

EE 183DA Lab 3: Jam Band

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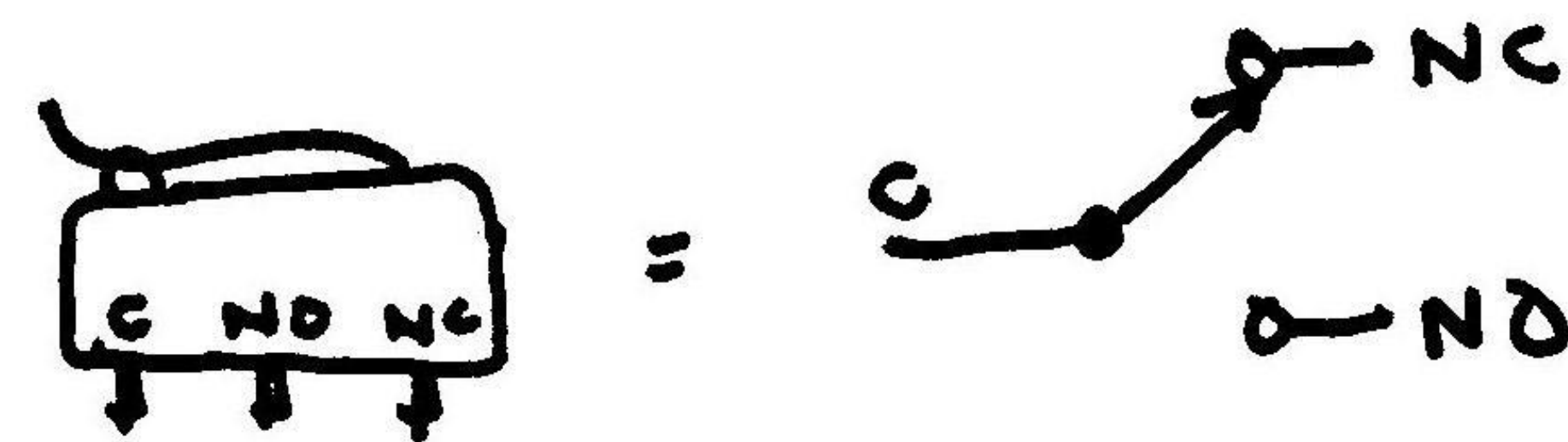
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Introduction

In this lab session, we continue with the electromagnetic hacking system in Lab 2, but this time we add sensors to our “musical instruments”, and they can measure the state of other instruments. After that, they will act based on the measurements.

Specifically, we used servos and mechanical arms to knock on water bottles to create percussion music. The two sensors that we chose are limit switch and photo resistors. The microcontrollers will read the input from the sensors, and if a certain condition is met, the MCU will write to the servo and the servo will rotate. The first servo is controlled by the web interface by the user, but the second and third servo are controlled by the sensors.

Methods



- I'm in charge of the limit switch sensor of the system
- Switch Model: 10t85
- Connect NC to VCC, NO to 0V, C to a digital GPIO pin of the MCU
- NC: Normally Closed Terminal
NO: Normally Open Terminal
- When the switch is closed, the C pin will connect to the logic high level voltage (3.3V)

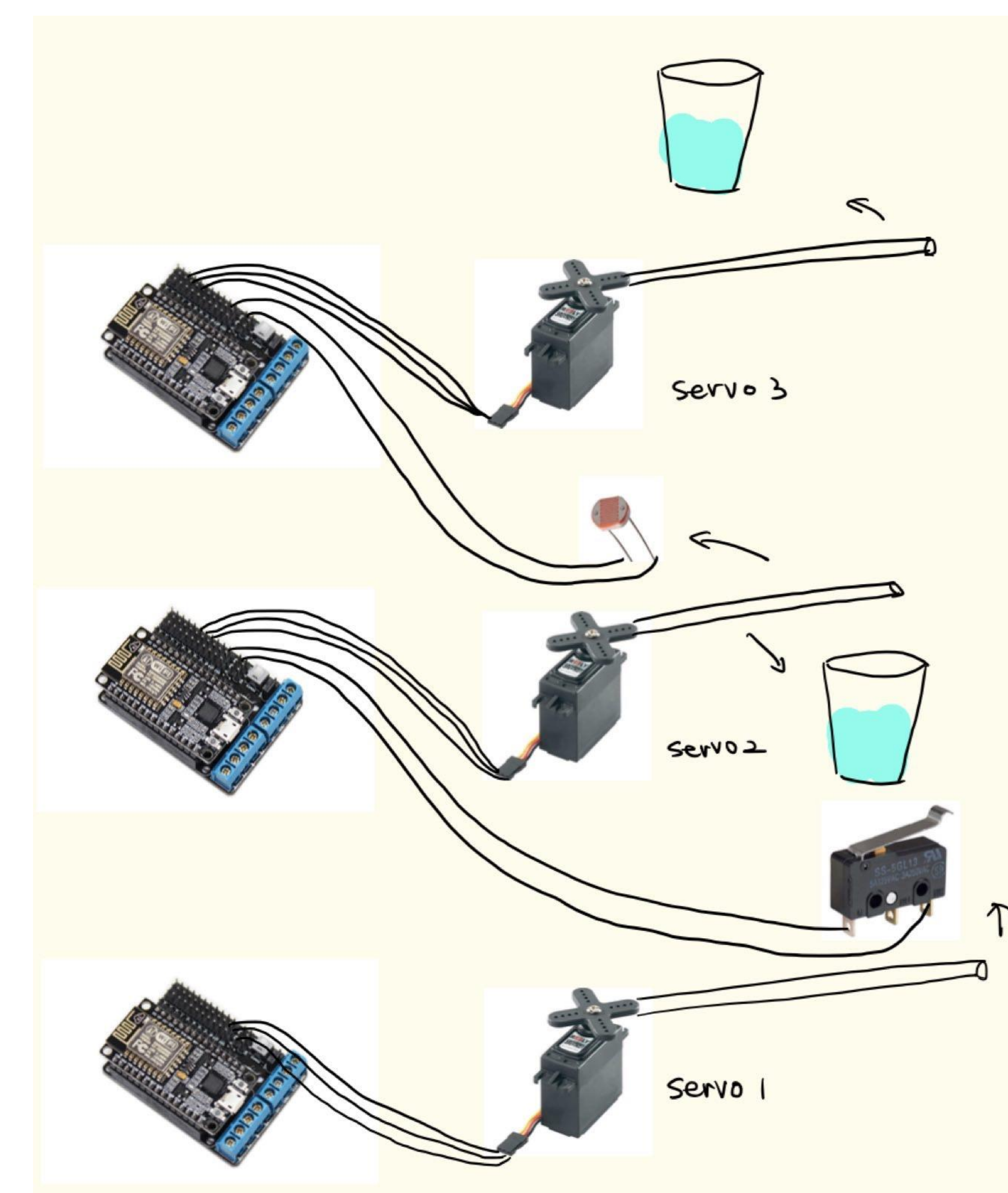
Methods (Cont'd)

- Use analogRead function on Arduino to read the voltage level
- analogRead: Reads the value from the specified analog pin
- For a digital GPIO Pin, the results of analogRead() are either 0 (switch turned off), or 1023 (switch turned on)
- Write the servo to a certain angle when the voltage is high

Conclusions

- In this lab, we combined the actuators with the sensors to create a more advanced system
- The MCUs processed the signal from the sensors and controlled the servo based on the results

Results



Relevant Links

- Demonstration Video:
<https://youtu.be/ljqijyLrOXg>
- Github Repository:
https://github.com/duanzr1996/EE183DA_Lab3