



CSE 321: Real-time and Embedded Operating Systems

PROJECT PHASE 3

Baby Breathing Monitoring System



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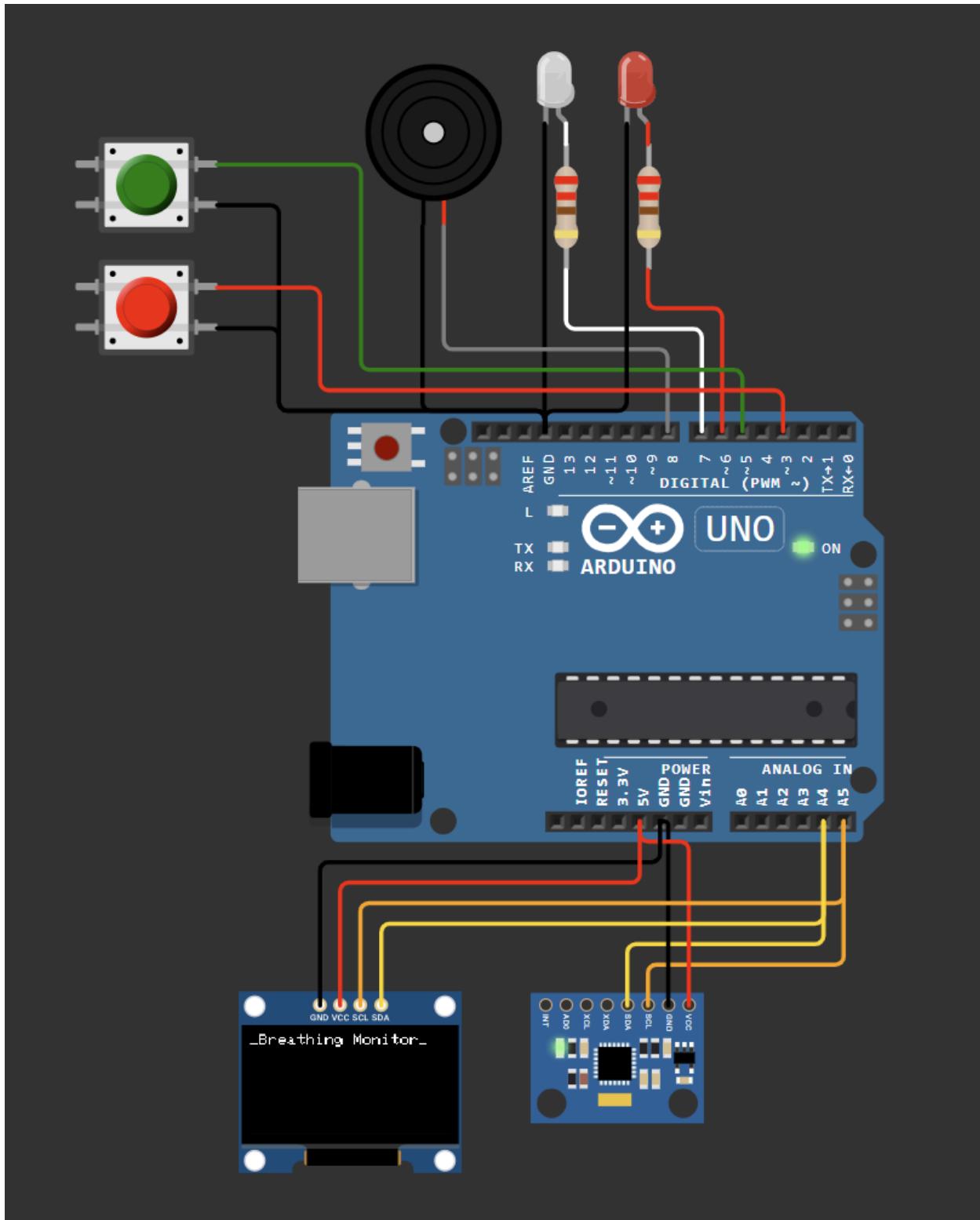
Due date: 2025.12.2

