REPORT ON AUTOMATIC WATER PUMPING SYSTEM WITH OVERFLOW CONTROL

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1.1 ABSTRACT

- In our daily life, we observe lots of wastage of natural resource such as water, one of the major area where the wastage of water is seen is overhead tanks at our homes. Whenever the water in the tank gets empty, we switch on the water pump to fill up the tank. Once the water in the tank fills up, it starts to overflow without any indication to us. In addition, we need to manually switch on/off the water pump in a timely manner. So in order to prevent the overflow of the tank and make the whole process of pumping up the water automated an Automatic Water Pumping System with Overflow and Water Level Indicator can be great solution.

1.2 DESCRIPTION

- This automated system has two water level sensor, which is to be attached at top x1 and bottom x1 surface of the water tank which detects the water level in the tank and switches on/off the water pump and also displays the water level.

1.3 IDENTIFYNG FEATURES

- It must detect the water level and display the water level.
- It must detect the low water-level and start the water-pump immediately with an indication.
- It must detect the high water-level and stop the water-pump immediately with an indication.

1.4 SWOT ANALYSIS

SWOT ANALYSIS

Strengths:	Weaknesses:
➢ Prevents the wastage of water. ➢ Totally automated water-pumping system, which reduces manual efforts of the user. ➢ Saves the electricity and water bill money of the user.	➢ Maintenance or servicing of the system is required. ➢ Risk of short-circuit is present.
Opportunities:	**Threats:**
➢ Additional features can be added to the system. ➢ Improvements in the design can be can be made in order to make it the safest system.	➢ Short-circuit can occur as the electronic components has the attached in moist/liquid environment.

1.5 4W'S AND 1H

➢ Why?

This system can be used by anyone who wants to save water as well as their money.

➢ What?

This system is an automatic water-pumping and water level indicator system which save a lot of manual efforts.

➢ When?

When the water level is low the water gets filled in the tank through water-pump and when the water gets filled fully in the tank, the water-pump offs.

➢ Where?

This system can be used at any place where the water storage tank is present.

➢ How?

The system controlled by atmega328 microcontroller and water level sensor which gives inputs to microcontroller, based on which the water-pump is controlled to fill the water tank.

2. REQUIREMENTS

2.1 HIGH LEVEL REQUIREMENTS

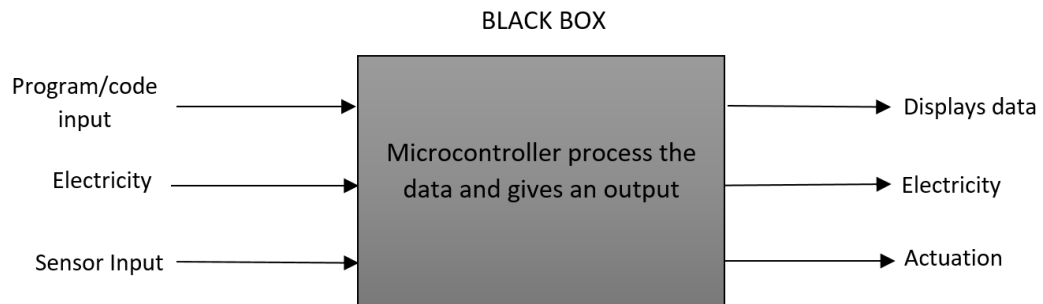| Test-ID	Description
HLR1	Display the water-level present in the tank
HLR2	Switch on the water-pump when water-level is low in the tank
HLR3	Switch off the water-pump when water is fully filled in the tank

