NORTH SOUTH UNIVERSITY

Department of Electrical and Computer Engineering

CSE331: Microprocessor Interfacing & Embedded System

Final Report

Water level monitoring using 8051/PIC microcontroller

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Water level Monitor

Introduction:

Water Level Controller using 8051 Microcontroller project will help in automatically controlling the water motor by sensing the water level in a tank. This article explains how to detect and control the water level in an overhead tank or any other container. This system monitors the water level of the tank .

The motor is switched OFF when the overhead tank or container is FULL. Here, the water level of the tank is indicated on LCD (Liquid crystal Display). Using this system, we can avoid the overflow of the water.

Objectives:

The main objective of this project is to design and implement a water level monitoring system that can accurately measure the water levels and provide real-time feedback. The system should be able to detect the water levels using sensors and display the information on an LCD screen.

Equipment:

1. AT89C51
2. BC548
3. BUTTON
4. CAP-ELEC
5. CAP-POL
6. CAPACITOR
7. CRYSTAL
8. FAN-DC
9. LED-GREEN
10. LED-RED

11. LM016L
12. MOTOR
13. MOTOR-DC
14. RESISTOR
15. SOUNDER
16. SW-SPDT

Methodology:

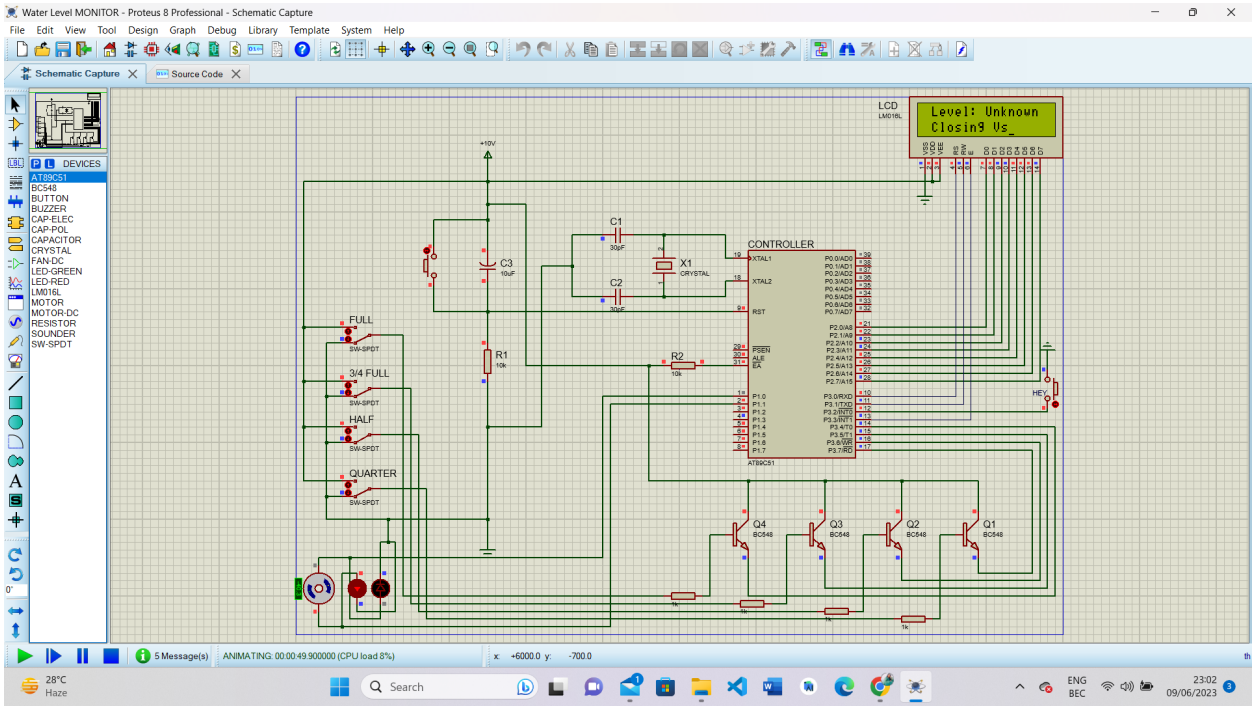
In this work, the water level monitor here presented consists of the following major units: sensors, comparator circuit, microcontroller, display unit to display the water level pump , and the pump . Water pump has been controlled using water level sensors. Four level sensors are used to detect the water level.. The system used sensors to measure the water levels and send the data to the microcontroller. But In simulation we have taken four switches to indicate the water level . These switches are : quarter , half , ¾ full , and full. And they all are connected to the motor and P3.4, P3.5 P3.6 and P3.4 of the 8051 microcontroller through the transistor the 8051 micro controller and The microcontroller will then process the data and display the water levels on an LCD screen which data bits are also connected to the p2.0 - p2.7 and control pins rs, rw, E is connected to P3.0 , P3.1, P3.2 respectively .So when all the switches are open it indicates that the tank is empty. When only the switch for Quarter is on , the motor will be turned on and it will show that water level is in quarter. If Switches for Quarter and half both are turned on , it will show that the water level is half and the motor is still on . And if Switched for Quarter , half , and ¾ full turned on , the lcd will display that ,the water is ¾ full and motor is on .Lastly if all switches are turned on , it means that tank is full and motor is automatically turned off and it will also be shown in LCD.

