of water is present in the tank.

We made this water level indicator using LEDs, a battery, and some wire connections. It will be useful to save water instead of overflowing. When a certain amount of water is filled in the tank, we can switch off the motor. Hence the water will not get wasted

PURITY OF WATER



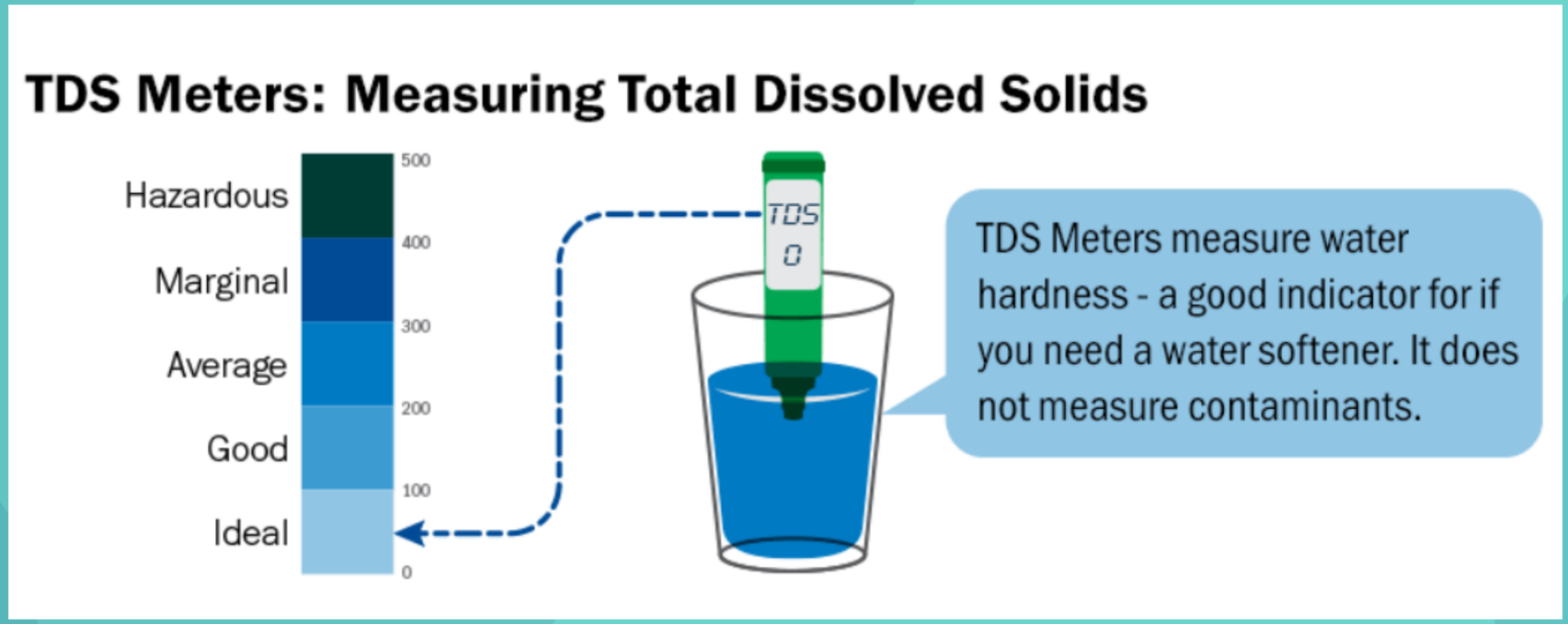
What is TDS?

The full form of TDS in drinking water is “Total Dissolved Solids”, and it is the measure of all inorganic and organic substances that are dissolved in water. The very common inorganic substances that are found in water are magnesium, calcium, and potassium. To a certain degree, the presence of these minerals in the water is actually healthy, but when the level becomes too much, it is a cause of worry.

PURITY OF WATER

Why Do You Need to Check TDS?

By measuring TDS levels in the water, you will be able to make sure whether the water you are drinking is pure or impure. The maximum TDS level of drinking water is 500 mg/L. Whether you get your water from the nearby lake or a tank, you must make sure that it meets this mentioned level. If you see that the level is exceeding 500 mg/L, we suggest that you do not drink that water.

