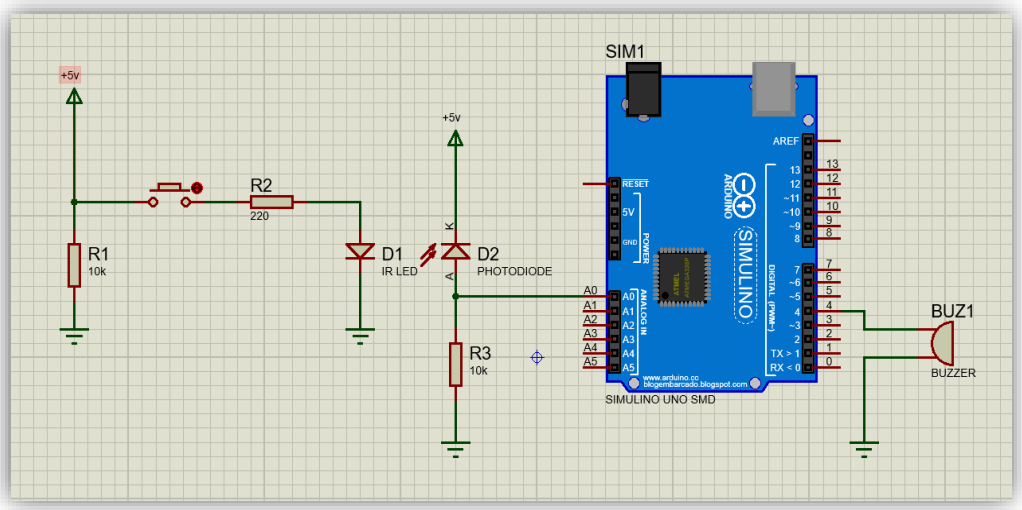
I. Introduction:

- In this project, you will discover the interesting world of optical wireless communication systems by constructing a simple yet functional setup using infrared (IR) LEDs and photodiodes. This project aims to introduce you to the basic principles of optical communication and Morse code encoding.



II. Objective:

- Your objective is to build an optical wireless communication system capable of transmitting messages encoded in Morse code from a transmitter to a receiver using IR LEDs and photodiodes.

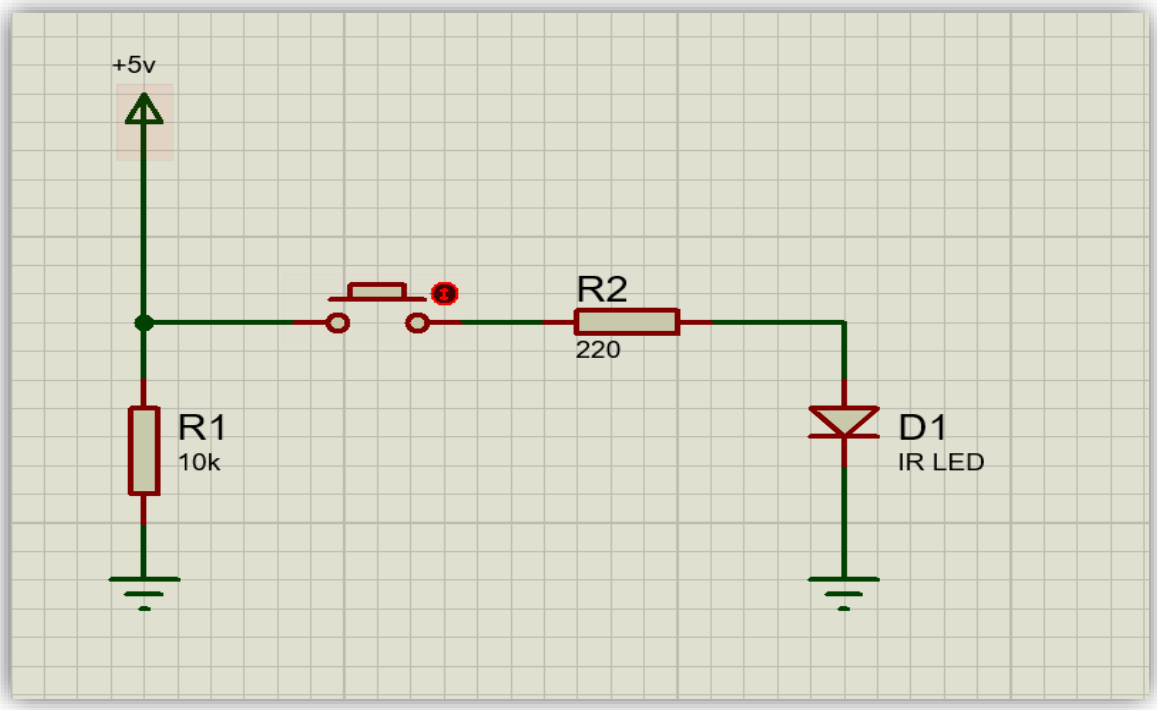
III. Components:

