Plant Watering and Humidifier System*

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Houseplants require watering when their soil becomes a certain level of dry, which can be tricky when we are not in the apartment during most of the day or simply forget to water the plants at the appropriate time. My Arduino project will consist of a system that detects when the moisture level of the soil of the plants is lower than it should be, and automatically water the plants for a certain amount of time. A power supply will be attached to the water pump to be able to extract the water from the plastic bottle into the plant pot. The moisture sensor is immersed in the plant's soil and detects when the moisture level is too low. A relay model is connected to the water pump to determine when the code decides to stop the watering. A display of three digits will be connected to the solenoid, battery and Arduino. It will show multiple measurements in the system, such as the moisture percentage of the soil and the time the soil takes to dry up.

I. LIST OF PARTS

1. Arduino UNO
2. Breadboard
3. Power supply (Battery)
4. Soil moisture sensor (YL-69)
   The soil moisture sensor runs once 5V and GRD are connected. It puts out what voltage cross across the two electrodes, and calculates the resistance or how much current is going through each one of them. As soon as the electrodes hit the water, resistance drops so we get a lower output voltage. If we put the finger on it it changes quite a bit.
5. Relay module (Keyes SR1y)
   Relay runs through the power supply. The outputs connected are 12V and GRD. There are 3 pins: minus (-) to GRD, plus (+) to 5V, and the switch so it's on and off (digitalWrite() for 0 and 1). It can switch to 10 amps max, for DC 30 V max.
6. Water pump
   The pump needs 12 V, therefore it works out as it is less than DC 30 V (we don't know the name but it's standard). The water pump runs through the power supply, and although it is quite slow (not a big problem), it works. Part of it comes off and it is the motor. The axel from the motor goes in between the motor. The rollers pinch the pipe and all 3 rollers spin and rotate.
7. Water Float Sensor
   It detects the level of water in the reservoir. The sensor has ten copper traces, five are power traces and the other five are sense traces.
8. Plastic water bottle
9. Plastic pipe
10. LCD display

II. IMPLEMENTATION

A. Week 1

The initial block diagram is shown in Figure 1.

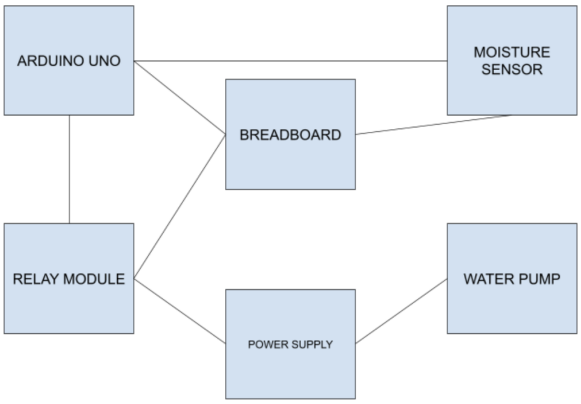

FIG. 1. Block diagram of schematics: First draft of software and electronics

B. Week 2

Work with sensing system. Write control functions for sensors. The block diagram of software and electronics is shown in Figure 2.

* A special thank you to the Electronics Laboratory staff

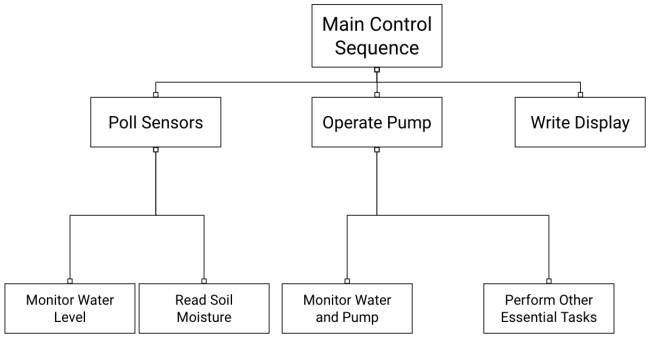

FIG. 2. Block diagram of software and electronics: An addition of the LCD display and float

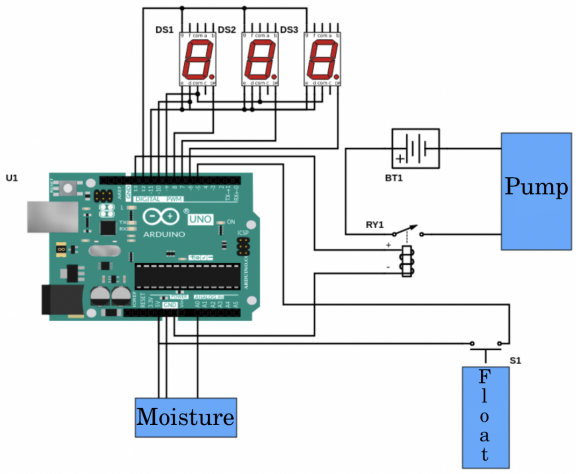

FIG. 3. Block diagram of software and electronics: An addition of the LCD display and float

C. Week 3

Wire up display. Testing with plants to figure out thresholds. The block diagram of software and electronics is shown in Figure 3.

D. Week 4

Assemble hardware. Finish writing code.