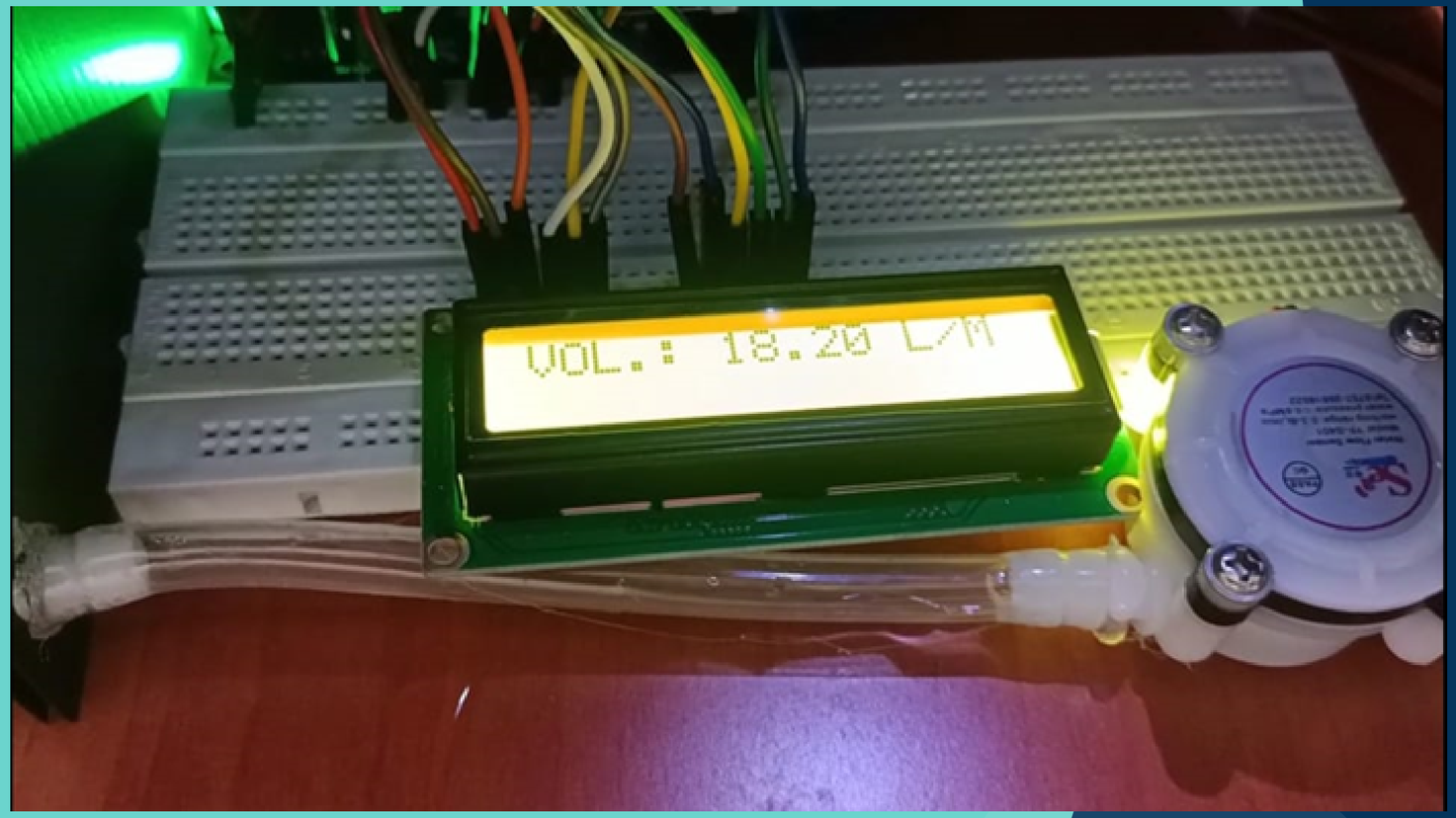


PURITY OF WATER

Level of TDS (mg/L)	No. of TW	%	TDS Rating
<300	5	25	Excellent
300-600	8	40	Good
601-900	5	25	Fair
900-1200	-	-	Poor
>1200	2	10	Unacceptable

REACH OF WATER TO THE DESTINATION

- To measure the volume of the water passing through the pipe.
- Purpose: to identify if the person is extracting more amount of water or is receiving less due to any fault.



- Materials used: Water flow sensor, jumper wires, breadboard and Arduino Board.

