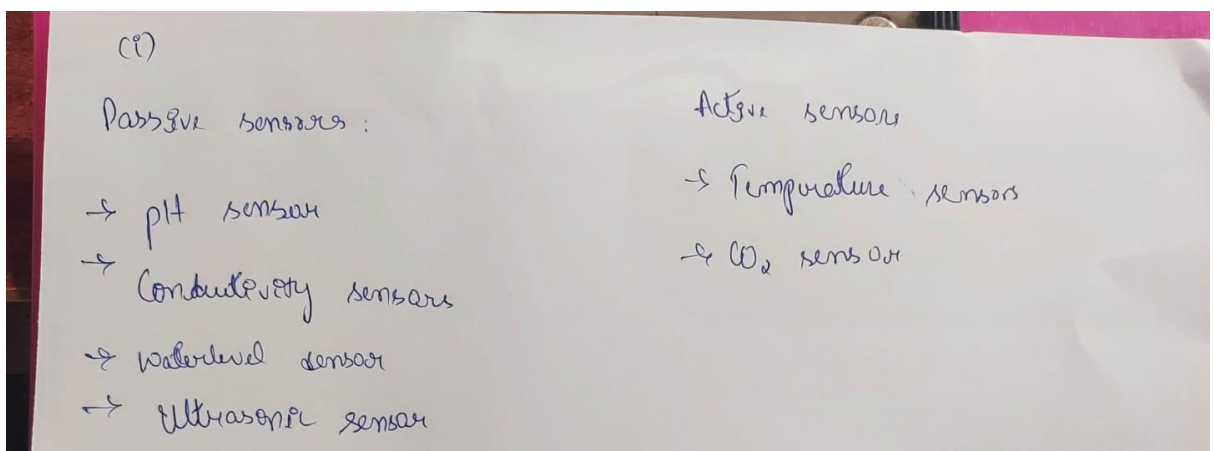


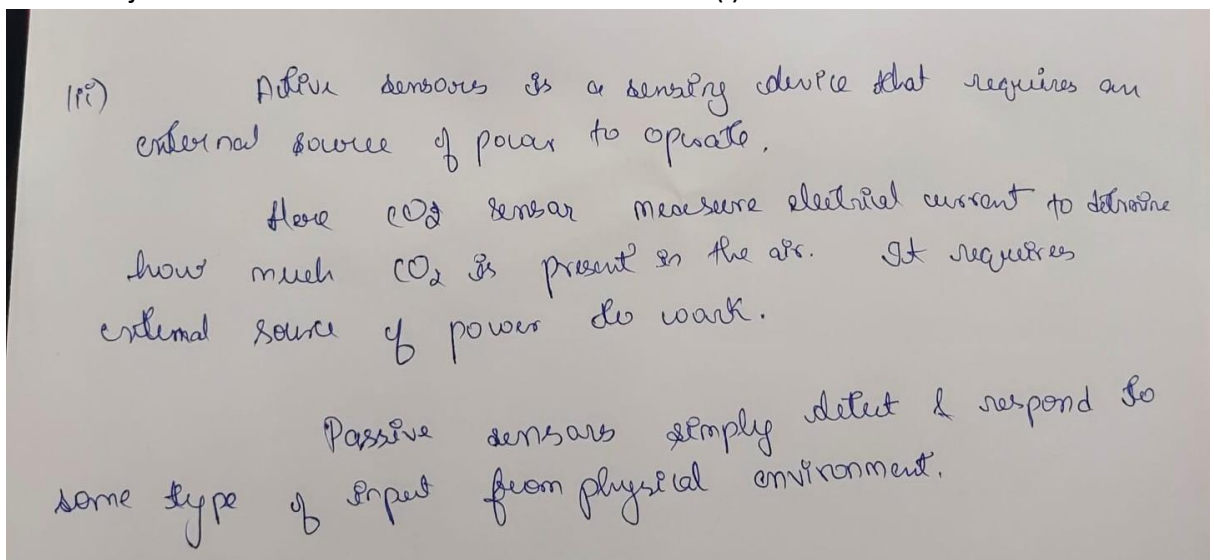
## CSE 3112 -Digital Assignment 2

Design an Autonomous smart swimming pool using Active & Passive sensors and actuators.  
Submit the documents with the following details