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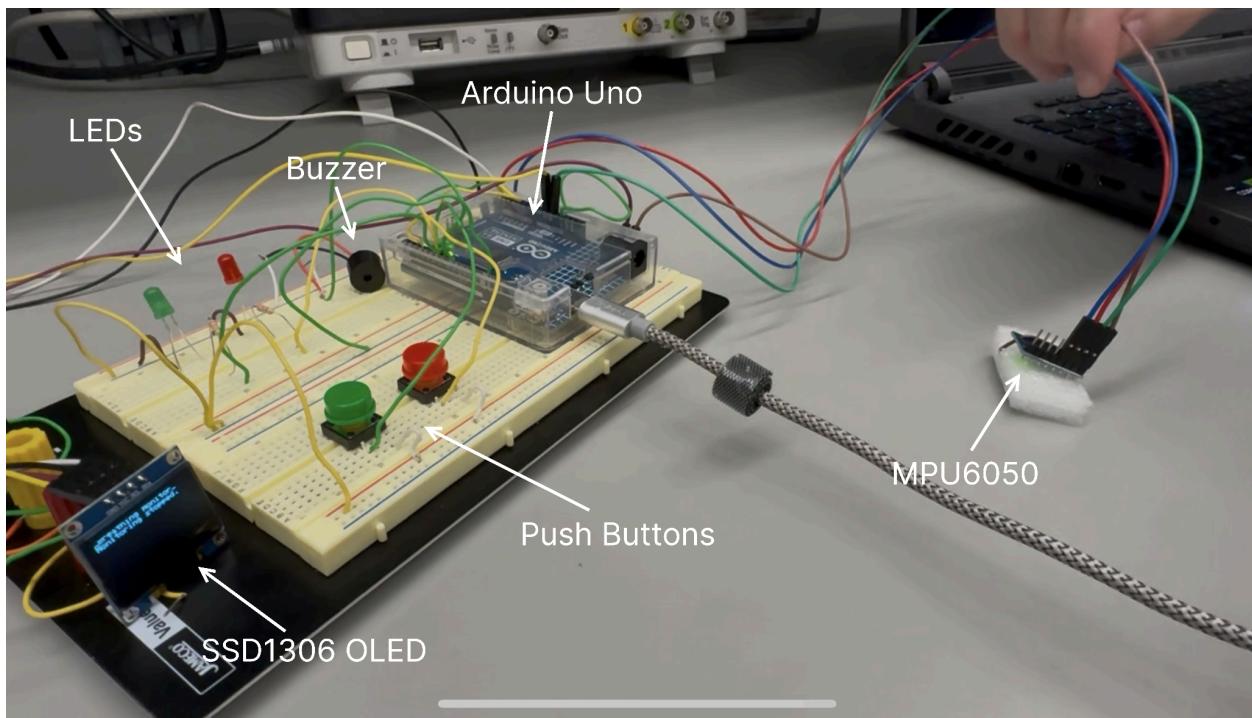
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1 Final Circuit Design