CODE

```
#include <LiquidCrystal.h>
LiquidCrystal lcd(7, 6, 5, 4, 3, 2);
int X;
int Y;
float TIME = 0;
float FREQUENCY = 0;
float WATER = 0;
float TOTAL = 0;
float LS = 0;
const int input = A0;
void setup()
{
Serial.begin(9600);
lcd.begin(16, 2);
lcd.clear();
lcd.setCursor(0,0);
lcd.print(“Water Flow Meter”);
lcd.setCursor(0,1);
lcd.print(“******”);
```

CODE

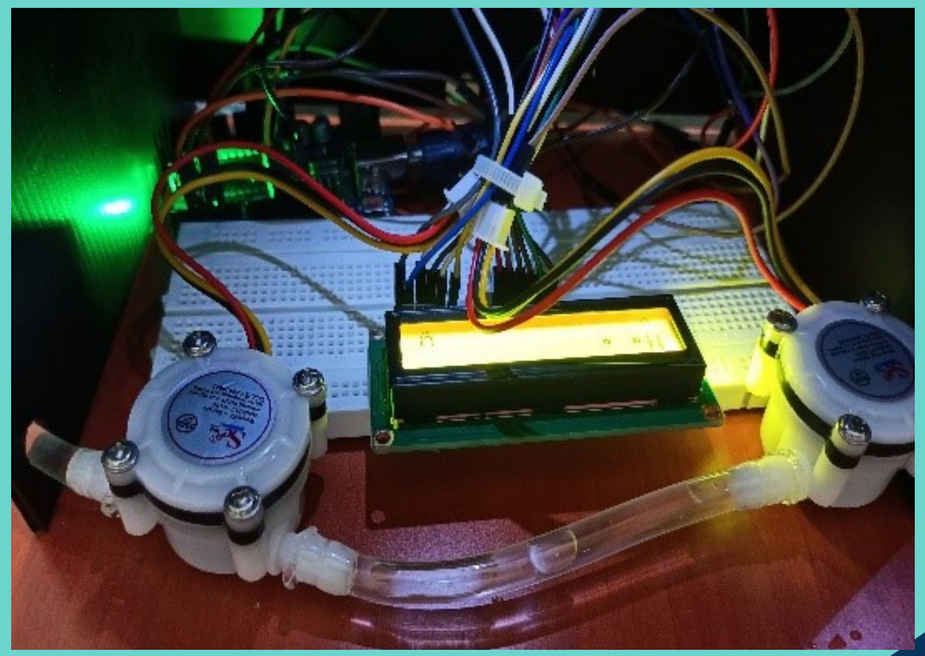
```
delay(2000);
pinMode(input,INPUT);
}
void loop()
{
X = pulseIn(input, HIGH);
Y = pulseIn(input, LOW);
TIME = X + Y;
FREQUENCY = 1000000/TIME;
WATER = FREQUENCY/7.5;
LS = WATER/60;
if(FREQUENCY >= 0)
{
if(isinf(FREQUENCY))
{
lcd.clear();
lcd.setCursor(0,0);
lcd.print("VOL. :0.00");
```