Component name	Number
IR transmitter	1
Push button	1
IR receiver (photodiode)	1
Buzzer	1
220-ohm resistance	1
10kohm resistance	2
Jumpers	—

IV. Procedures:

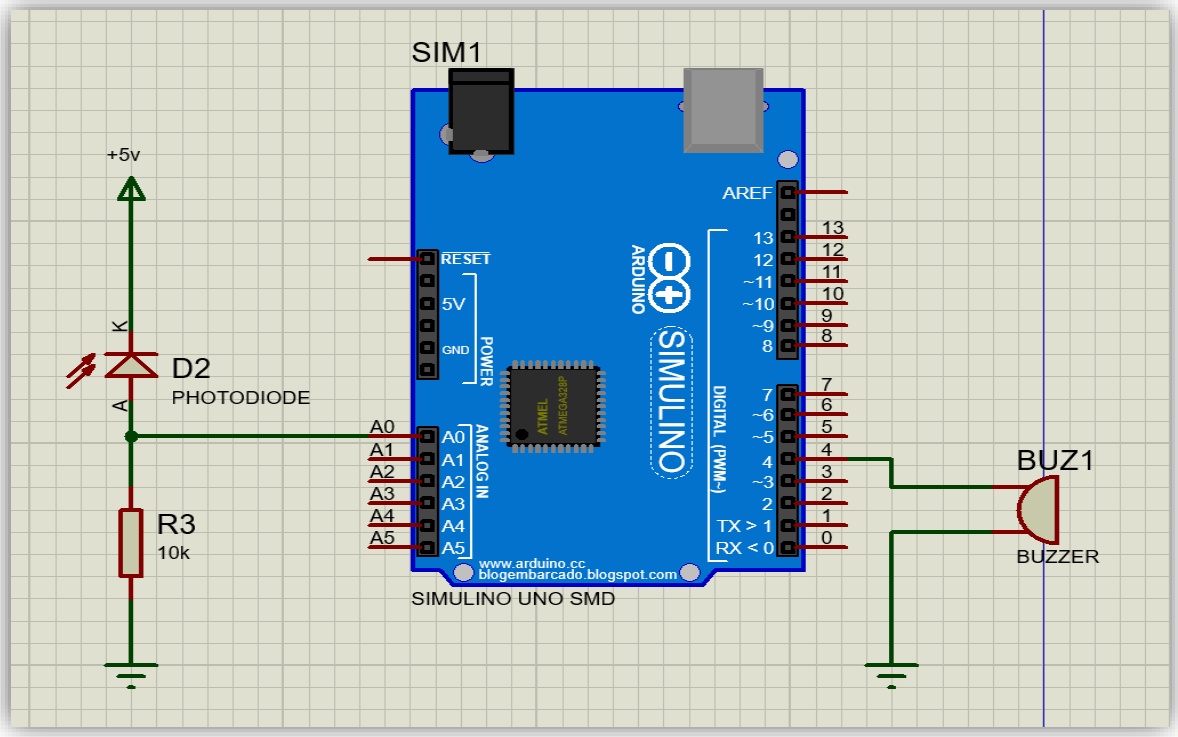
1. Transmitter circuit:

- Build a transmitter circuit that transmits IR light (the message) to the IR receiver (photodiode).
- The transmitter circuit contains a pull-down resistance, and a push button switch that is used to send IR morse code signal to the IR receiver depending on the time that the button switch is held for.
- According to my Arduino code, I set three ranges of holding time: one to indicate that I'm sending a dot, another one to indicate that I'm sending a dash, and the last one to tell the controller that I'm done sending morse code data.
- The circuit diagram of the transmitter circuit is as follow:



Tx circuit

2. **Receiver circuit:**
   - Build a Receiver circuit that is used to read the transmitted IR morse code data, and then displays it on the buzzer.
   - The transmitter circuit contains a pull-down resistance, a photodiode IR receiver, an Arduino uno micro controller board, and a buzzer.
   - When the IR receiver receives a specific morse code letter, the Arduino assembles these letters together and compares them with the morse code table decoder, then displays the detected letter on the serial monitor.
   - At the end, the Arduino sends signals to the buzzer to give sounds that correspond to the detected received letter morse code.
   - The circuit diagram of the transmitter circuit is as follow:



Rx circuit