Project Report

CSE331.08

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WATER CONTROLLER SYSTEM

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Table of Contents

Introduction 1
Objectives 1
Applications 1
Flow Diagram and Schematic Diagram: 2
Block Diagram 2
Stages of Proteus Simulations 3
Code Snippet: 5
Software Used 6
Conclusion 6
Reference 6

Introduction

Automating the control of various real-life situations has been a challenge in the industrial sector for a long time. Amongst all of those applications, manual labor is required for controlling the water levels in tanks for chemical plants. It is crucial to ensure the control of the level of water in those instances as the level of water in the tank results in other chemical operations. The continuous real-time monitoring with the help of microcontrollers, therefore, becomes a key solution that can be applied in chemical plants.

Objectives

In this age of crisis, it is paramount to conserve as much energy and water as possible. We need to incorporate technology into our regular chores, and one such task is the implementation of a water level controller. It avoids running the pumps during odd hours and ensures maximum water supply during peak hours. The dedicated sensors and time controllers can pump the water level to its peak before prime hours. It can maintain the water level throughout the day in the household and industrial water pumps.

Applications

- Ensure live updates and monitoring in industrial applications such as chemical plants, removing the need for human intervention
- Decrease water wastage in the residential and industrial water pumps

Flow Diagram and Schematic Diagram:

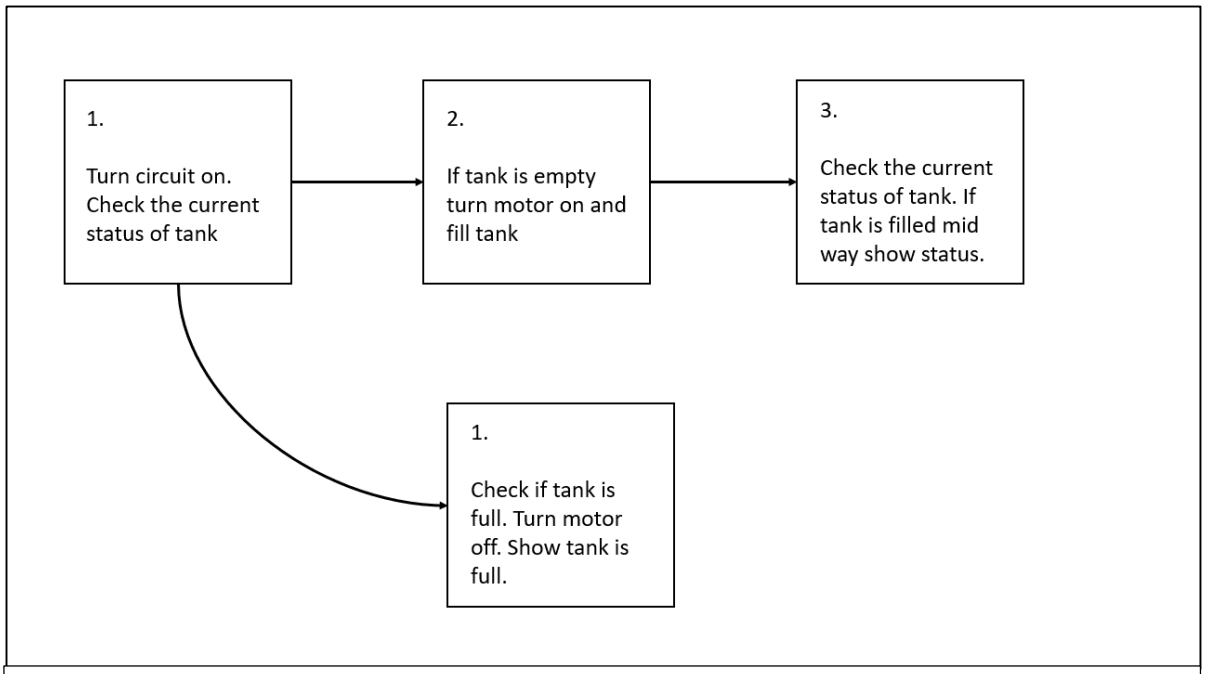

Figure 1.1: Flow Diagram

Block Diagram

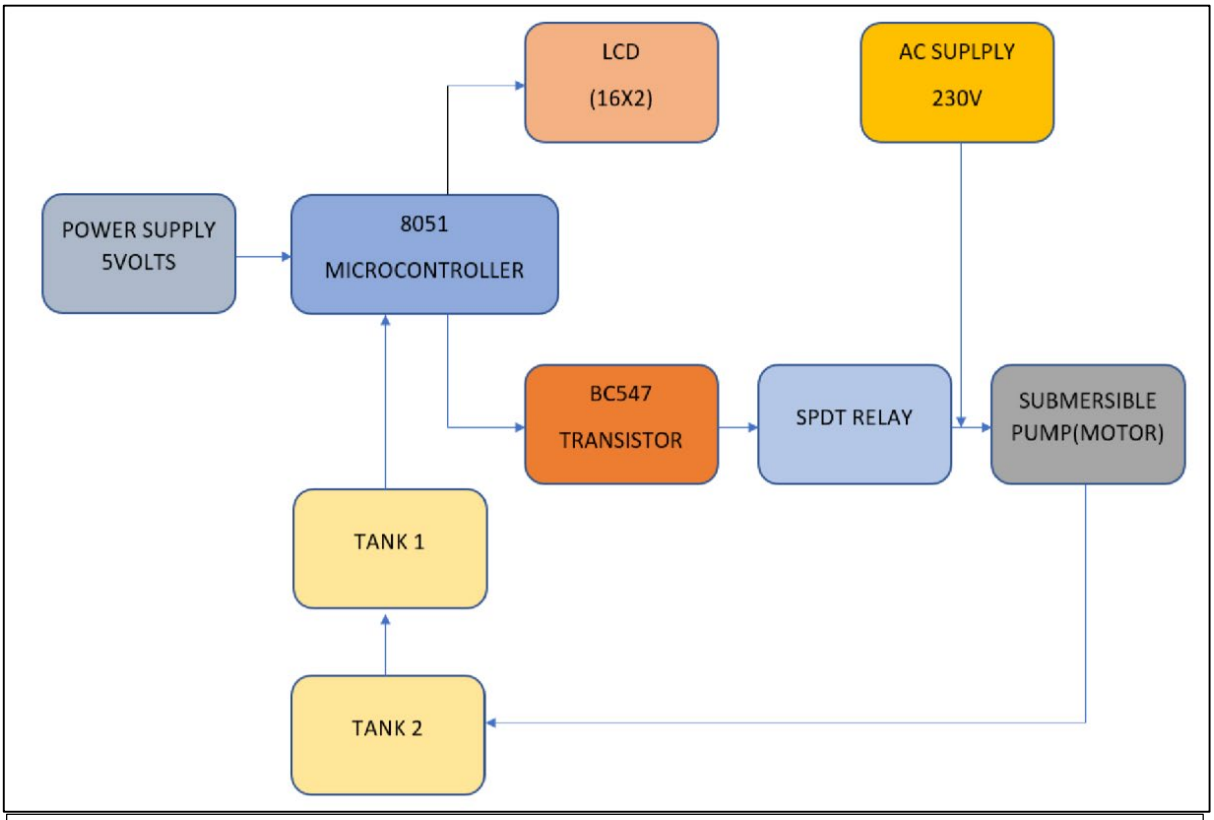

Figure 1.2: Block Diagram

