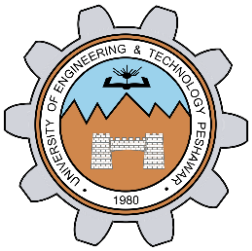
PROJECT PROPOSAL



CSE-203L Circuit & Systems-II Lab

Fall 2022

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C

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DATE:

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PROJECT TITLE:

Automatic Water Management System

PROBLEM STATEMENT:

Whenever we are dealing with multiple channels, we want to have a flexible and strong channel controlling system. To be more specific, we have encountered a problem in which we have **multiple solenoid valves** and **one water resource**. Each **solenoid valve** is located at different house. So, we need to design a system in which there'll be a controlled system for these **solenoid valves**. For instance, when one solenoid valve is **ON**, the others must be **OFF**. When all are **OFF**, any can be **ON**. In this way, **one water resource** would be shared among **different channels (solenoid valves)** but will be controlled by one solenoid valve at a time. The solenoid valves are **ON** for a specific time and then they are automatically **OFF**

INTRODUCTION:

We need to design a **system** in which we can select any input and then grant authority to that input only. For this purpose, we need a **microcontroller** which have the capability to make a decision and **grant authority** to the **selected input**. Our first proposed solution for a microcontroller is **ATmega328P** which is embedded in Arduino.

Arduino is an **open-source platform based** around **programmable** development **boards** that can be integrated into a range of **simple** and **complex projects**.

With the help of Arduino, we can program and design this system.

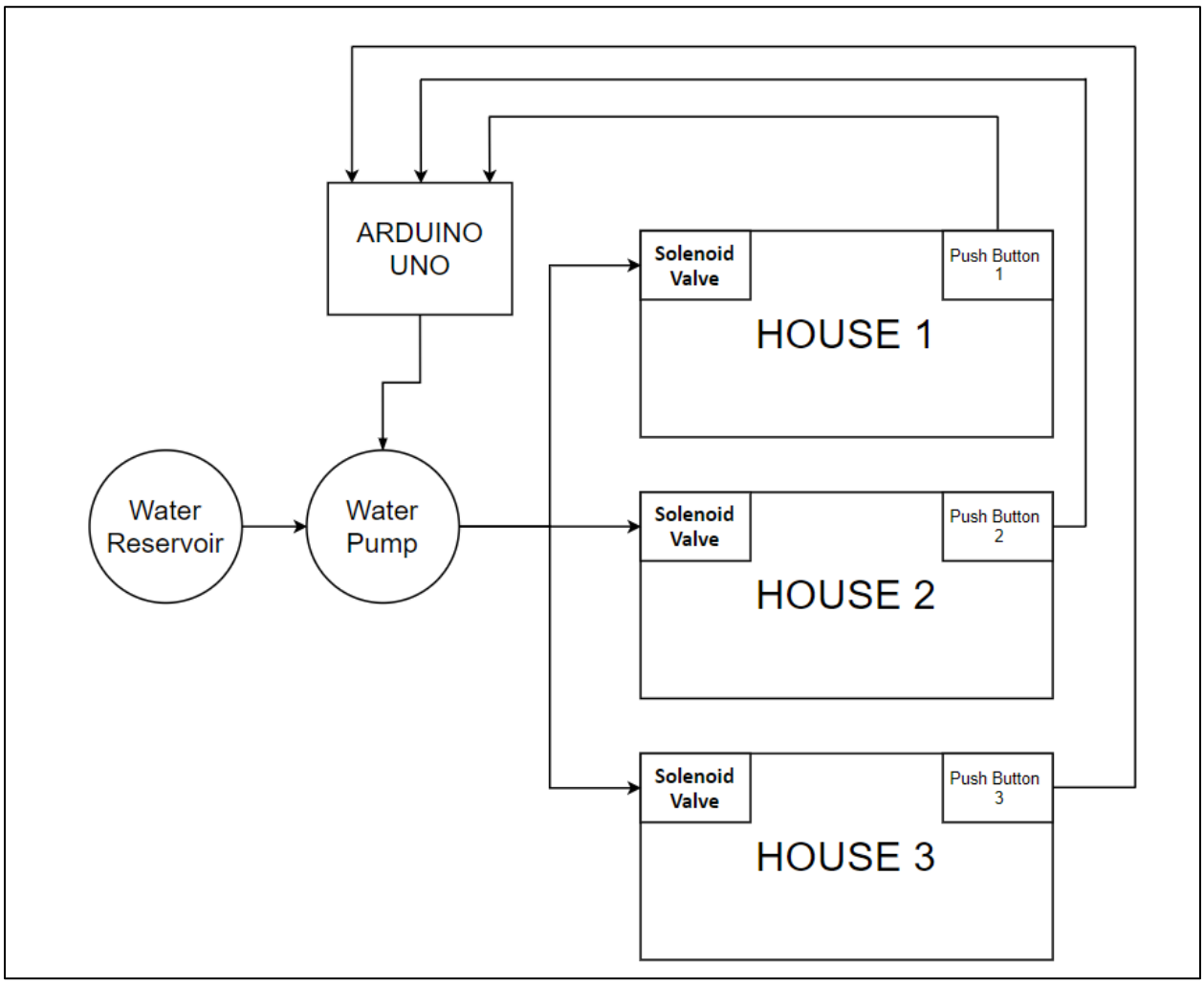
TOOLS/EQUIPMENTS:

- 1 x Arduino UNO
- 3 x Push Buttons
- 3 x 1/10k Ω Resistors
- 3 x 100 Ω Resistors
- 3 x DPDT Relays
- 3 x Diodes
- 3 x BC547 NPN Transistor
- Connecting Wires
- Veroboard
- Power Supply

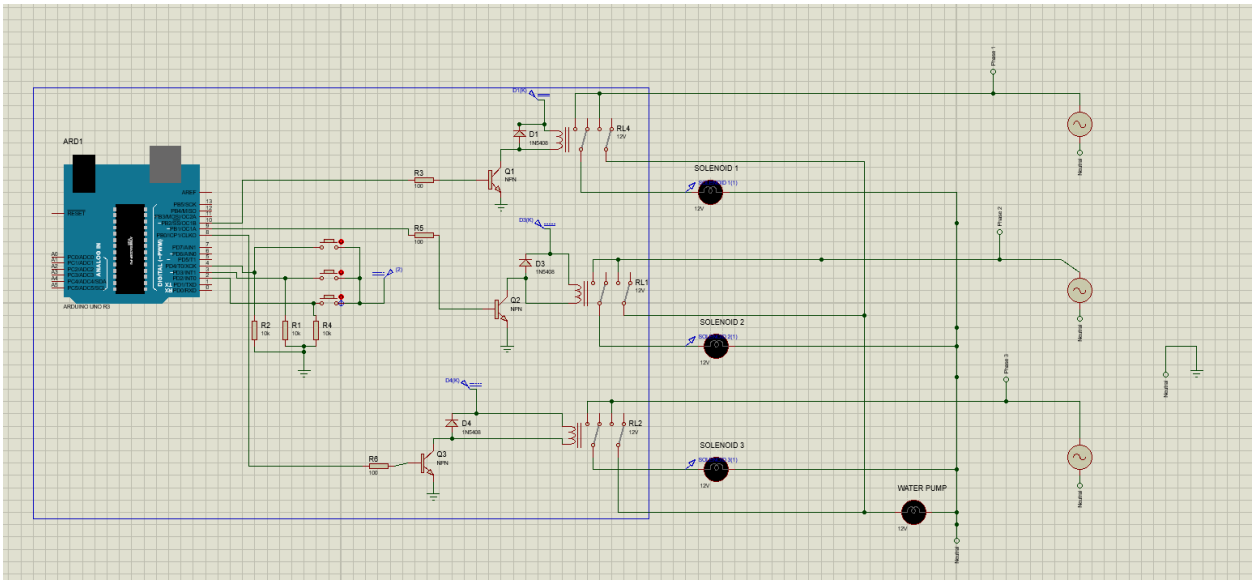
WORKING:

The flow of this project is given below in the form of flowchart. There is **one water reservoir** and **multiple solenoid valves**. As soon as one of the switches is ON, the others are disconnected and will remain **closed** as long as one of the other is **ON**. So, Arduino will accept input signal from the currently active solenoid valves only. When all are in-active, Arduino could receive input from all three water pump holders. But as one of them is ON, then Arduino will shift priority to that particular house only.

FLOWCHART:



CIRCUIT DIAGRAM IN PROTEUS:



ARDUINO CODE:

```
//Define output at pin 8, 9 and 10
#define O1 8
#define O2 9
#define O3 10

//Define input at pin 2, 3 and 4
int I1 = 2;
int I2 = 3;
int I3 = 4;

//Declaring 3 variables for storing 3 input values
int val1 =0;
int val2 =0;
int val3 =0;

float timeDelay = 2000; //A delay of 2 seconds

void setup() {
  // put your setup code here, to run once:
  Serial.begin(9600);
  pinMode(I1, INPUT);
  pinMode(I2, INPUT);
  pinMode(I2, INPUT);

  pinMode(O1, OUTPUT);
```

```
  pinMode(O1, OUTPUT);
  pinMode(O2, OUTPUT);
  pinMode(O3, OUTPUT);

}

void loop() {

  if(val1 == 0 && val2 == 0 && val3 == 0){
    val1 = digitalRead(I1);
    val2 = digitalRead(I2);
    val3 = digitalRead(I3);

    digitalWrite(O1,val1);
    digitalWrite(O2,val2);
    digitalWrite(O3,val3);
  }

  if(val1 == 1 || val2 == 1 || val3 == 1){
    delay(timeDelay);
    val1 = 0;
    val2 = 0;
    val3 = 0;
  }
}
```

RESULTS:

With the help of this system, we can minimize the labor of manually switching off solenoid valves. Further, we can avoid the forbidden state (multiple channels open at a time).