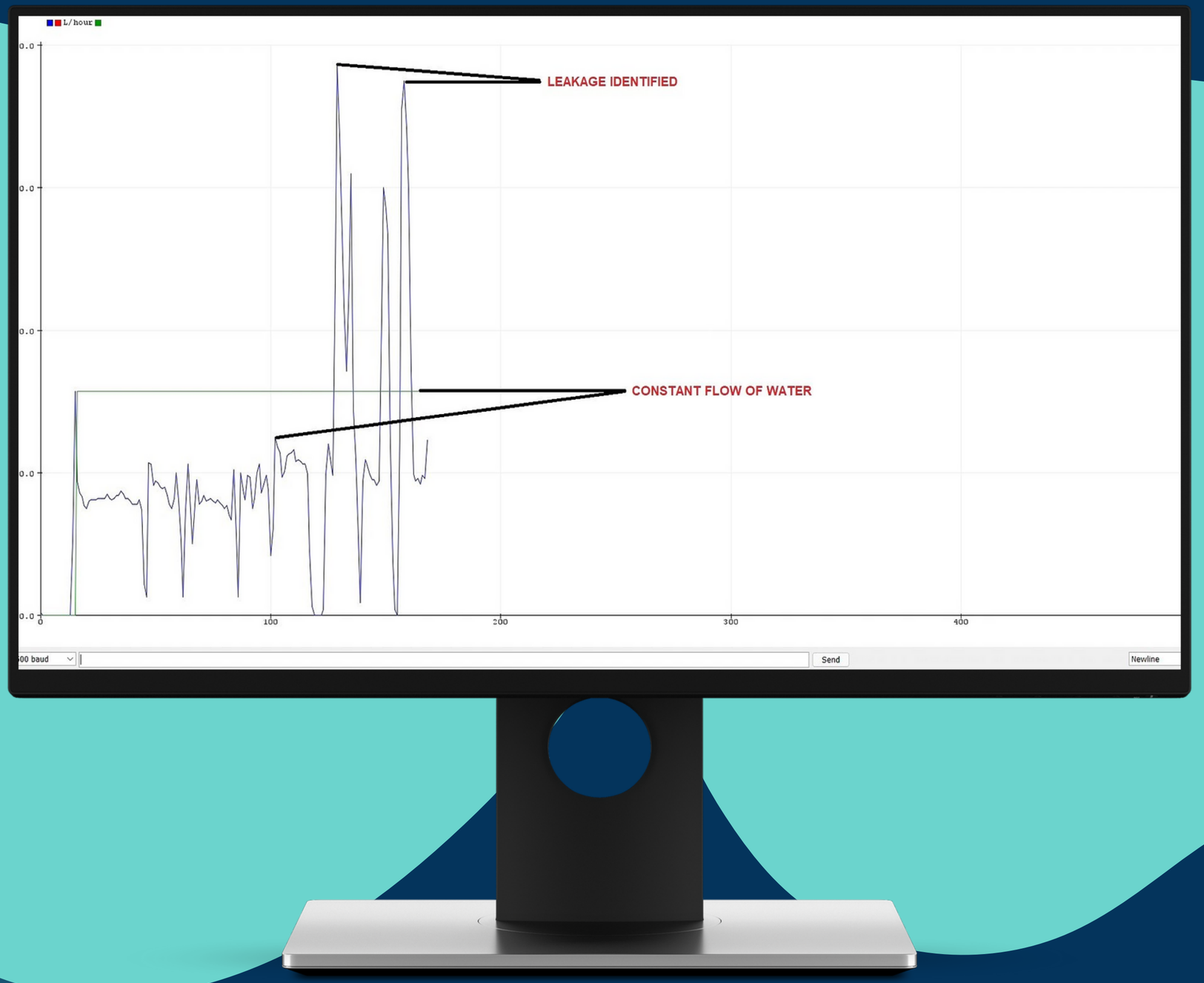
CODE

```
lcd.setCursor(0,1);
lcd.print(“TOTAL:”);
lcd.print( TOTAL);
lcd.print(” L”);
}
else
{
TOTAL = TOTAL + LS;
Serial.println(FREQUENCY);
lcd.clear();
lcd.setCursor(0,0);
lcd.print(“VOL.: “);
lcd.print(WATER);
lcd.print(” L/M”);
lcd.setCursor(0,1);
lcd.print(“TOTAL:”);
lcd.print( TOTAL);
lcd.print(” L”);
}
}
delay(1000);
}
```

LEAKAGE DETECTION

The water leakage detection system is to find the water leakage in the pipes. The leakage of water in pipes can be found by using led, arduino and two water flow sensor. we have to find the constant flow of water. If the flow is high then graph roars to the highest peak point then there is an leakage between the pipes. If the flow is low then graph will be all time low.Hence there is no leakage in the pipes.




L/hour
0.0
0.0
0.0
0.0
0
100
200
300
400
LEAKAGE IDENTIFIED
CONSTANT FLOW OF WATER
00 baud
Send
Newline

CODE

```
#include <LiquidCrystal.h>
// initialize the library by associating any
needed LCD interface pin
// with the arduino pin number it is connected
to
const int rs = 12, en = 11, d4 = 7, d5 = 6, d6 = 5,
d7 = 4;
LiquidCrystal lcd(rs, en, d4, d5, d6, d7);

unsigned int estimateAvg = 250;
unsigned int avarageValue = 0;
unsigned int avarageCount = 0;
unsigned int avarageResult = 0;

unsigned int checkTime = 10;
unsigned int checkTimeCount = 1;
unsigned int hour = 0;
unsigned int returnValue = 0;
unsigned int secondInput = 0;
```