2.2 LOW LEVEL REQUIREMENTS

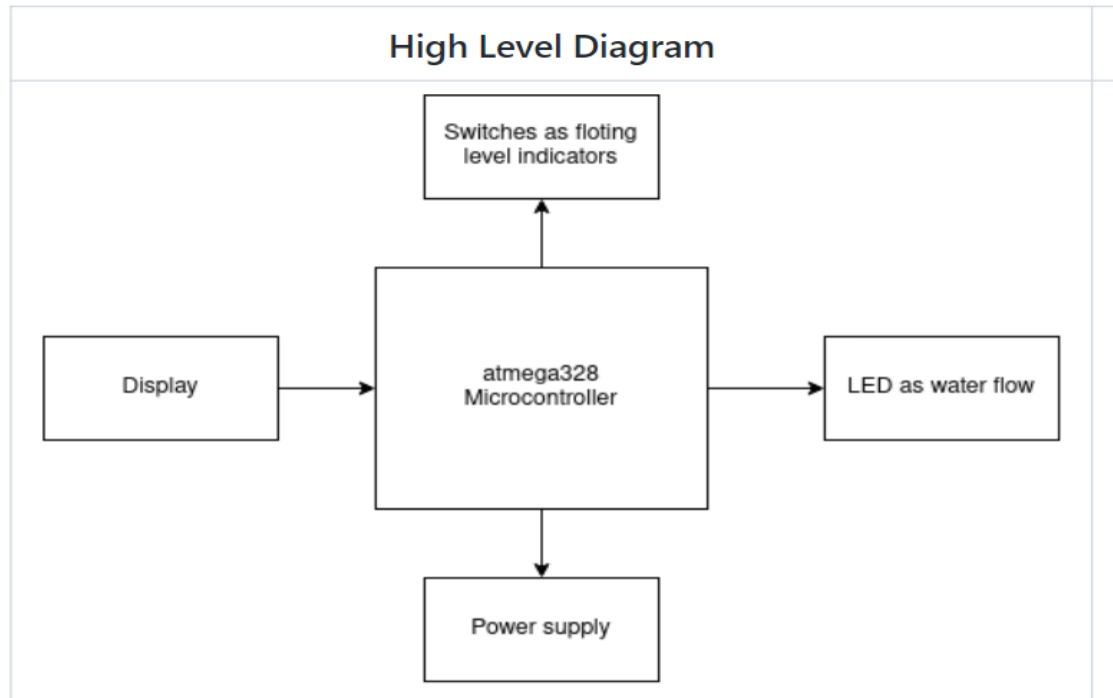| Test-ID	Description	HLR-ID
LLR1	Display the water-level in terms of liters	HLR1
LLR2	Display the water-level based on sensor's input	HLR1
LLR3	Switch on the water-pump when both the water-level sensors are open	HLR2
LLR4	Switch on the water-pump when bottom sensor is closed and top sensors is open	HLR2
LLR5	Switch off the water-pump when both the water-level sensors are closed	HLR3
LLR6	Switch off the water-pump when bottom sensor is open and top sensor is closed	HLR3

3.COMPONENT DETAILES

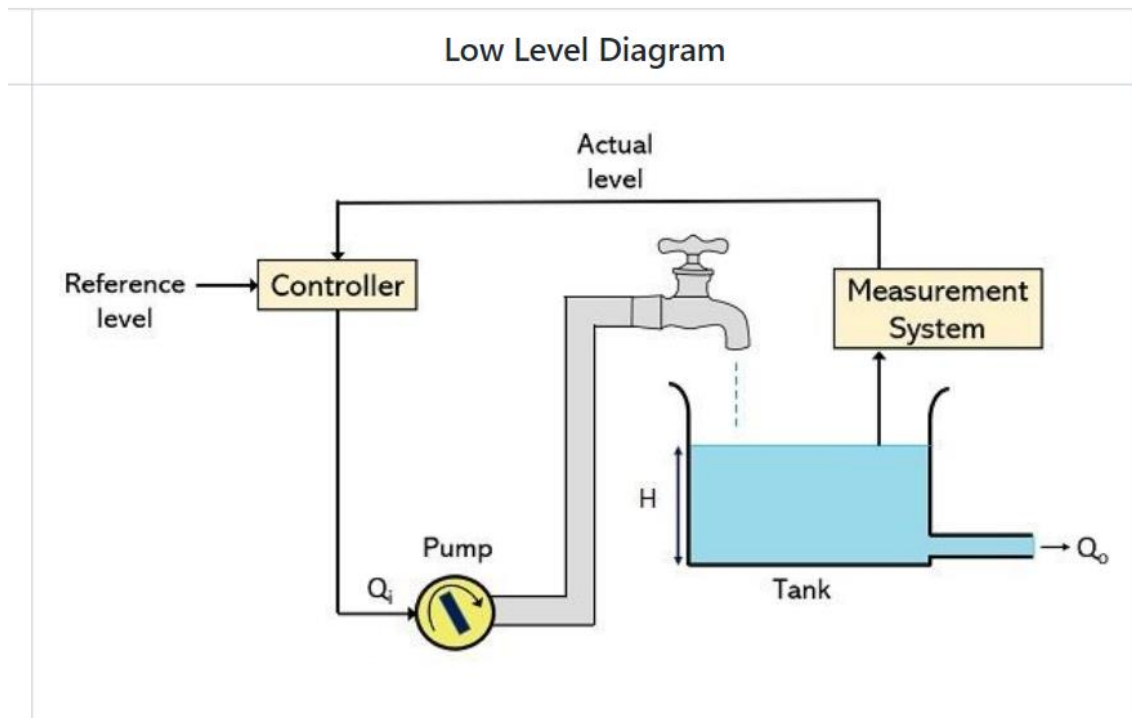| Components Used	Working As	Component Discription	Quantity
Atmega328 microcontroller	Microprocessor	ATmega328 is a single-chip microcontroller created by Atmel in the megaAVR family which has a modified harvard architecture 8-bit RISC processor core. Atmega328 has 28 pins in total which is divided into 3 Ports in total which are named as Port B, Port C and Port D. It has EPROM and clock built internally.	x1
16x2 LCD	Display	Liquid Crystal Display or LCD is used to display character digitally. A 16x2 LCD display can display 16 characters per line and there are 2 such lines.	x1
DCmotor	Water-pump	It has a set of magnets in a metal cover, and a coil of wire in which current passes in order to generate an electromagnetic field. Due to which the axel of the foter rotates.	x1
LED	Indication	A light emitting diode(LED) is a semiconductor light which emits light when current flows through it.	x1
1kΩ Potentiometer	Water-level detector	A 1KΩ potentiometer hass a 3-I/O pins with 15mm shaft. This is used for adjusting various parameters such as voltage and current in an electronic circuit.	x1
100Ω Resistor	Resistance	A resistor is a passive two-terminal electrical component that implements electrical resistance in an electronic circuit. An 100Ω resistor can make excellent pull-ups, pull-downs and are a good current limiters.	x1
Switch	Water-level sensors	Switch make or breaks the circuit by switch on/off condition, whivh is opening or closing of the electrical line or circuit.	x2

