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**: 1

**Lab Partner Name**: Ruiyu Son

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?
   1. What are the requirements for the Timer? (Positive and Negative edge, down counter, etc)
   2. How does the Timer incorporate with the PING sensor?
   3. How will the counter work to go from 16 bit to a 24 bit counter?
3. Task Board: What are several tasks you identified in your planning (for you and lab partner)?
   1. Understanding how to set up the alternate function for the GPIO so we can use the PING sensor
   2. Understand the correct configuration for the timer and their registers
   3. Follow 11.4 in the tivia data sheet
4. **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)

* In order to understand the requirements for how the timer should be configured we walked through the Lab manual where it gave instructions on how the timer should be configured. From their we would look at the specific registers needed to configure the timer and make sure the right bit was being set so it followed those instructions. We talked to the TAs about this one, still have some questions about it but we concluded that the PING sensor sends its out put which uses the alternate function of the GPIO port b pin 3. The timer is configured to catch the rising and falling edge which will give the time it took for the wave to be sent and then come back to the sensor. Looking at the Prescale register and ILR register we concluded that the prescaler adds to the regular counter to make it go from 16 – 24 bits.

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)
   1. I didn’t make an update to my prelab sketch.
2. 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)
   1. We stepped through our init function which set up the GPIO and the Timer 3b . We ran into an infinite while loop during our GPIO set up because it was checking for the wrong value on whether or not it should move on. We should this to the TAs fixing the problem and then showing how it went the rest of the way through the init after fixing the problem.
3. **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?
   1. We set out to make it the functional demo and finish the lab while grasping a good understanding of how lab 7 worked with timers.
2. What actually happened?
   1. We finished initializing everything in our init function and the skipped over part 1 since it only used the GPIO and not the timers and moved on to part 2 (functional milestone). We began configuring the timer to its correct specifications. After we started with the interrupt registers. This is where we got stuck but there was little time left in the lab so this is where we stopped.
3. Why did it happen?
   1. We had a good plan set up for how we wanted to tackle the lab so we followed the guide in section 11.4 of the tivia data sheet. This helped us along in the init processes and for which registers we needed. It gave us a good base for the interrupt processes. Once we got to this point my lab partner and I worked to understand how to send and interrupt. (changing the GPIO to and input from and output and then switching it back once the processes was over)
4. What are we going to do next time (to improve)?
   1. I think we could work better with the structured pairing. Rather than each having a specific task for the lab we pretty much worked through it together at the same pace doing the same thing. This probably hindered our productivity a little bit.