SMART WATER MANAGEMENT

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PHASE 4: Declaration part – 2

Smart Water Management :

In the development part 2 of a Smart Water Management System, the focus should be on setting sensors and working with iot devices. Arduino boards are widely used for sensor data acquisition and actuator control.

Water Level Monitoring:

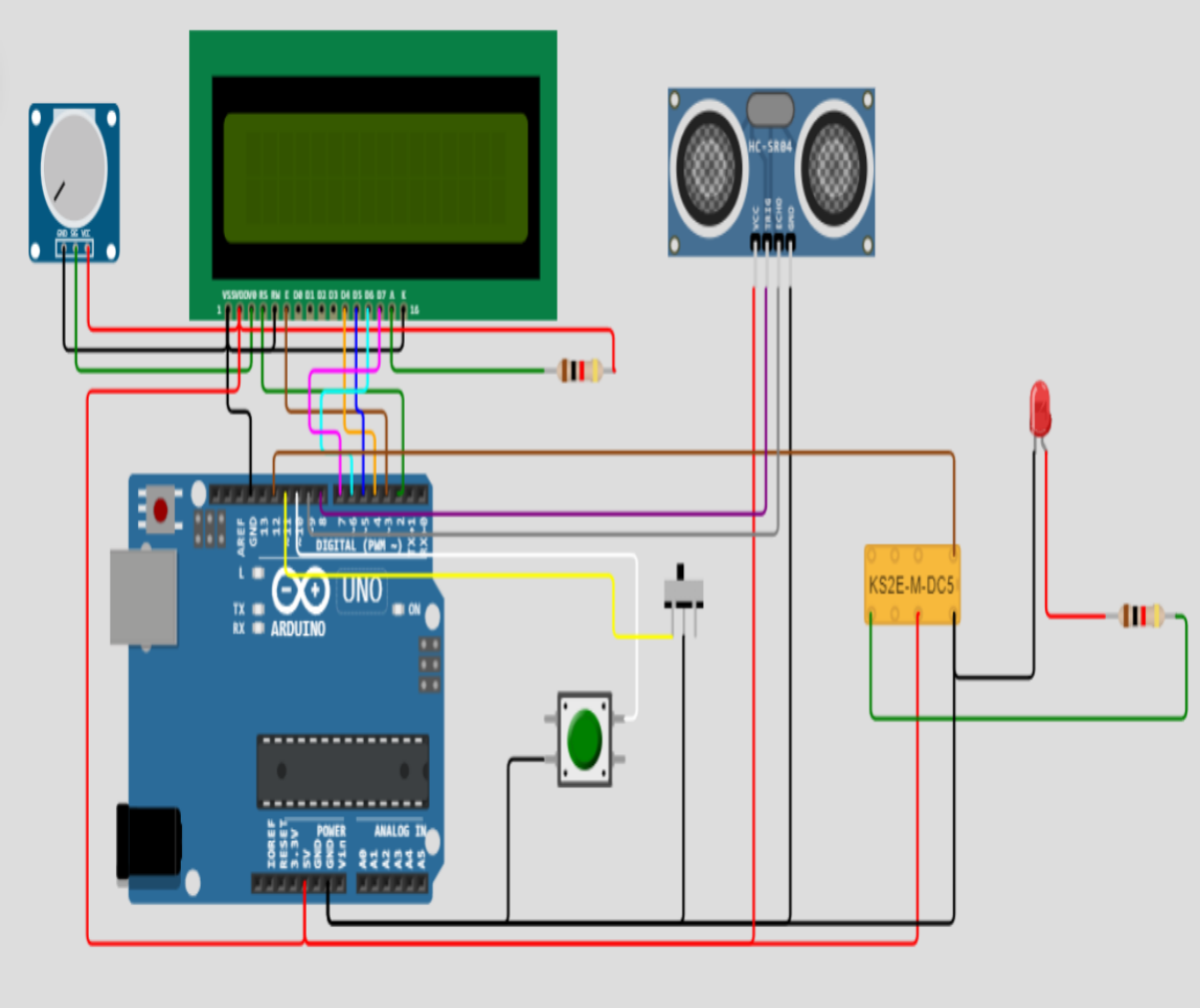
Components :

Some components are used to make this sensor work. The components are,

1. Arduino UNO
2. Potentiometer
3. lcd 1602
4. hc-sr04 Ultrasonic Distance sensor
5. pushbutton

6. slide-switch
7. ks2e-m-dc5 Relay

Connection of Arduino Board using Wokwi:



Code :

```
#include <EEPROM.h>
#include <LiquidCrystal.h>
LiquidCrystal lcd(2,3,4,5,6,7);
long duration, inches;
int set_val,percentage;
bool state,pump;
void setup()
```

