Quiz #3

LabVIEW Dr. Pogo

Assignment is due "in class" on Thursday, October 2, 2025.

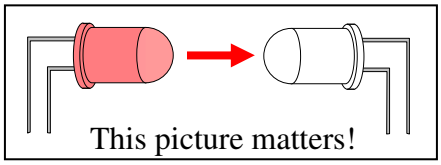
Quiz #3: Reading circuit diagrams, assembling hardware (7 points), and coding (3 points).
You will not submit any code; you will instead personally demonstrate your working *hardware* and *code*.
You may demonstrate your completed hardware *before* working on code, if you prefer.

Inputs: See below. The program requires 3 daq subvi's (detect daq, digital-in, digital-out).
Outputs: See below. A baseplate for the LabVIEW vi is provided.
Operation: Run once
Hardware: One USB-6008 DAQ with USB Cable

Components:

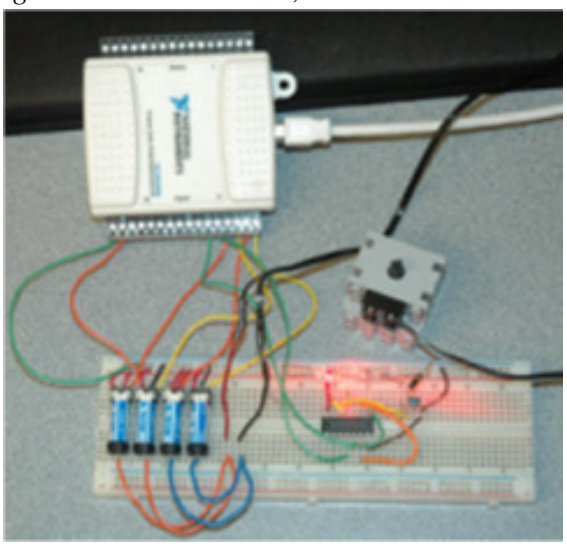
1 × NPN 222 Transistor	1 × 7400 Quad NAND chip
1 × Red LED	1 × Photodiode
1 × 10kΩ Resistor	1 × 100 Ω Resistor
1 × Lego motor	1 × Lego motor wire
4 × 5V relays.	1 × Prototyping board

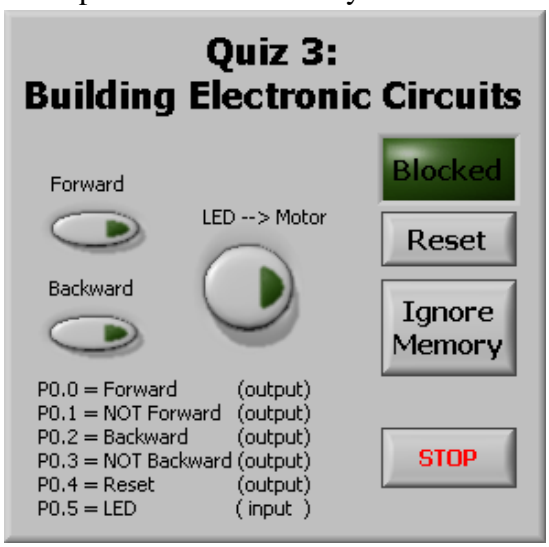
Various wires (28 total: 8 long, 5 medium, 4 short, 11 very short)

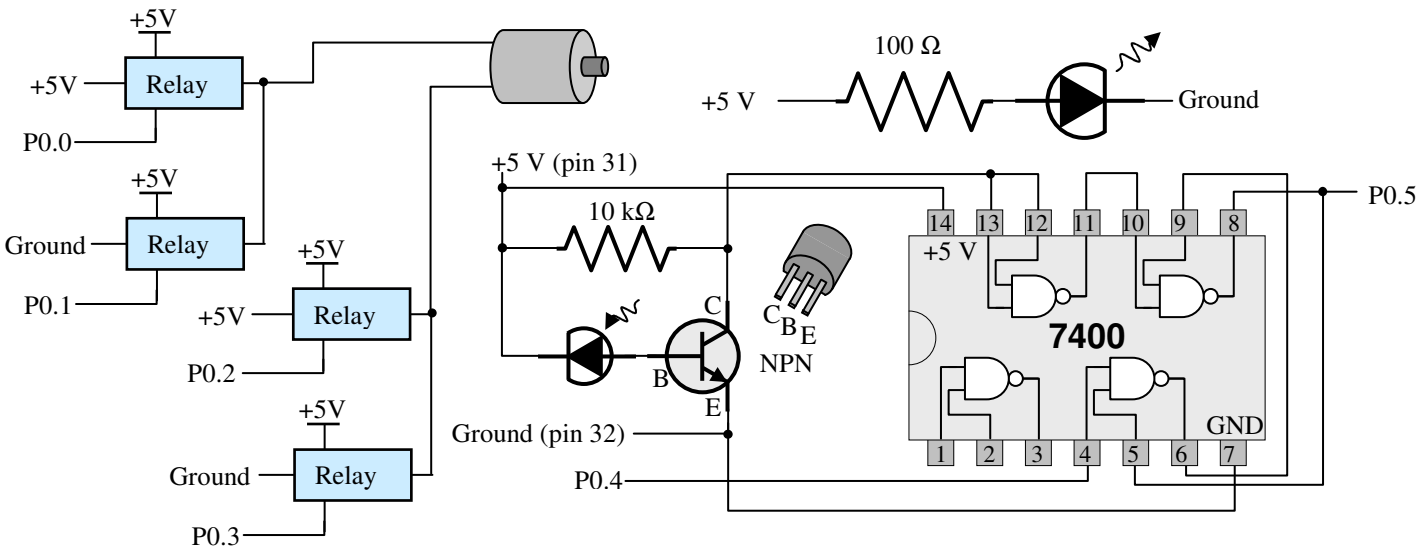


You may not actually connect the circuit to +5V on the DAQ until you are completely done.

You must **build** the circuit below, **repair** the vi baseplate, and **test** the vi and hardware. The *Forward* and *Backward* controls operate the motor as indicated, unless the *LED Motor control* is activated. In that case, the motor turns forwards if the LED is blocked, and is otherwise stationary. The panel LED indicates when the photodiode is blocked. In normal operation, once it is blocked, the panel LED remains lit until it is *Reset* from the front panel. However, if the *Ignore* button is active, then the LED is lit only while the photodiode is actually blocked.







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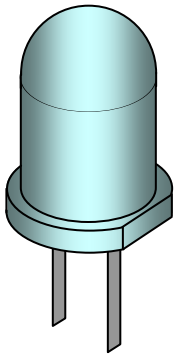
Notes & Hints



Stop bending the wires on the LED and photodiode right now! You are entitled to make exactly ONE bend. Look at the "this picture matters" sketch on the other side until you are confident about how you will place these components on your breadboard.

The "red" LED I provide looks *clear* when viewed axially.
The "clear" photo-sensor looks *black* when viewed axially.
Each has a leg nearer to a flat edge (see sketch).
The circuit diagram shows this flat edge for each.

The software repair requires the addition of exactly three *small* objects, as well as some related wires.

Note that the software is "active low", as discussed in class, so a "false" means on, and a "true" means off.

Complete your hardware assembly first. Then, test it using my demo version of this quiz. Then, if that works, you can begin the software portion of this quiz.

You may not submit any subsequent assignment or quiz until you have submitted at least the hardware portion of this quiz.