We wrote the program for the Water Level Controller in Keil µVision IDE and generated the .hex file. And then Burn the program (.hex file) to the microcontrollerThe simulation-based approach used to test the system before actual implementation. The simulation is carried out using Proteus software, which allows us to simulate the hardware and software of the system. The simulation helped us to identify any possible errors or bugs in the system before actual implementation.

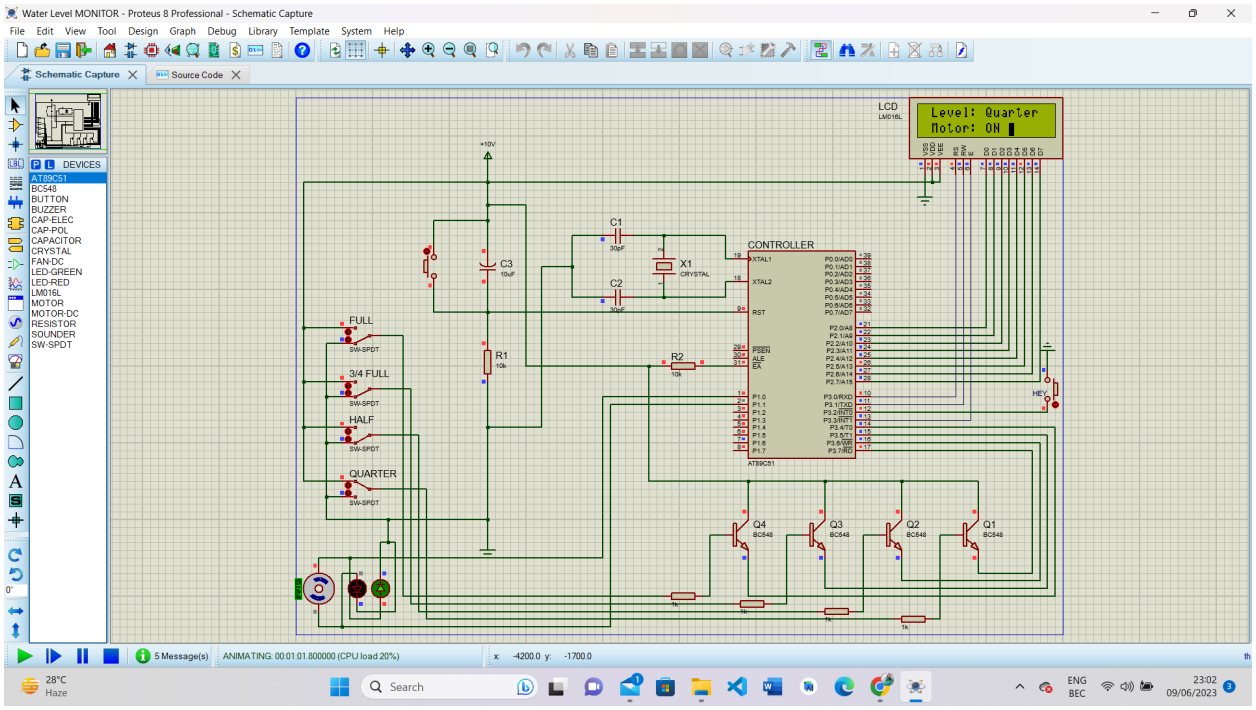
Simulation:

Circuit diagram :