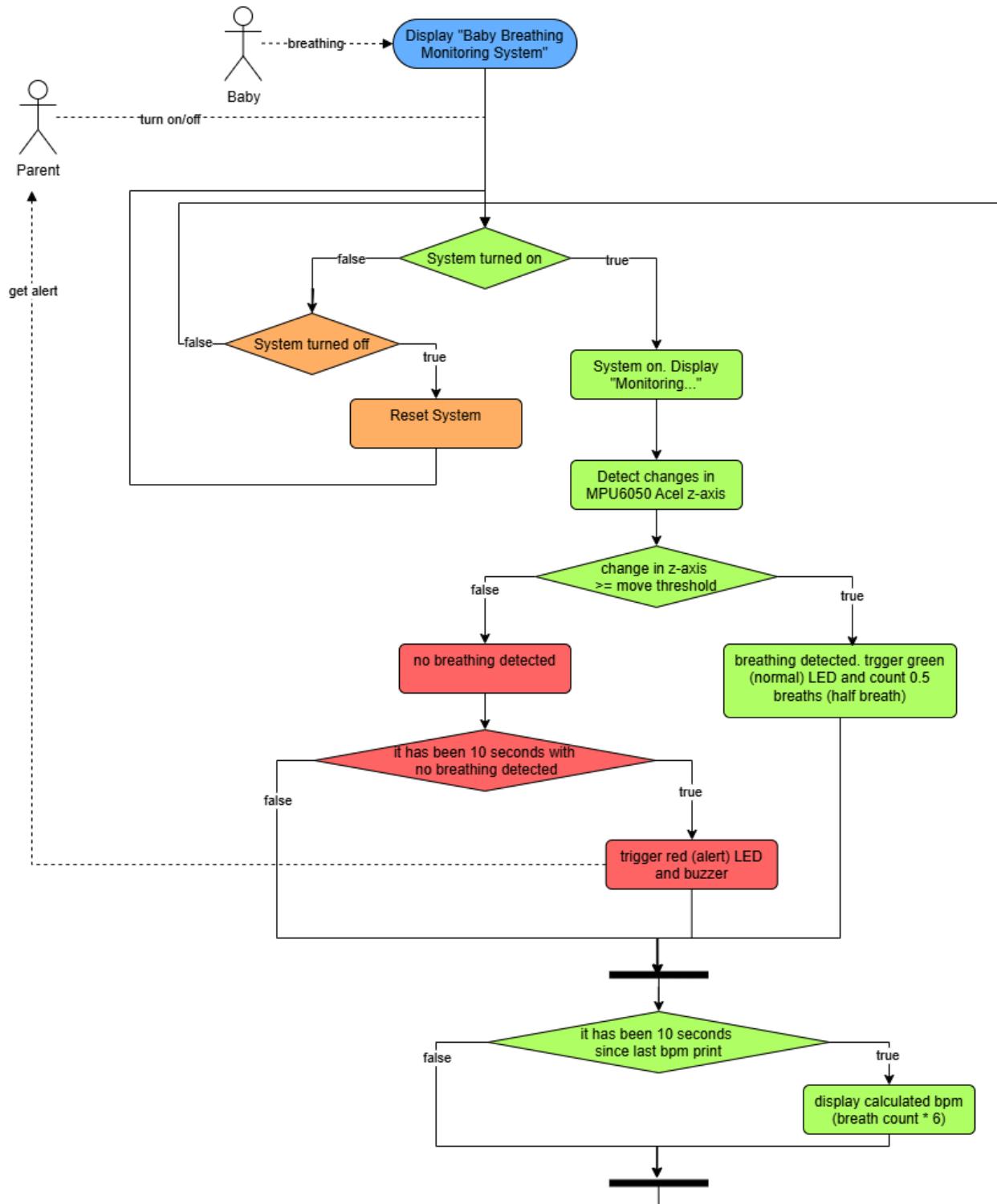
1.1 Wokwi Setup



1.2 Our setup



2 Final Logic Diagram



3 Project Documentation

3.1 Part 1

In part 1, we decided on our project idea, Baby Breathing Monitoring System. Through research and input from the TA's we decided which components would be best for this project. We weren't sure if the MPU6050 would be sensitive enough to detect slight breathing movement, but we wanted to try anyway.

3.2 Part 2

We ordered our components at the start of phase 2. We wanted to get started as soon as possible, so we started writing code and testing on Wokwi before. Once the components came in, we tested each individually. We could not test the MPU6050 immediately, since it required soldering. We soldered the MPU6050 and tested it a week later, but it did not work. The light would flash occasionally, but we were getting the error output "MPU6050 failed.". Thankfully, the rest of our components worked.

3.3 Part 3

We found out our MPU6050 was damaged from either soldering incorrectly or using 5V when we should've been using 3.3V. We ordered a new MPU6050, which worked as expected when we tested it individually using code provided by Wokwi. We went ahead and tested our system using the code we wrote in part 2. We had to make adjustments to our code to ensure the breath count and breaths per minute are accurate, but after making these changes, our system works as expected.

If we had more time, we could find a way to make the system less invasive. Having to attach the MPU6050 to the infant's chest would most likely be uncomfortable and dangerous, since the wiring would be near the infant. One solution would be to use TinyML and an infrared camera to detect breath from the infant's nostrils. Overall, we are very happy with how our project turned out.