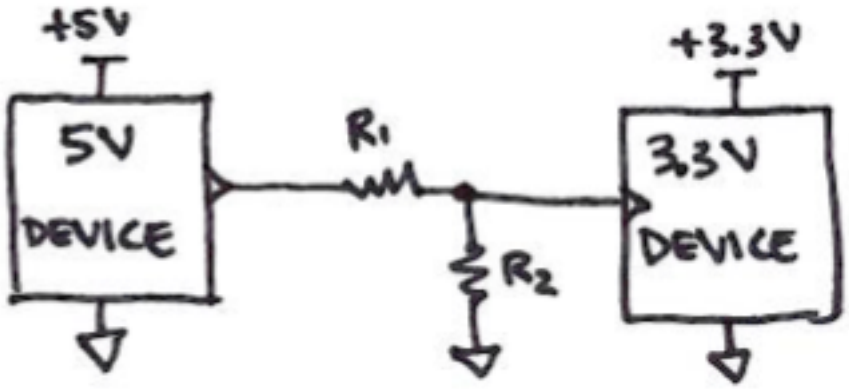
1. **A Basic Level-translator**

You're building a system that requires a 5 V digital output to be interfaced with a 3.3 V tolerant digital input. A coworker suggests using a simple resistor divider as the level-translating interface.



- What are the advantages and disadvantages of using a resistor divider for this interface?

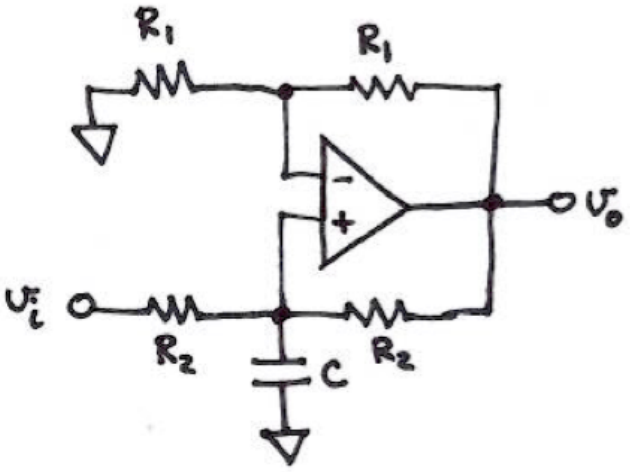
- What characteristics set the relative ratio of the divider resistances?

- What characteristics set the lower limit for the total divider resistance (R1 + R2)?

- What characteristics set the upper limit for the total divider resistance?

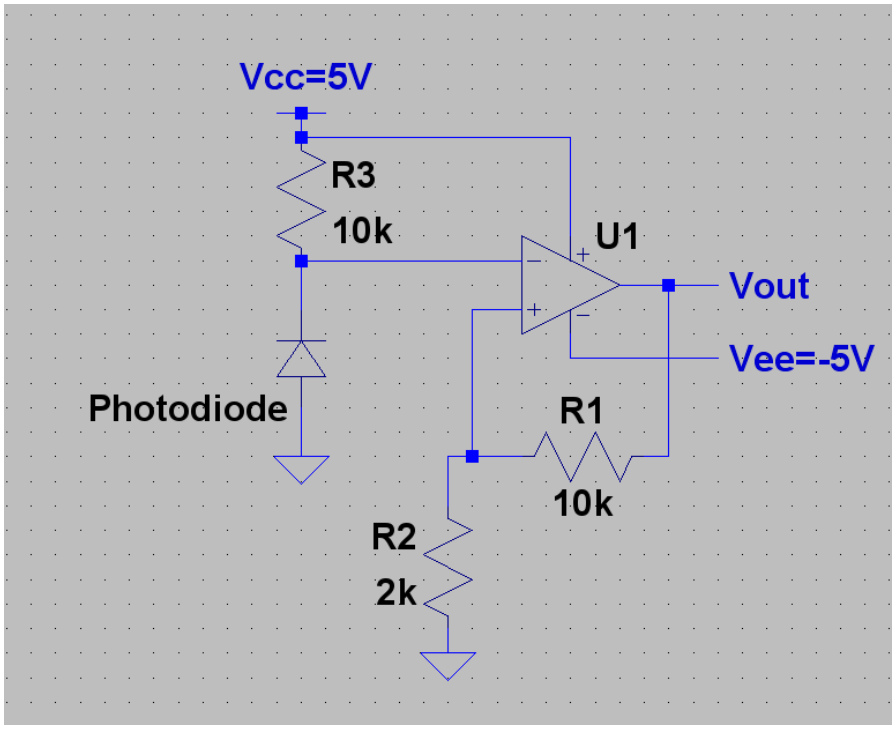
2. Mystery Analog Circuit

While studying a system schematic, you come across the analog sub-circuit shown below that connects a low-impedance source node Vi to a high-impedance input node Vo. What does it do?



3. **Photo-OP**

Study the circuit below and describe its operation:



4. **Resistance is not futile**

You've decided to get into the lucrative resistor manufacturing business with the help of an investment partner. You're looking at resistor manufacturing and test equipment from two competing companies: 1k-R-Us, and Vive la Resistance, Inc.

Each company has provided measurement data for a run of 1k-ohm nominal resistors manufactured by their respective equipment (see the attached data files).

The amortized cost of the equipment from either company, including resistor manufacturing, testing, and sorting, is 3 cents per resistor. You analyze the market and figure that you can sell 1% precision resistors for 10 cents each, and 10% precision resistors for 3 cents each.

Create a 1-slide summary for your investment partner that makes your case for which equipment is the better investment.