Stages of Proteus Simulations

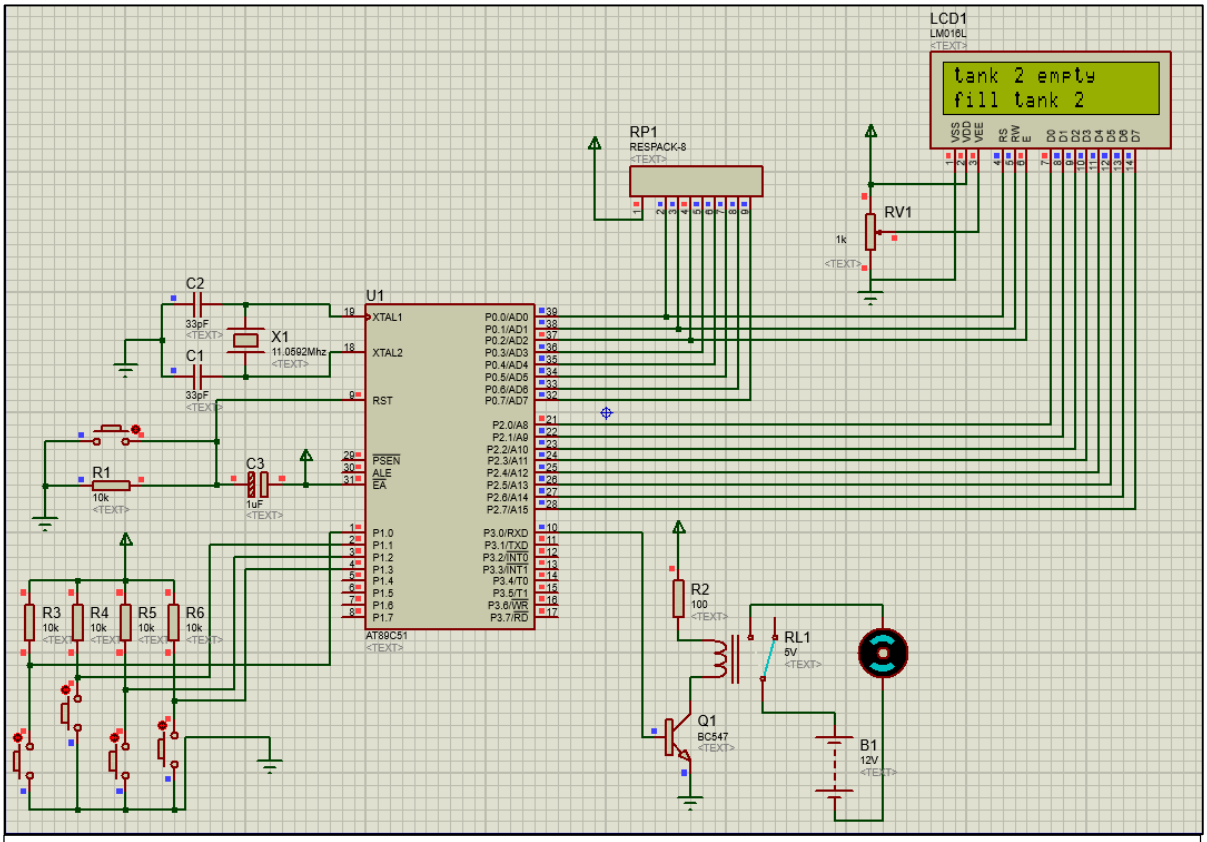

Figure 1.3: Tank 2 from the ground, which will be used to fill up the other tank, is empty

