EE 2920 - Week 7 Lab: Timer/Counters

1 dedicated lab period, 2 lab periods to complete

Name:_____

Objectives

- Understand and use the integrated Timer Counters
- Generate waveforms

Prelab

student check off

- Review the Timer/Counter class notes ☐

Assignment

Part 1: a) Interface 2 pushbuttons to your MSP432 Launchpad.

b) Use TimerA in Periodic Mode to create 4 selectable square wave outputs

1.	not pressed	not pressed	→	261.63Hz
2.	not pressed	pressed	→	329.63Hz
3.	pressed	not pressed	→	392.00Hz
4.	pressed	pressed	→	523.25Hz

c) Document your calculations.

d) Generate oscilloscope plots to verify the output frequencies.

Printouts required for checkout

> 15 lines for main
> 6 lines for pin config fn
> 4 lines for timer setup fn
> 2 lines for read btn fn
> 2 lines for set freq fn
> 6 lines for ISR

Part 2: a) Interface 2 pushbuttons to your MSP432 Launchpad.

b) Use TimerA in Fast PWM mode to create 4 selectable 1.75KHz PWM outputs

1.	not pressed	not pressed	→	10%
2.	not pressed	pressed	→	25%
3.	pressed	not pressed	→	75%
4.	pressed	pressed	→	90%

c) Document your calculations.

d) Generate oscilloscope plots to verify the output frequencies.

Printouts required for checkout

> *15 lines for main
> *6 lines for pin config fn
> *4 lines for timer setup fn
> *2 lines for read btn fn
> 2 lines for set duty fn
> *6 lines for ISR

Check Off

You must demonstrate your working design(s) prior to the end of the 2nd lab period

- Demo your Part 1   50%   _____
- Demo your Part 2   30%   _____

Lab Report (informal)

- Due at 4:00 pm, 1 day after the second lab period – in the box outside my office
- Include this cover sheet
- Include a properly documented informal lab report.   20%   _____

Strategy

** I suggest you create 2 different programs – do not overwrite prog x to make prog y **

Part 1: Get 1 frequency working first – verify with oscilloscope. Add other frequencies.

Part 2: Get 1 duty cycle working first – verify with oscilloscope. Add other duty cycles.