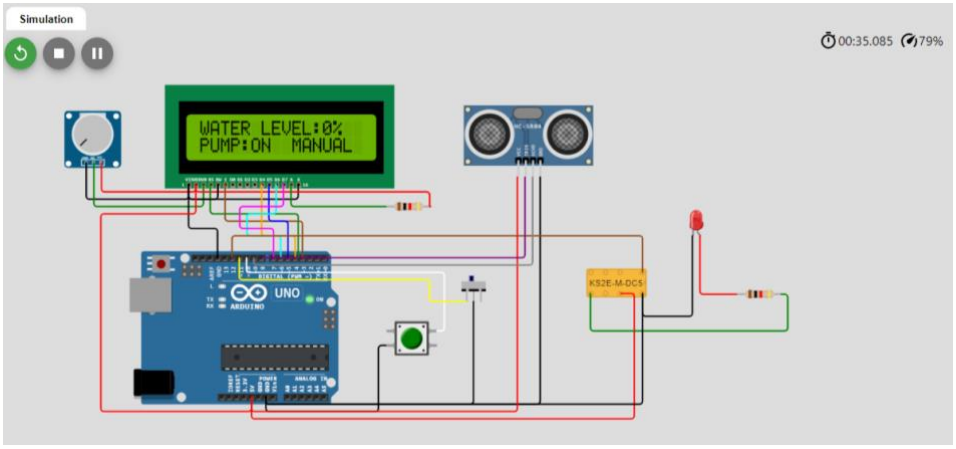
```
{
  lcd.begin(16, 2);
  lcd.print("WATER LEVEL:");
  lcd.setCursor(0, 1);
  lcd.print("PUMP:OFF MANUAL");
  pinMode(8, OUTPUT);
  pinMode(9, INPUT);
  pinMode(10, INPUT_PULLUP);
  pinMode(11, INPUT_PULLUP);
  pinMode(12, OUTPUT);
  set_val=EEPROM.read(0);
  if(set_val>150)set_val=150;
}
void loop()
{
   digitalWrite(3, LOW);
   delayMicroseconds(2);
   digitalWrite(8, HIGH);
   delayMicroseconds(10);
   digitalWrite(8, LOW);
   duration = pulseIn(9, HIGH);
   inches = microsecondsToInches(duration);
   percentage=(set_val-inches)*100/set_val;
   lcd.setCursor(12, 0);

   if(percentage<0)percentage=0;
   lcd.print(percentage);
   lcd.print("%   ");
   if(percentage<30&digitalRead(11))pump=1;
   if(percentage>99)pump=0;
   digitalWrite(12,!pump);
   lcd.setCursor(5, 1);
   if(pump==1)lcd.print("ON ");
   else if(pump==0) lcd.print("OFF");
   lcd.setCursor(9, 1);
   if(!digitalRead(11))lcd.print("MANUAL");
   else lcd.print("AUTO   ");
}

   if(!digitalRead(10)&!state&digitalRead(11))
{
      state=1;
      set_val=inches;
      EEPROM.write(0, set_val);
      }
      if(!digitalRead(10)&!state&!digitalRead(11)){
        state=1;
        pump=!pump;
```

```
        }
        if(digitalRead(10))state=0;
        delay(500);
}
long microsecondsToInches(long microseconds)
{
   return microseconds / 74 / 2;
}
```

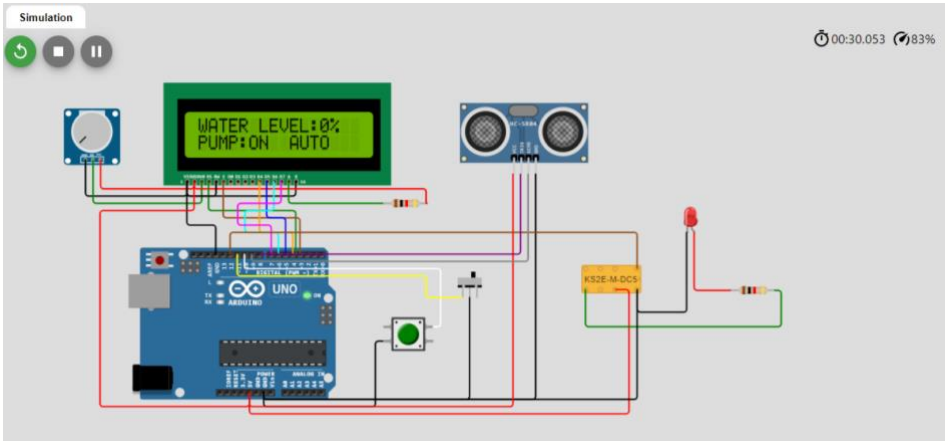
Output:

The pump is in manual mode, so we change the pump mode into auto-mode. In the beginning, the LCD display automatically displays 0% which means the tank is empty.

1.



2.



If the water level is 100% there is less distance then automatically the pump will off. If the water level is 0% there is high distance then automatically the pump will be on.

Similarly we adjusting the distances the pump will automatically on and off.

Conclusion :

In the smart water management many concepts are including them like water level monitoring, monitoring the pH value, etc., in this phase I developed the water level monitoring by using Wokwi simulator by using the ultrasonic sensor.