CODE

```
unsigned int initialValue;
const int ledPin =  13;
const int ledPin1 =  12;
volatile int flow_frequency1;
volatile int flow_frequency; // Measures flow
sensor pulses
unsigned int l_hour; // Calculated litres/hour
unsigned char flowsensor = 2; // Sensor Input
unsigned char flowsensor1 = 3;
unsigned long currentTime;
unsigned long cloopTime;
void flow () // Interrupt function
{
  flow_frequency++;
  secondInput = 1;
}
void flow1 () // Interrupt function
{
  flow_frequency++;
}
```

CODE

```
void setup()
{
  // set up the LCD's number of columns and
rows:
  lcd.begin(16, 2);

  pinMode(flowsensor, INPUT);
  pinMode(ledPin, OUTPUT);
  pinMode(ledPin1, OUTPUT);
  pinMode(flowsensor1, INPUT);
  digitalWrite(flowsensor, HIGH); // Optional
Internal Pull-Up
  Serial.begin(9600);
  attachInterrupt(0, flow,CHANGE); // Setup
Interrupt
  sei(); // Enable interrupts
  currentTime = millis();
  cloopTime = currentTime;
}
```

CODE

```
void loop ()
{
 currentTime = millis();
 // Every second, calculate and print litres/hour
 if(currentTime >= (cloopTime + 1000))
{
      lcd.clear();
      hour += (millis()/1000)/60/60;
      cloopTime = currentTime; // Updates cloopTime
      // Pulse frequency (Hz) = 7.5Q, Q is flow rate in
L/min.
      l_hour = (flow_frequency * 60 / 7.5); // (Pulse
frequency x 60 min) / 7.5Q = flowrate in L/hour
      flow_frequency = 0; // Reset Counter
      Serial.print(l_hour, DEC); // Print litres/hour
      Serial.print(" L/hour    ");
      Serial.println(initialValue);
```

CODE

```
if(l_hour > 0 && initialValue > 0 && secondInput != 1){
 averageValue = averageValue + l_hour;
 averageCount+=1;
 averageResult = averageValue / averageCount;
 }
if(secondInput == 1 && l_hour > 0){
        returnValue = returnValue + 1;
        }
        if((millis()/1000) > (checkTime * checkTimeCount)){
           checkTimeCount+=1;
         }
        if((millis()/1000) <= (checkTime * checkTimeCount)
&& l_hour > estimateAvg && l_hour > 0 && initialValue
> 0){
          lcd.setCursor(0,0);
          lcd.print("You took more");
          lcd.setCursor(0,1);
          lcd.print("water");
       }
```

CODE

```
else{
            if(l_hour < initialValue && l_hour > (initialValue-200) &&
l_hour > 0 && initialValue > 0){
                lcd.setCursor(0,0);
                lcd.print("Waterflow Normal");
                lcd.setCursor(0,1);
                lcd.print(l_hour);
                lcd.setCursor(5,1);
                lcd.print("l/H");
                lcd.setCursor(9,1);
                lcd.print(averageResult);
               }else if(l_hour > initialValue && initialValue > 0 && l_hour >
0){
                  lcd.setCursor(0,0);
                  lcd.print("OVERFLOW");
                  lcd.setCursor(0,1);
                  lcd.print(l_hour);
                  lcd.setCursor(5,1);
```

CODE

```
lcd.print("l/H");
 lcd.setCursor(9,1);
 lcd.print(averageResult);
 }
else if(l_hour == 0 && initialValue > 0){
                    lcd.setCursor(0,0);
                    lcd.print("NO FLOW");
                    lcd.setCursor(0,1);
                    lcd.print(l_hour);
                    lcd.setCursor(5,1);
                    lcd.print("l/H");
                    lcd.setCursor(9,1);
                    lcd.print(averageResult);
                  }else if(l_hour < (initialValue-200) && l_hour > 0 &&
initialValue > 0){
                      lcd.setCursor(0,0);
                      lcd.print("LEAK");
                      lcd.setCursor(0,1);
                      lcd.print(l_hour);
```

CODE

```
l lcd.setCursor(5,1);
 lcd.print("l/H");
 lcd.setCursor(9,1);
 lcd.print(averageResult);
 }
 }
      if(l_hour > 100 && secondInput == 1 && returnValue == 3){
           initialValue = l_hour;
           detachInterrupt(0);
           attachInterrupt(1, flow1, RISING);
           secondInput = 2;
         }
   }
}
```

