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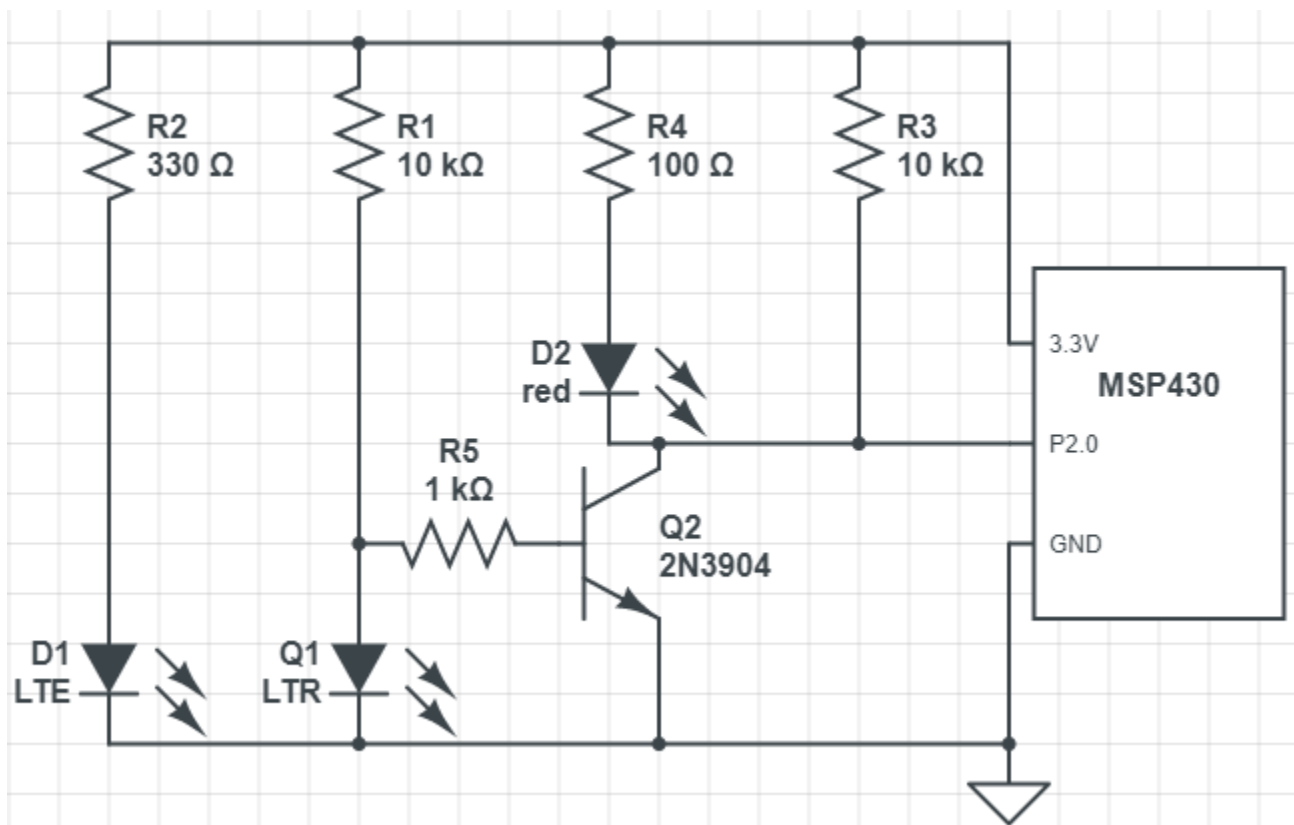
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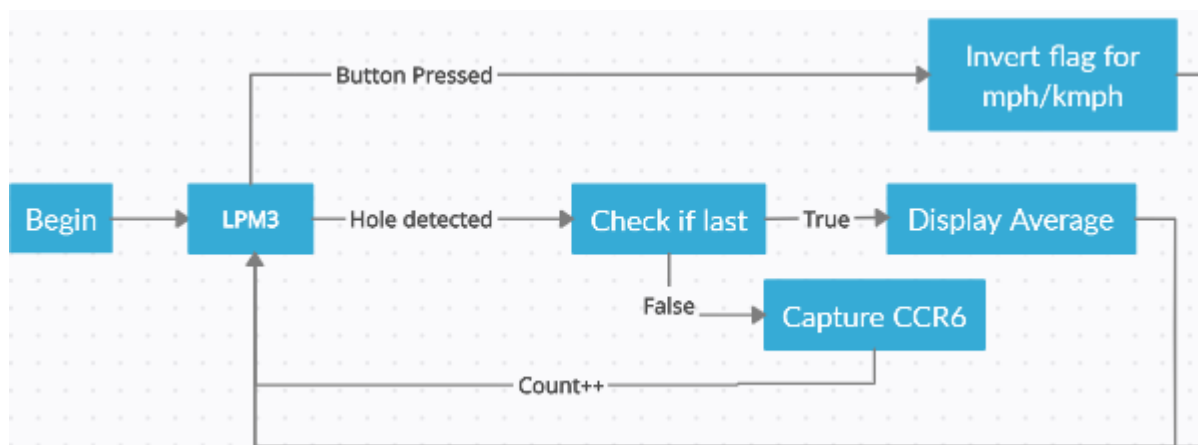
Lab 7: Speedometer

Introduction: The purpose of this lab is to implement a speedometer using an IR emitter and receiver. The idea when the receiver can see the emitter, an interrupt will be triggered that will then allow for measurement to be taken.

Hardware Design:



Software Design:



Conclusions: I successfully managed to implement all the desired functions of the lab. However, I am uncertain if my method to calculate miles per hour is valid.

Questions:

1) D1: 3.3V and 10mA; Q1: 3.3V and 3.3mA; R1: 250 Ohms and R2: 1k Ohms according to data sheet.

2) $65536 * 10 * 10^{-6} = 0.655$ seconds

3) $16000 / 65536 = 2.44$ mph

4) Resolution = $65536 / 10^6 = 0.0655$ us/step

5) $16000 / \text{resolution} = 244,274.8$ mph

6) Velocity = m / s; In my case m = 0.16 and s = total ticks * $10 * 10^{-6}$; mph = velocity / 0.447;

mph = $(16000 / \text{total ticks}) / 0.447$

Demo Video: <https://youtu.be/CSUpFnMDWIY>