Lab Worksheet

**Lab Number (circle this week’s lab)**

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| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |

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**Lab Section**: 8

**Lab Partner Name**: Jon Schnell

This lab worksheet is the final deliverable for a lab. You will usually have three deliverables for a lab:

1. **Prelab assignment BEFORE LAB**: Posted with the lab manual, typically involves a system sketch, submitted in Canvas before the start of your lab section, may be worked on and used by lab partners in class on Tuesday during lab planning
2. **Demonstrations IN LAB**: Demonstrated/discussed with a TA in lab and recorded using a demo evaluation sheet to be printed and signed in lab (functional demo of a lab milestone, debug demo using debugging tools to explain something about the internal workings of your system, Q&A demo showing ability to formulate and respond to questions)
3. **Postlab assignment AFTER LAB**: Submitted in Canvas before the start of your next lab section, may be reviewed by lab partners in class on Tuesday during lab retrospective, consists of three items (prelab planning boards, lab notes, and lab retrospective)

Deliverable #1 has its own Canvas assignment submission. (10 points)

Deliverable #2 has an evaluation sheet that is printed in lab, used as a checklist, and submitted to your TA. The TA will enter points in Canvas based on the demo evaluation sheet. (40 points)

Deliverable #3 has its own Canvas assignment submission. (30 points)

This worksheet will help you develop the items needed for deliverable #3.

1. **PRELAB PLANNING BOARDS**
2. Question Board: What are the three priority questions from your lab planning work?

What does the ping sensor do?

How does the sensor record distance?

How do we set the ping sensor up so that it can detect the width of objects?

1. Task Board: What are several tasks you identified in your planning (for you and lab partner)?

* Find ping-related registers
* Identify which registers need to be used and set up
* Identify how to set up a specific timer
* Set up said timer
* Set up a scanning movement method
* Enable interrupts to detect objects
* Set up distance formula using timing of the ping sensor
* Using the distance and interrupts to find the width of objects in its sight using the scan method

1. **LAB NOTES**

During lab, keep notes about the following so that you can submit information with this deliverable.

1. Results related to the three priority questions (might be answers, might be more questions, write brief summaries, don’t include code files)

* The ping sensor sends out sound waves to be utilized for a variety of functions, including distance as used in the lab.
* Using the time between the sound wave being sent out and it returning tells us an estimate as to how far away an object is, within the device’s capabilities.
* Using the aforementioned distance formula and a scanning method, we can use the ping sensor to rhythmically scan every few degrees to get an idea of how wide an object is based on the distances recorded by the ping sensor.

1. Any additions, refinements, or corrections to the prelab system sketch based on what you learned (include an updated sketch, or briefly describe at least one update you made)

* There is not much to add here, as the system hardware sketch was correct.

1. Description of your debug demo (what did you demo and why, what did you find, a paragraph is fine, may want to include a screenshot)

We demoed what is pretty much question 3 from the prelab. Considering the COVID-19 outbreak, we could not personally witness the demo. From what we were told, the sensor did exactly what it was supposed to do: it swiveled a few degrees, took a scan, and relayed the distance recorded from that scan. This process completed for a full scan, and it accurately described the width of the object it scanned.

1. **LAB RETROSPECTIVE**

Take 10-15 minutes and answer these questions as you think about your lab experience. You don’t need to describe everything, try to pick something notable.

1. What did we set out to do?

We set out to utilize the ping sensor to record distances and to find the width of objects within its sights.

1. What actually happened?

While what we set out to do did not initially happen, it did eventually get to that point. We were successful in what we set out to do.

1. Why did it happen?

There was some misunderstanding as to what needed to happen to initialize the ping sensor and the corresponding timer. This caused a significant delay in this lab.

1. What are we going to do next time (to improve)?

We will thoroughly check lab documentation to ensure that we know exactly what registers need to be initialized and what bits within them need to be set.