

# ELEC334 HW4

November 30, 2020



## Problem 1 [15 pts] – Board Support Package

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Explain the concept of *Board Support Package* (BSP) and create one for your board. You can later use this BSP in your homeworks / labs / projects. (Make sure to include in your submissions)

## Problem 2 [10 pts] – Software Faults in the wild

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Find and give examples of 4 different software faults happened in the world. Give one paragraph explanation, reference article(s) and if exists video links.

## Problem 3 [15 pts] – Bouncing

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Explain the bouncing phenomena on physical switches, give hardware and software prevention methods, support with schematics and/or pseudo-codes (C style). Explain their strengths and weaknesses.

## Problem 4 [20 pts] – State Machines

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Implement a simple state machine to toggle on-board LED at different speeds. Assign each speed to a mode, and attach a button to cycle through the modes. (Each button press will cycle through these modes.)

Example:

- Mode 0 -> No toggling, LED is off
- Mode 1 -> LED is toggling at 1 second intervals
- Mode 2 -> LED is toggling at .5 second intervals
- Mode 3 -> LED is toggling at .1 second intervals
- Mode 4 -> No toggling, LED is on

Utilize enums, and structs for your state machine. Make it universal (meaning, it should be a separate library independent of your code) and scalable (meaning, it should be easily expanded for different use cases.)

Note. You should not have a `delay()` function on your main code which defeats the purpose of the state machine.

## Problem 5 [20 pts] – Reading

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Read P. Liggesmeyer and M. Trapp, “*Trends in Embedded Software Engineering*,” in IEEE Software, vol. 26, no. 3, pp. 19–25, May–June 2009, doi: 10.1109/MS.2009.80 paper and write one page summary. Do not copy paste from the article. Try to elaborate.

## Problem 6 [20 pts] – Reading

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Read J. Grenning, “*Applying test driven development to embedded software*,” in IEEE Instrumentation & Measurement Magazine, vol. 10, no. 6, pp. 20–25, December 2007, doi: 10.1109/MIM.2007.4428578 paper and write one page summary. Do not copy paste from the article. Try to elaborate.