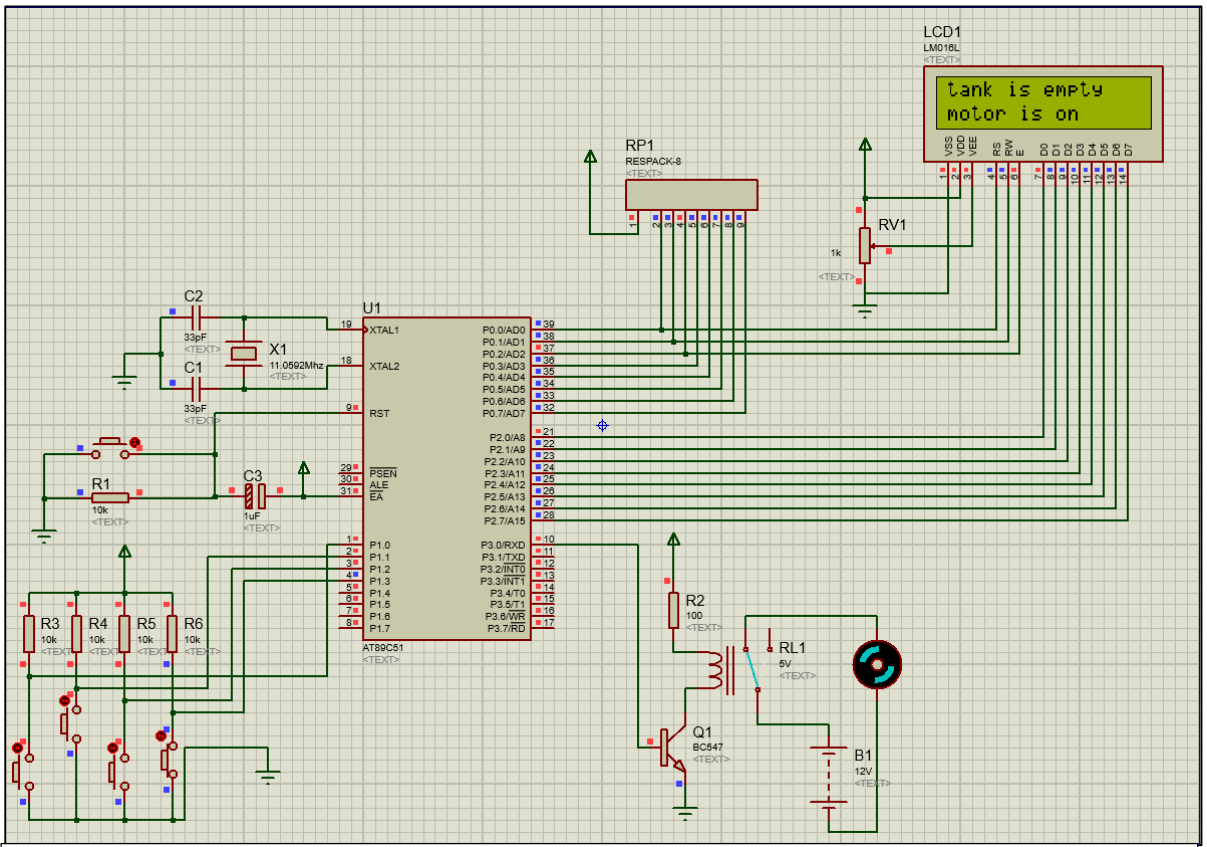

Figure 1.4: Tank 2 from the ground is being filled up by the motor. The motor is moving.