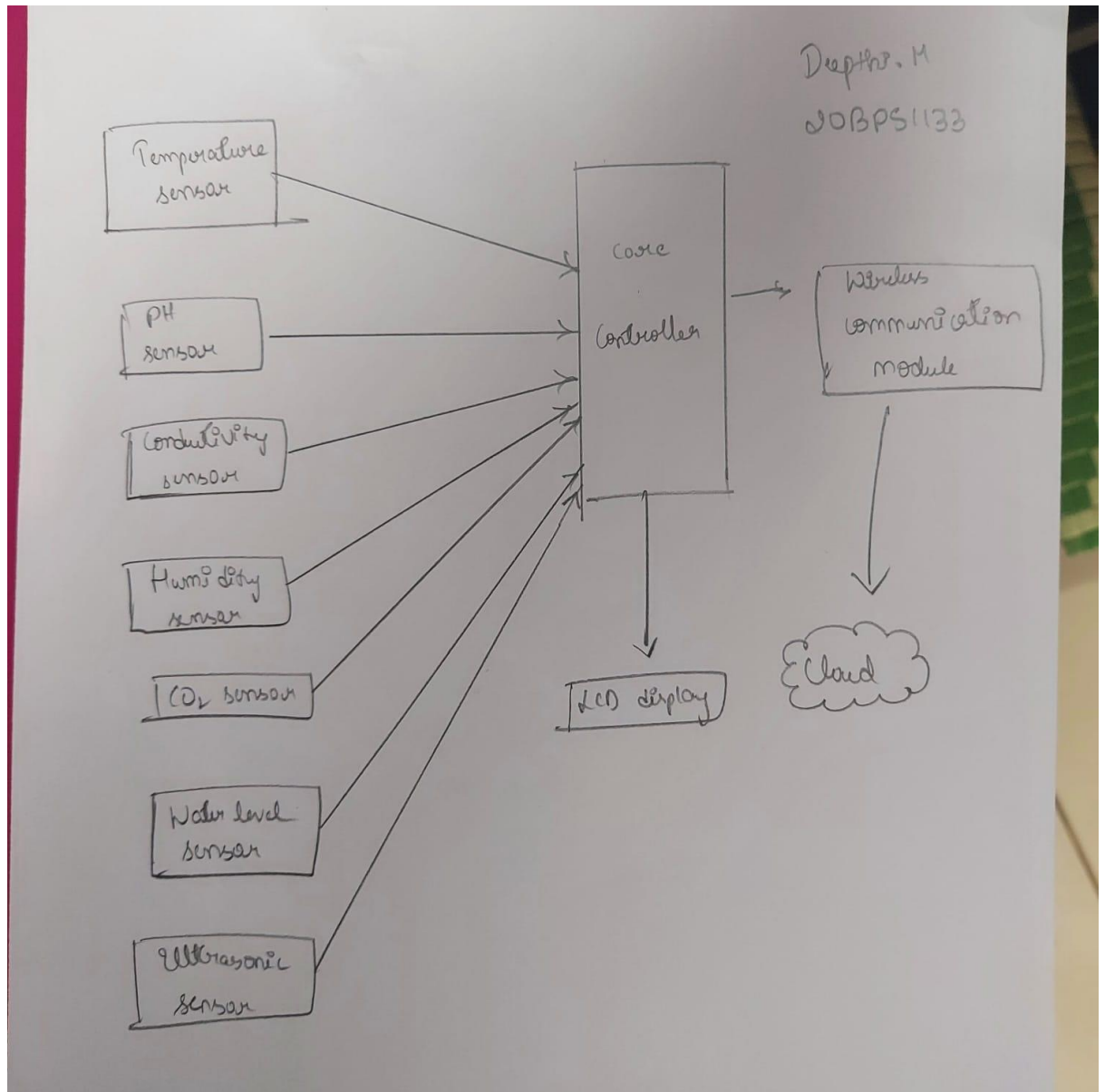
- i. List the active and passive sensors used in the above scenario