4. ARCHITECTURE

4.1 BLACK BOX

BLACK BOX

Program/code input →		→ Displays data
Electricity →	Microcontroller process the data and gives an output	→ Electricity
Sensor Input →		→ Actuation

4.2 BEHAVIOURAL DIAGRAM/ BLOCK DIAGRAM

High Level Diagram

Switches as floting level indicators

Display → atmega328 Microcontroller → LED as water flow

Power supply

Low Level Diagram

4.3 STRUCTURAL DIAGRAM/ FLOWCHART

High Level Diagram	Low Level Diagram
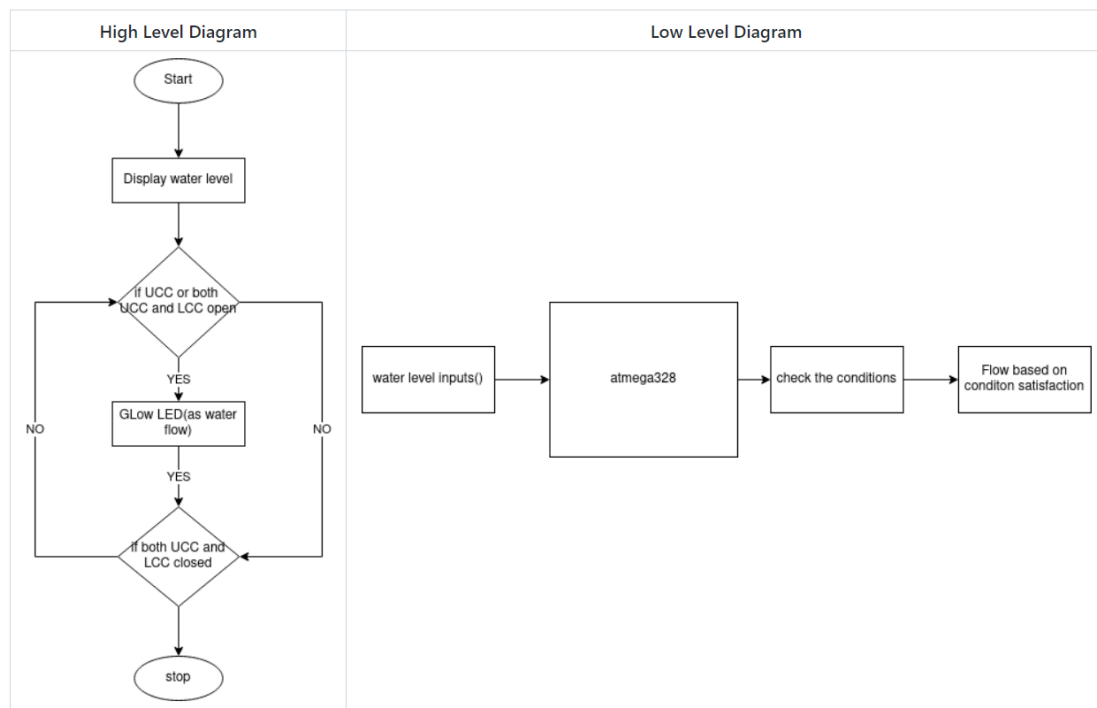
4.4 BEST METHOD FOLLOWED

- The best of the best diagrams are considered.
- With the use of all the diagrams code will be built.
- Low level and High level requirements are implemented.

5. TEAT PLAN AND OUTPUT

- To be implemented.

5.1 HIGH LEVEL TEST PLAN

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LLR4	Switch on the water-pump when bottom sensor is closed and top sensors is open	HLR2
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LLR6	Switch off the water-pump when bottom sensor is open and top sensor is closed	HLR3

6. APPLICATIONS

- This system can be used in overhead water tanks in house.
- This system can be used in offices and industries.
- This system can be used in other liquid tanks such as oil, milk. .etc, other than water.