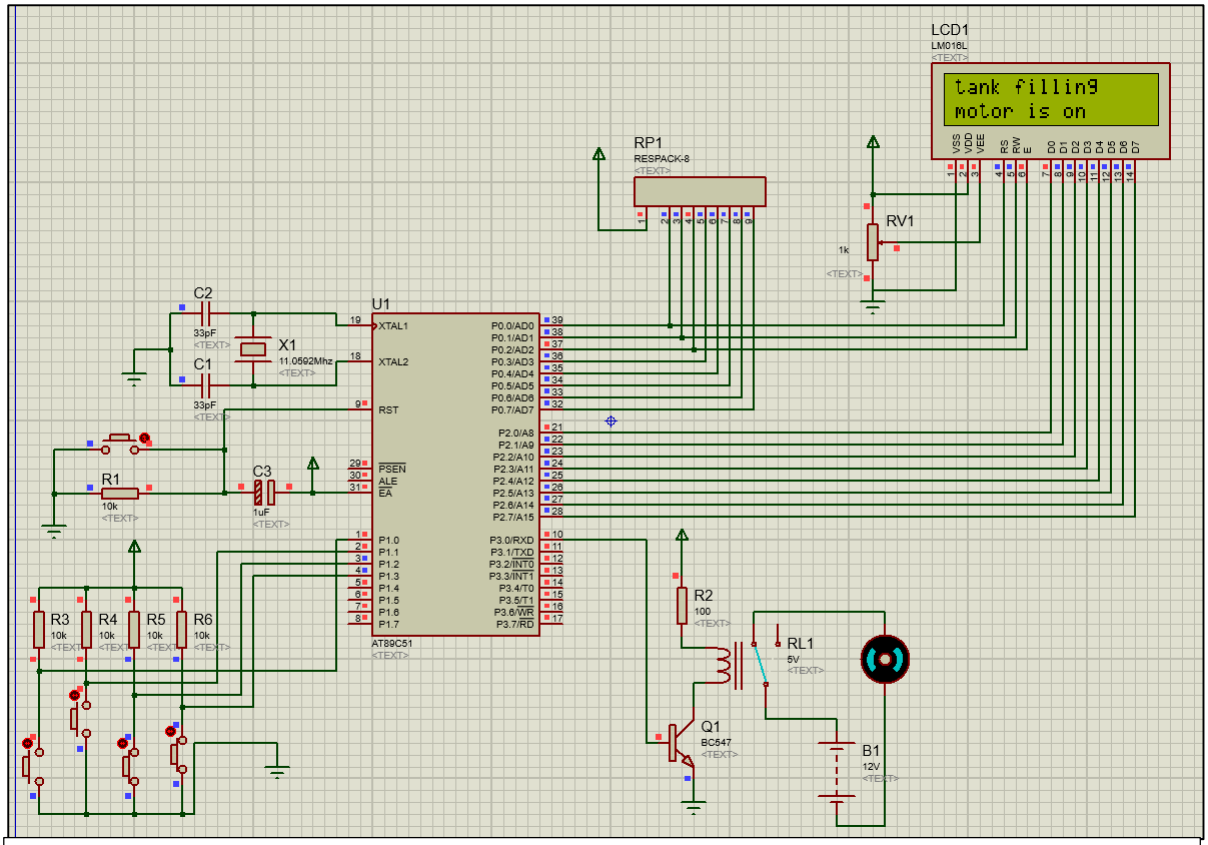

Figure 1.5: The new tank to be filled is filling up. The motor is moving.

