

ECE2049: Homework 5

Content: Lectures 10-11

Due: Thursday, June 23 by 11:59pm EDT

Submission notes:

- For full credit, please show your work and denote your answers with a circle or a box.
- Always write or draw your diagrams neatly! We cannot be expected to GUESS what you meant to write! Some problems (such as those involving code) must be typed to be graded—the others may be handwritten (neatly!) or typed.
- Points for each problem are as indicated. Some portions of problems are marked as “BONUS,” which count as extra credit.

1. (5 pts) Please complete the “Interim Course Survey” located in the Quizzes section of our course page on Canvas, located here: <https://canvas.wpi.edu/courses/35856/quizzes/48849>

This survey is designed to help me plan the remainder of term. Your feedback is extremely useful for helping me accommodate everyone and create a comfortable learning environment. **Your responses are anonymous, unless you choose to include your contact information—otherwise, Canvas will just record that you completed the survey.**

2. (10 pts) For a certain application, Timer A2 has been configured as shown below with the goal of creating periodic interrupts every 0.005 seconds.

```
void runtimerA2(void)
{
    TA2CTL = TASSEL_2 | MC_1 | ID_2;
    TA2CCR0 = 1309;
    TA2CCTL0 = CCIE; // Enable timer A2 interrupt
}
```

- a. Assuming that ACLK, SMCLK, and MCLK are running at their default settings, what is the **exact time** between interrupts, t_{INT} ? (Your answer should be close to 0.005 sec.)
- b. If the system clock and timer settings from this problem are used to implement some kind of time-critical system, how long until the time count is off by 0.005 seconds? Will it be fast or slow? How do you know?
- c. Write an interrupt service routine for Timer A2 for this application, using a single level of leap counting to keep the display accurate for longer.