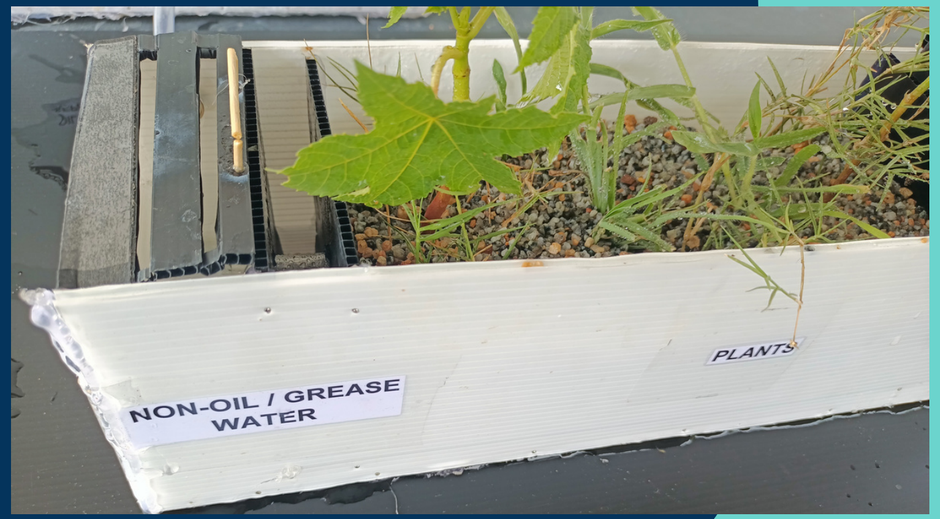
RAIN WATER HARVESTING

This Water level identification system is used to measure and identify the water level. We can do this water level indicator using LEDs, a battery, and some wire connections. Which will be useful to save water instead of overflowing. When a certain amount of water is filled in the tank, we can switch off the motor. Hence the water will not get wasted

RECYCLING WATER

This recycle tank is designed in a way of eight chambers. Starting from the

- Kitchen water
- Solid waste removing
- Oil / Grease separation
- Sedimentation process
- Oxygen supply
- Non- Oil / Grease water
- Plants
- Recycled water


NON-OIL / GREASE
WATER
PLANTS


OPPO F17 Pro · ©Harish
2022/02/19 13:15

MATERIALS USED IN THIS PROJECT

Ply wood for Base	X1	Rs: 400
Bread board	X1	Rs :200
Arduino UNO	X2	Rs: 1494
Board	X1	Rs: 30
Arduino UNO	X3	Rs: 40
Cable	x3	Rs: 1487
Jumper Wires	x1	Rs: 399
Water Flow Sensor	x1	Rs: 373
TDS Sensor	x2	Rs :722
LCD Display	x2	Rs: 60
Water Pump	x 10m	
Pipe		

Video Demonstration

MAIN MODEL

RECYCLING WATER MODEL

INDIVIDUAL CONTRIBUTION

OF EACH TEAM MEMBER

GOPINATH K

- Art work of illustrating and the architecture of Main model and Recycle tank.
- Digitalized the design and drafting of the Main model and Recycle Tank.
- Giving the idea and Implementing of the Main model and Recycle tank.
- And some extra features were made to the main model to make it a decorative one. Like street lights, house lightning works, the Reach of water to the destination system, and leakage detection systems lighting.
- Made the construction of each house and their proper electrical connection
- Executing the Recycle tank model with various chamber designing with the lightning condition and making it a working one.
- Budjet Planning for this Project .

ABISHEK PRABAKARAN

- Worked on water leakage detection system.
- Referred various sources and how it works, Circuit diagram and code part of it.

CHANDRU T

- Worked on purity of water.
- Chose the TDS meter
- Provided content for making ppt.

SANDEEP S

- Worked on water level indication. Suggested the idea to know the water level.
- Helped in leakage detection ' s simulation, tested in Tinkercad and also we enquired some people regarding the water related issue.

MANIN THOMAS TA

- Planning and initiating the project.
- Researching about the water related issues that our community face.
- Design and implementation of Reach of water to the destination.
- Cross-checking existing works.
- Conducting discussions and integrating knowledge.
- Compiling what we have done to present it to the faculties.

PRABHU B

Rain water harvesting and pipeline connection methodology.

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THANK YOU