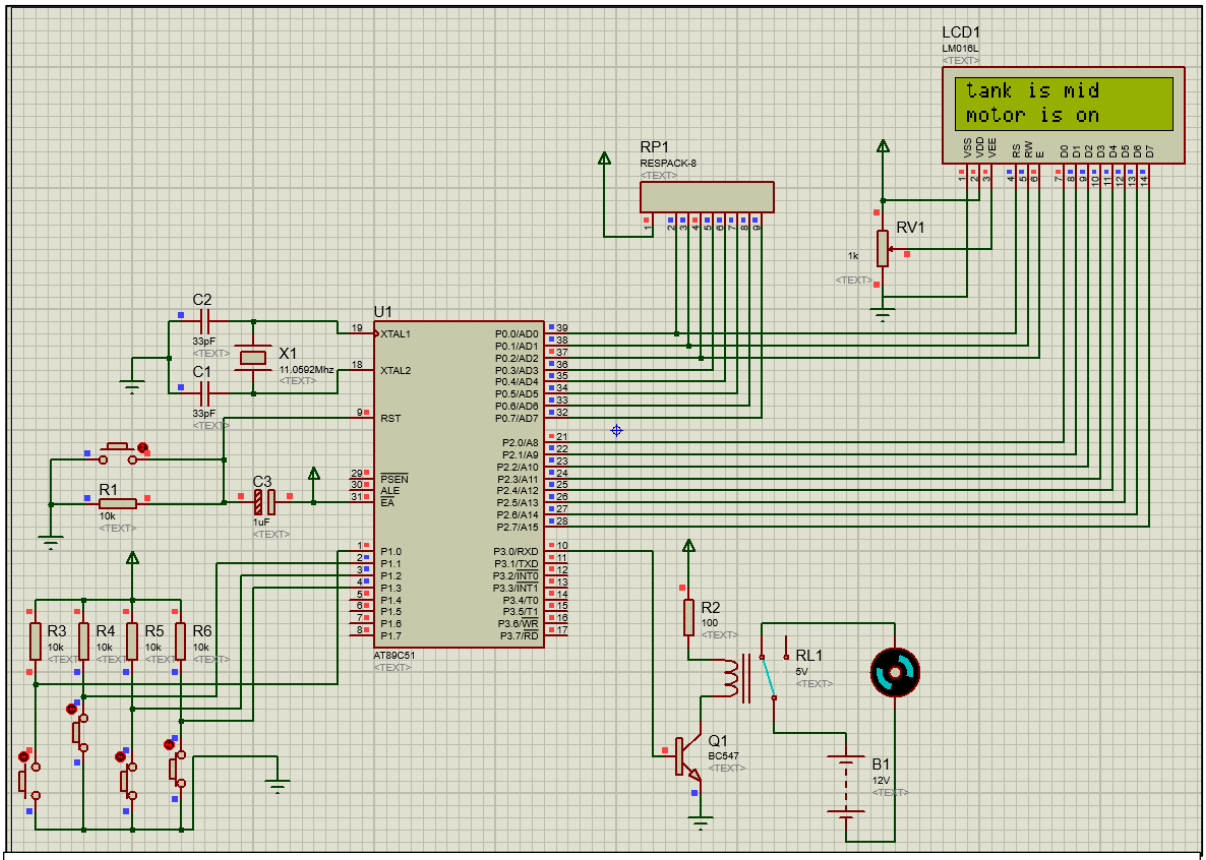

Figure 1.5: The new tank is filled up till the mid-way. The motor is still moving to fill up the tank more.

