



Tilt Indicator

Abstract

In this assignment, you will create a simple tilt indicator with the MPU9250, the 595 shift register, and the 8 LEDs.

Description

Functions to achieve:

Use 8 LEDs to indicate the tilting angle of your breadboard within the range of +/- 90 degrees. When you tilt the breadboard in both directions, the LEDs should be able to light up selectively. The specific visual effect is up to you. For example, you can light up the LED one-by-one and keep the previous on so that when you tilt the board to, say +/-90 degree the LED are all on or off. Alternatively, you can decide to only keep one LED on at a time. The key is to use the LED visual effect to indicate the tilting angle. The tilting range to test is +/- 90 ish.

Note: Since we only have one small breadboard, you will need to connect the IMU using jumper wires. You can either 3D print a custom housing or simply use blue tape to attach it to the breadboard so that, when you demonstrate the tilting, the IMU moves accordingly with the breadboard.

Requirement:

1. The LEDs only need to respond to the tilting along one axis (e.g. X-axis).
2. Make sure that the MPU's VCC is connected to the 3.3V of your ESP32, as it is not 5V tolerant.
3. In your code, you should only use the Wire library. No other external lib should be used.
4. Feel free to use Arduino's built-in functions such as shiftOut(), bitClear(), bitSet(), etc.

Delivery

There are two deliverables.

- First, your code. You can put them in a zip file if needed.
- Second, a quick video demo of your experiment.

Due Date

Friday Nov 15th, 11:59 PM EST