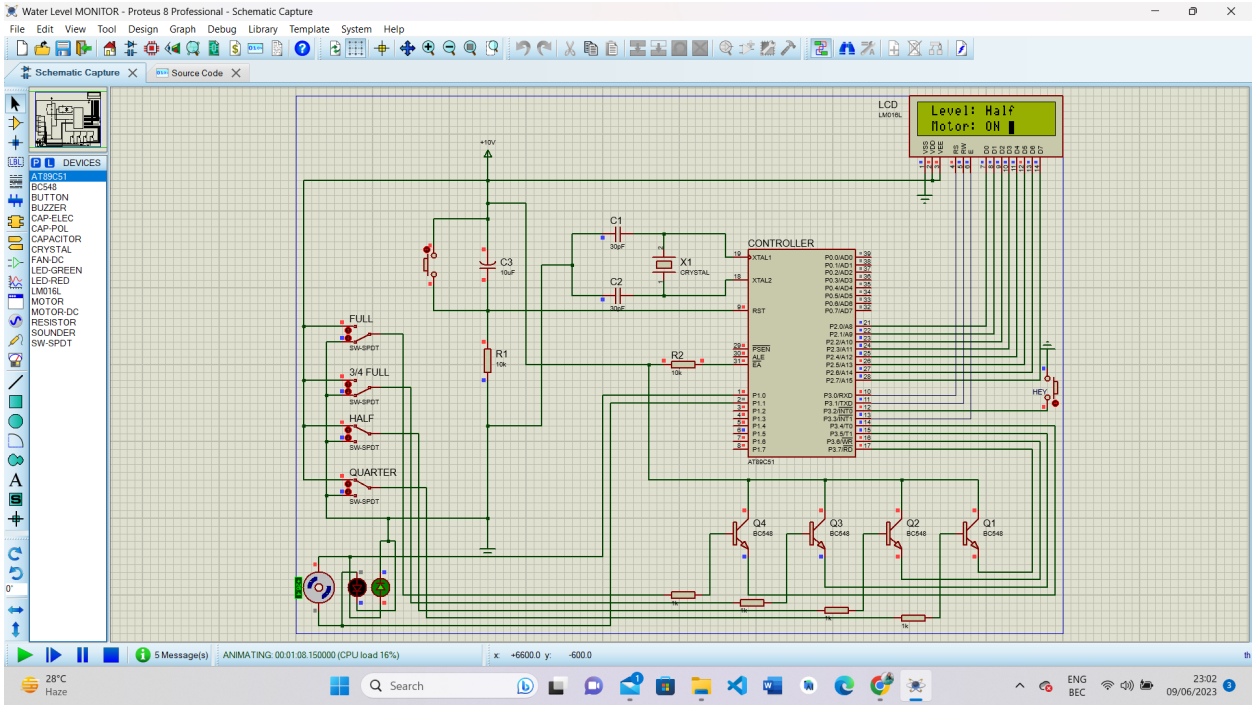
Tank is empty simulation result :



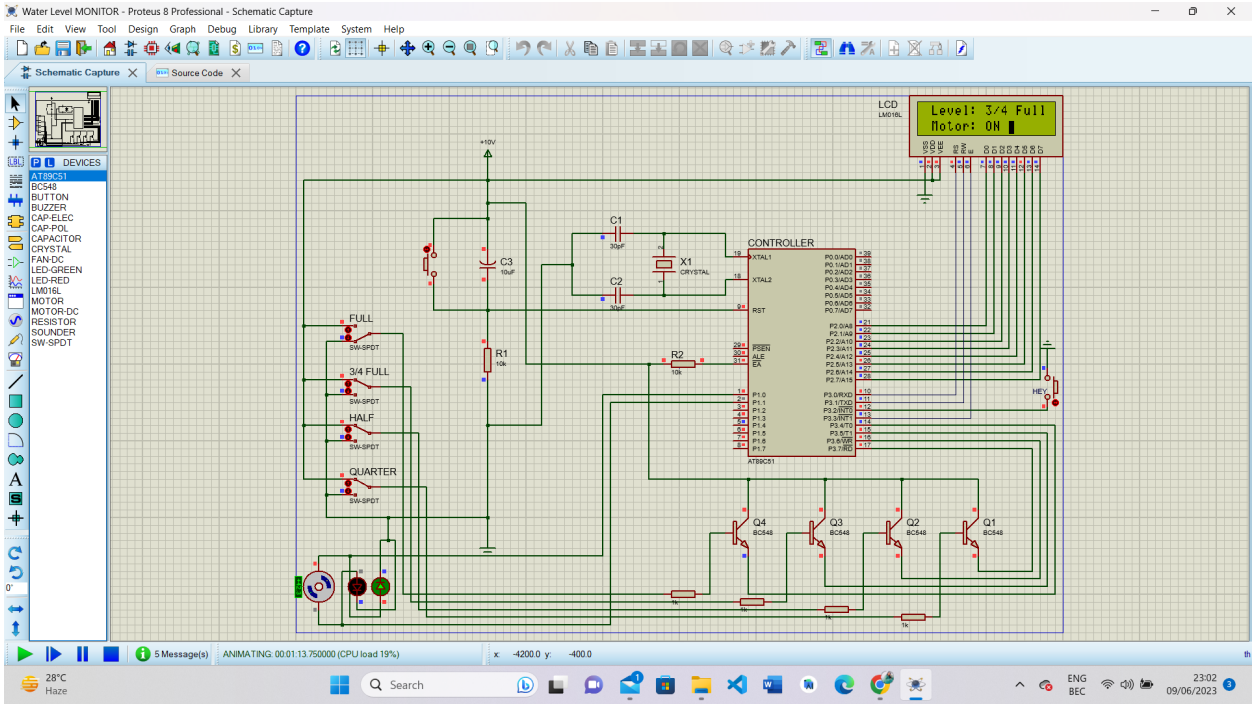
Tank is quarter and motor is ON simulation result :