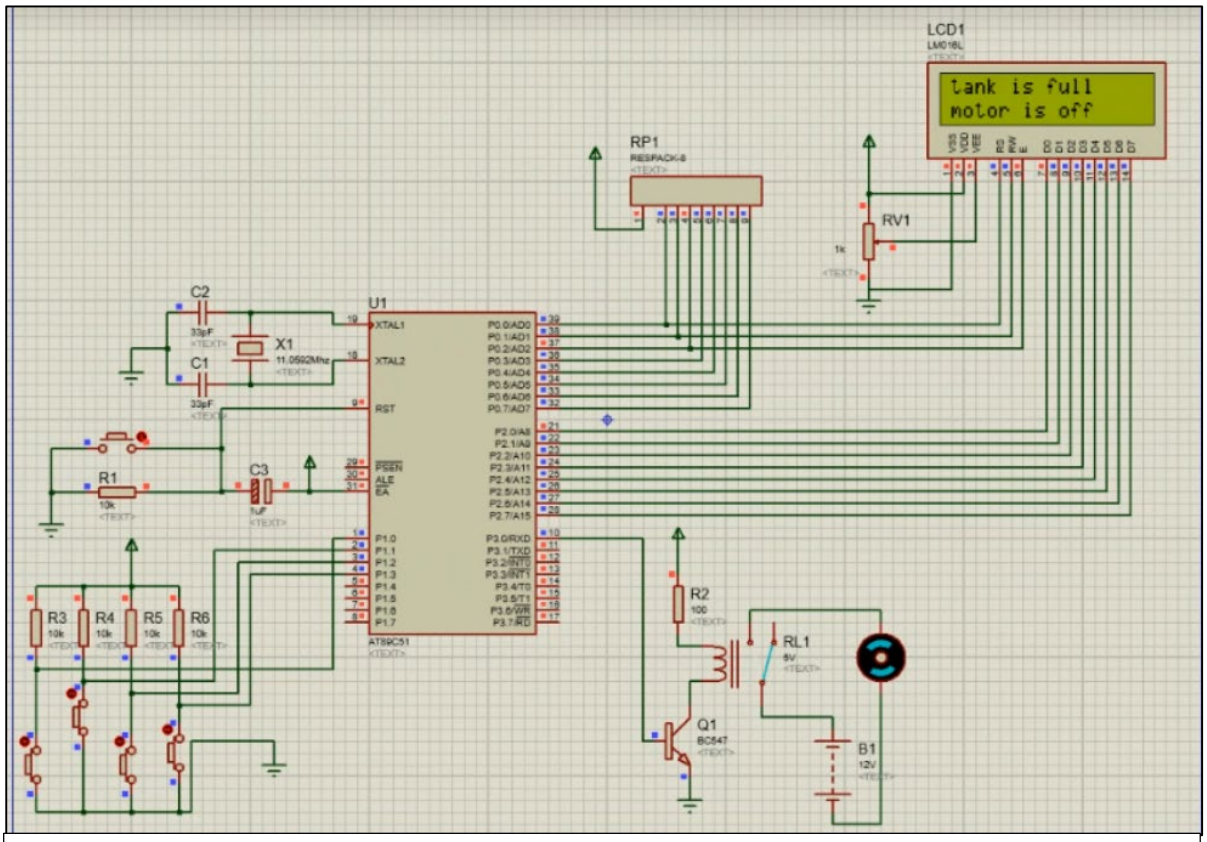

Figure 1.5: The new tank is filled up completely. The motor is turned off.

Code Snippet:

C:\Users\parin\Documents\NSU Summer 2022\CSE331\331project.uvproj - µVision

File Edit View Project Flash Debug Peripherals Tools SVCS Window Help

Target 1

watercontroller1.c | watercontroller2.c | STARTUP.A51

```
#include<reg51.h> // macros called
sbit full=P1^0;//defining the pin to indicate full status
sbit mid=P1^1;//defining the pin to indicate mid status
sbit emp=P1^2;//defining the pin to indicate empty status
sbit t2=P1^3;//defining the pin to indicate status of tank 2 which is the ground tank
sbit rs=P0^0;//defining the pin for lcd display
sbit rw=P0^1;//defining the pin for lcd display
sbit en=P0^2;//defining the pin for lcd display
sbit rly=P3^0;//defining the pin for lcd display

void lcddta(unsigned char[],unsigned char);//declaring all the subroutines to be called
void lcdcmd(unsigned char);//declaring all the subroutines to be called
void msdelay(unsigned int);//declaring all the subroutines to be called
void main(void){
    rly=0;// initializing all the initial levels
    P0=00;// initializing all the initial levels
    P2=00;// initializing all the initial levels
    full=1;// initializing all the initial levels
    mid=1;// initializing all the initial levels
    emp=1;// initializing all the initial levels
    t2=1; // initializing all the initial levels

    lcdcmd(0x38);//calling the subroutines with the display values
    lcdcmd(0x0c);//calling the subroutines with the display values
    lcdcmd(0x06);//calling the subroutines with the display values
    lcdcmd(0x01);//calling the subroutines with the display values
        while(1){ // starting an infinite loop
            if(t2==0){//lower motor condition

                if(emp==1 && mid==1 && full==1){ //checks the first condition of the new tank
                    rly=1;//setting up the lcd display
                    lcdcmd(0x01);//setting up the lcd display
                    lcdcmd(0x80);//setting up the lcd display
                    lcddta("tank is empty",13);// entering string for the display
                    lcdcmd(0xc0);//setting up the lcd display
                    lcddta("motor is on",11);//entering string for the display
                }else if(emp==0 && mid==1 && full==1){// checks the second condition of the new tank
                    rly=1;//setting up the lcd display
```

Figure 1.6: Code snippet of our Micro-C program, done in Keil MicroVision 5

Software Used

- Proteus Version 8
- Keil MicroVision 5
- 8051 Microcontroller

Conclusion

Our simple and efficient water level controller will reduce workforce expense, power consumption, and wastage of water. We can also use this for oil level measurements in industries and chemical labs. We tried to design a system in such a way that its components can prevent the wastage of water automatically. This design has much more scope for future research and development. We hope some modifications in this project will lead to a practical range of usage.

Reference

1. https://www.electronicshub.org/water-level-controller-using-8051-microcontroller/
2. https://www.youtube.com/watch?v=bji8vwp1EgI
3. https://www.youtube.com/watch?v=fGeDXr1sxrs
4. https://www.youtube.com/watch?v=W-5N36GqcGQ