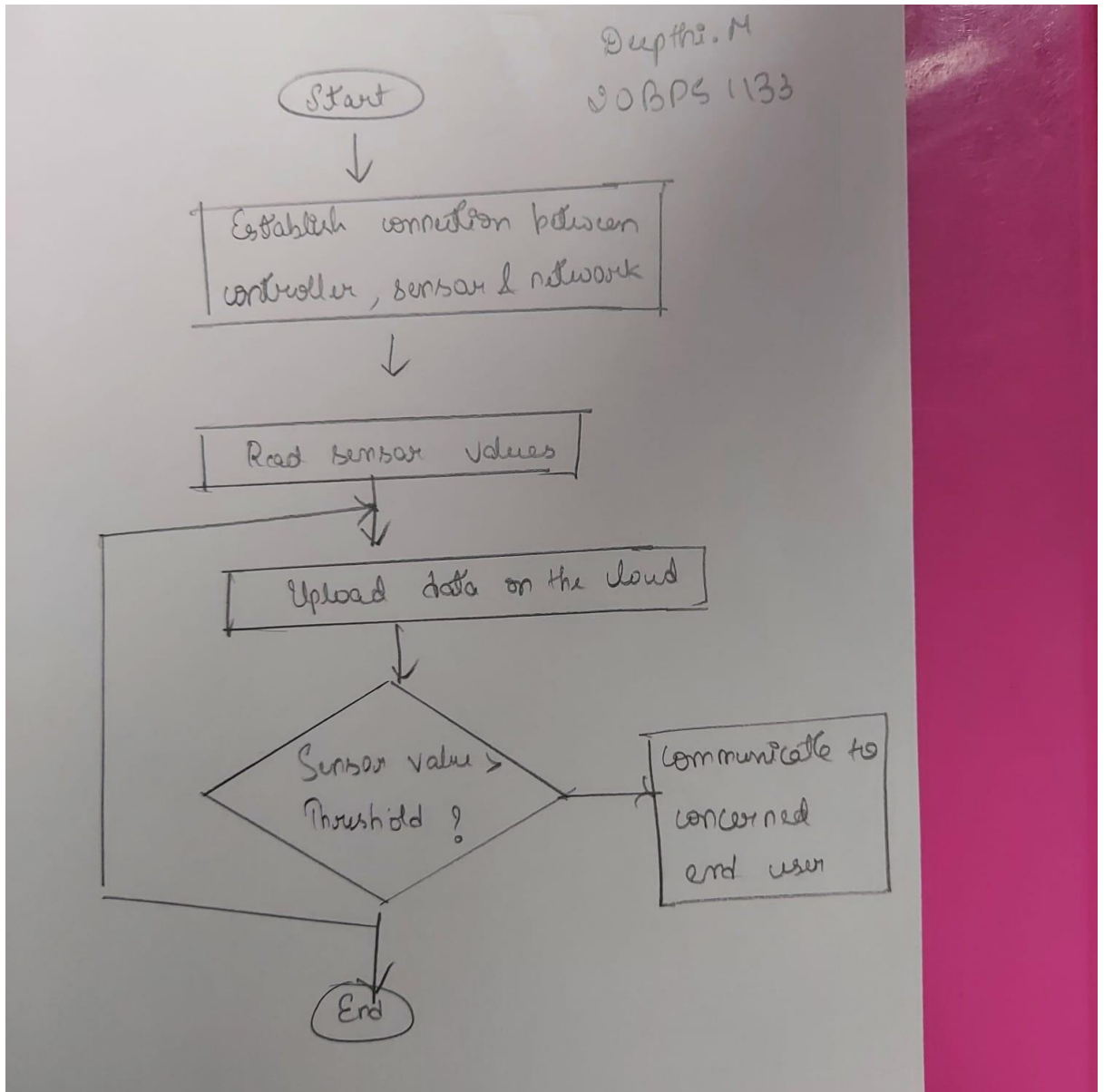


- ii. Give the justification for each sensor and actuators in (i)