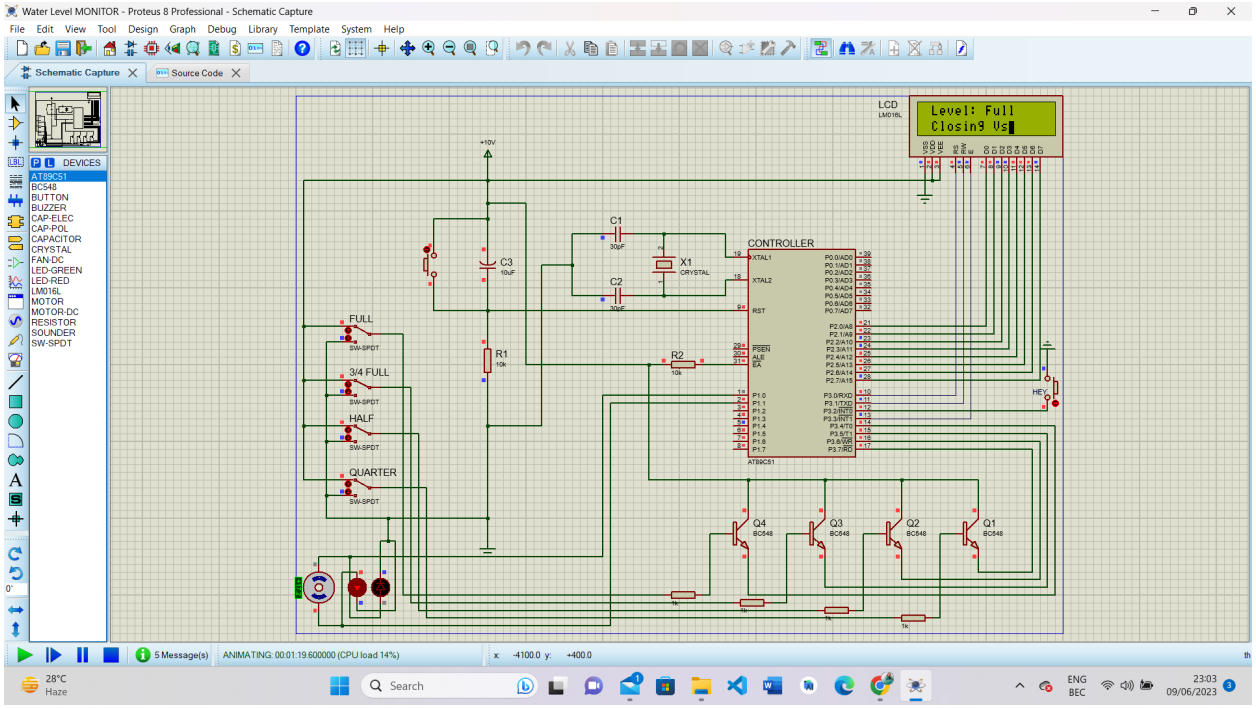
Tank is half and motor is ON simulation result :



Tank is ¾ full and motor is ON simulation result :



Tank is full and motor is OFF simulation result :



Merits and Demerits:

The Water Level Detection Software project has successfully developed a user-friendly software solution for monitoring water levels. It integrates with various water level sensors, providing accurate and reliable measurements. The software offers real-time data visualization, alerts for abnormal conditions, and data logging for historical analysis. It has merits such as accurate monitoring, intuitive interface, and historical data analysis. However, there are demerits, including dependency on sensor accuracy, initial setup complexities, and potential false alarms. Overall, the project provides a solid foundation for water level monitoring technology, with opportunities for future enhancements and improvements.

Conclusion:

The Water Level Detection Software project successfully developed a software solution that accurately detects and monitors water levels in various applications. The software provides real-time data visualization, alerts for abnormal conditions, and data logging for historical analysis. The project outcomes meet the initial objectives and lay the foundation for future improvements and advancements in water level monitoring technology.