

ECE3411 – Fall 2016

Lab 4a.

Measuring Human Reaction Time & Timer 1 Capture Interrupt

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Task 1: Measuring the Human Reaction Time

Implement a system to measure the Human Reaction Time down to a resolution of 1 ms.

In particular:

1. Print a message on UART for the user to get ready
2. Wait for some random amount of time, e.g. between 2 to 5 seconds
3. Turn on a LED & start Timer 1
4. The user is supposed to push a button as soon as the LED turns on
5. Read Timer 1 to measure the time between the two events, i.e. turning on the LED and detecting a button push
6. Print the reaction time in milliseconds on UART

Task2: Experimenting with Capture Interrupt

Run the sample code demonstrating “Timer1 Capture Interrupt” provided in Lecture 3b.

- Connect PB3 (OC2A) to PD7 (AIN1)
- This program uses Timer1 Capture Interrupt to accurately measure Polling time for Task1().
- It then prints the actual time (200 cycles) measured by Timer1 and the time observed by polling mechanism.
- Your task is to vary the time “t1” that controls the printing rate.
- Why does the observed polling time vary with “t1”?