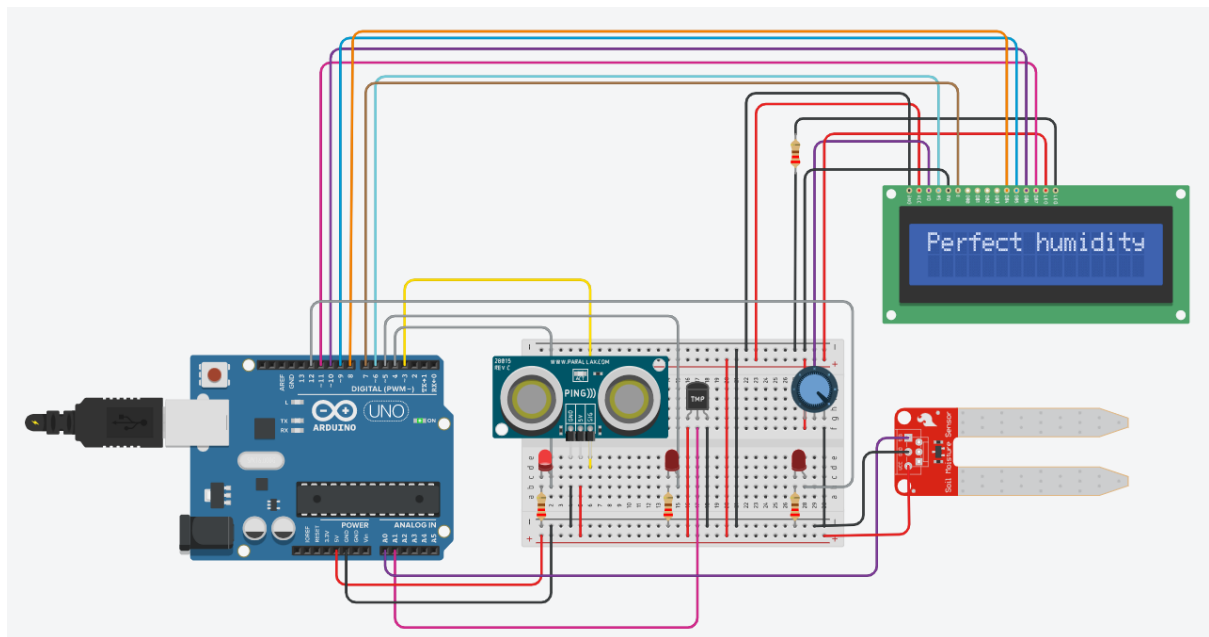


iii. Architecture of the proposed system





iv. Simulations results using Arduino (Attach the Code)



Code:

```
#include <LiquidCrystal.h>

int Humidity = A0;
int Temperatura = A1;
int US = 3;
int LedUS = 4;
int LedTemp = 5;
int LedHum = 12;

float time = 0, distance = 0, humidity = 0;

LiquidCrystal lcd(6, 7, 8, 9, 10, 11);

void setup () {
  //lcd setup
  Serial.begin(9600);
  lcd.print("Starting");
```

