ECE2049: Homework 1

Material: Lecture 1
Due: Start of Lecture 3: Tuesday, 24 May 2022 by 2pm EDT

Submission notes:
- For full credit, please show your work and denote your answers with a circle or a box.
- Always write and draw your diagrams neatly! We cannot be expected to GUESS what you meant to write!
- Please see the submission guidelines on the homework page of the course website for details.

1. (5 pts) Please do the following logistical tasks to help you get started with the course:
   a. Register for the course discussion board (EdStem) using your WPI email address: https://edstem.org/us/join/VBSzQc

   b. Complete the course background survey to provide some information about prior courses you have taken. This will help me calibrate course content to accommodate everyone. You can find the survey here: https://wpi.qualtrics.com/jfe/form/SV_3ZV5f1gTa8swdOm

2. (5 pts) You are given three **16-bit** values shown below. Each of these values can be interpreted as:
   - An unsigned number
   - A sign-magnitude number
   - A two's complement number

   Provide the decimal (base 10) equivalent of each value for each of these interpretations. Show your work.
   a. 0x4048
   b. 0x448C
   c. 0xDEED

2. (5 pts) A hardware device is responsible for reading the state of 8 relays that control a manufacturing process. The device represents the state of each relay (R0—R7) in an 8-bit value v, with the state of relay R0 is stored in the least significant bit, and the state of R7 in the most significant bit.

   If the device returns the value `v = 0x5B`, which relays are on?