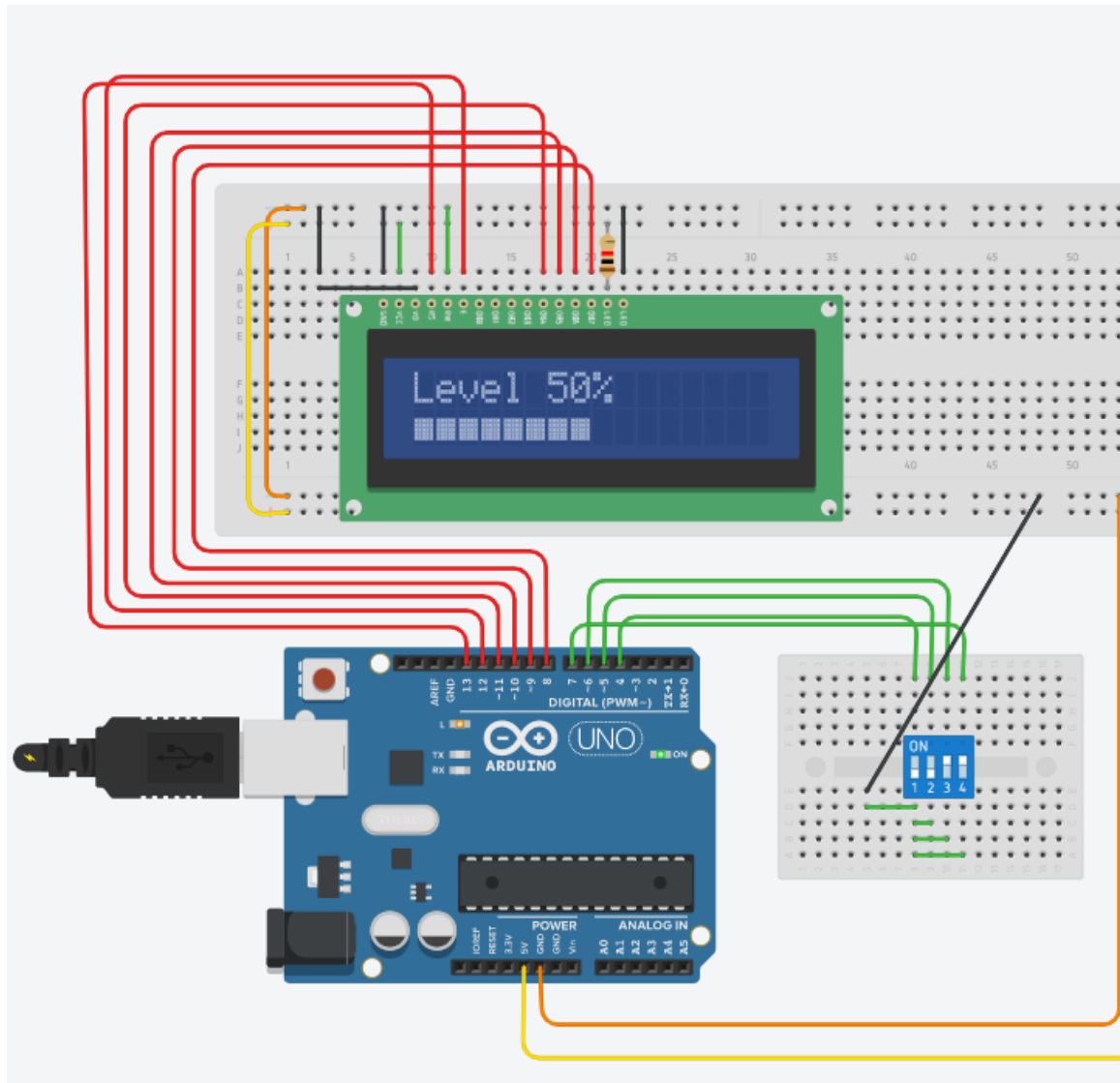
```
delay(1000);  
lcd.clear();  
pinMode(US, OUTPUT);  
pinMode(LedUS, OUTPUT);  
pinMode(LedTemp, OUTPUT);  
pinMode(LedHum, OUTPUT);  
pinMode(Humidity, INPUT);  
}  
  
void loop() {  
    int ts = analogRead(Temperatura);  
    float Temp = (ts * 500.0 / 1023.0)-50.0;  
    lcd.print("Temp = ");  
    lcd.print(Temp);  
    if (Temp > 28){  
        digitalWrite(LedTemp, HIGH);  
        lcd.setCursor(0, 1);  
        lcd.print("HOT");  
        delay(2000);  
        lcd.clear();  
    }  
    else {  
        digitalWrite(LedTemp, LOW);  
        lcd.setCursor(0, 1);  
        lcd.print("Stable temp");  
        delay(2000);  
        lcd.clear();  
    }  
}
```

```
pinMode(US, OUTPUT);
digitalWrite(US, LOW);
delay(0.1);
digitalWrite(US, HIGH);
delay(0.1);
digitalWrite(US, LOW);
delay(0.1);
pinMode(US, INPUT);
time = pulseIn(US, HIGH);
distance = (time)/29 /2;
lcd.print("Distance = ");
lcd.print(distance);
lcd.print("cm");

if (distance <= 150){
    digitalWrite(LedUS, HIGH);
    lcd.setCursor(0, 1);
    lcd.print("Object nearby");
    delay(2000);
    lcd.clear();
}
else {
    digitalWrite(LedUS, LOW);
    lcd.setCursor(0, 1);
    lcd.print("No one near");
    delay(2000);
    lcd.clear();
}
```

```
humidity = analogRead(Humidity);  
lcd.print("Humidity = ");  
lcd.print(humidity);  
if (humidity >= 150){  
    digitalWrite(LedHum, HIGH);  
    lcd.setCursor(0, 1);  
    lcd.print("Excessive humidity");  
    delay(2000);  
    lcd.clear();  
}  
else {  
    digitalWrite(LedHum, LOW);  
    lcd.setCursor(0, 1);  
    lcd.print("Perfect humidity");  
    delay(2000);  
    lcd.clear();  
}  
}
```

To check water level:



Code:

```
#include <LiquidCrystal.h>
```

```
int pin1 = 4;
```

```
int pin2 = 5;
```

```
int pin3 = 6;
```

```
int pin4 = 7;
```

```
int num = 0;
```

```
int counter = 0;
```



```
bool blink = true;
bool done = false;

LiquidCrystal lcd(13, 12, 11, 10, 9, 8);

void setup()
{
    lcd.begin(16, 2);

    pinMode(pin1, INPUT_PULLUP);
    pinMode(pin2, INPUT_PULLUP);
    pinMode(pin3, INPUT_PULLUP);
    pinMode(pin4, INPUT_PULLUP);
}

void loop()
{
    int max = 0;
    int level25 = digitalRead(pin1);
    int level50 = digitalRead(pin2);
    int level75 = digitalRead(pin3);
    int level100 = digitalRead(pin4);

    if (level25 == HIGH) {
        max = 25;
        if (level50 == HIGH) {
            max = 50;
            if (level75 == HIGH) {
                max = 75;
```

```
    if (level100 == HIGH) {  
        max = 100;  
    }  
}  
}  
}  
}  
  
int incDec = min(10, abs(num - max));  
if (num < max) num += incDec;  
if (num > max) num -= incDec;  
  
if (!done) {  
    //  
    lcd.clear();  
    lcd.setCursor(0, 0);  
    lcd.print("Level " + String(num) + "%");  
    delay(500);  
  
}}
```