

**Project Title:** Social Distancing Helper

**Class:** EF 230

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**Design Description:** Due to the coronavirus pandemic, the University of Tennessee, Knoxville (UTK) and the Center for Disease Control and Prevention have recommended that citizens maintain a six foot separation between each other at all times to minimize the risk of disease spreading. Determining a six foot distance visually can be challenging for students, so a device capable of accurately measuring distance and reporting this data back in a usable form would be extremely helpful. The purpose of the Social Distancing Helper is to ensure that college students on the campus of UTK maintain this six foot distance.

This device is constructed with an Arduino Uno, breadboard, ultrasonic sensor, piezo buzzer, LCD screen, LED light bulb, and several resistors and wires and is designed to be worn or carried by a student (see Figure 3). While on campus, a student could wear this device attached to a backpack, jacket, belt, or glove to help maintain distance between themselves and other students. This device could also be used by university staff to make sure that students are maintaining a proper distance at larger gatherings in cafeterias and sports venues. The Social Distancing Helper has the opportunity to be improved and shrunk down to a smaller size such that it could be integrated directly into clothing, but the design is so simple that any UTK student with the proper materials could construct it for less than \$25.

The design of the project has multiple components that allow the student or staff member to know if they are within six feet of another person. By using an ultrasonic sensor to measure the distance between the user and another object, the device helps a user confirm that he or she is maintaining a safe distance. If the distance between the user and the second object is greater than six feet, the Social Distancing Helper will beep slowly at a constant rate of two seconds. However, when the distance between the user and the second object is within six feet, the device plays a constant noise to alert the user. In addition to the sounds being played when there is an object inside or outside of six feet, there is an LCD screen. When the distance is less than six feet, the screen will display both the phrase "TOO CLOSE!" and the distance between the user and the object (see Figure 1). If the object is outside the six foot distance, then the LCD screen will display "Safe Distance" in addition to the distance between the user and the object, as seen in Figure 2. As a final act to alert the user that they are within 6 feet of another person, a red LED light will turn on when the person is within six feet of an object, as seen in Figure 1. By efficiently measuring the distance between people and supplying a user with usable information, the Social Distancing Helper will help ensure that the spread of coronavirus on the UTK campus is slowed.

## Arduino Graphics:

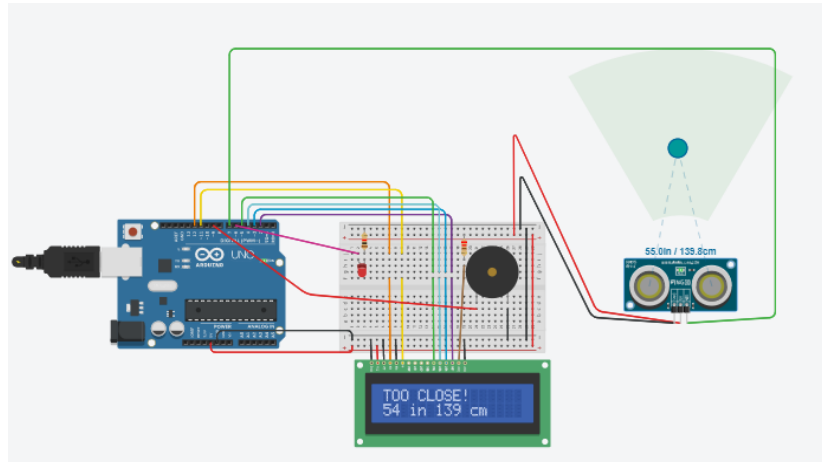
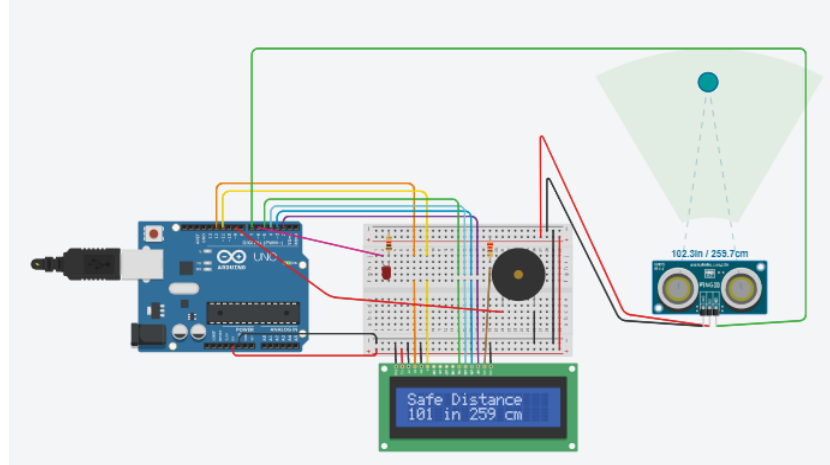


Figure 1. The Arduino circuit is displaying that the distance is less than 6 ft. (measured distance



is 54 in. or 139 cm).

Figure 2. The Arduino circuit is displaying that the distance is greater than 6 ft. (measured distance is 101 in. or 259 cm).

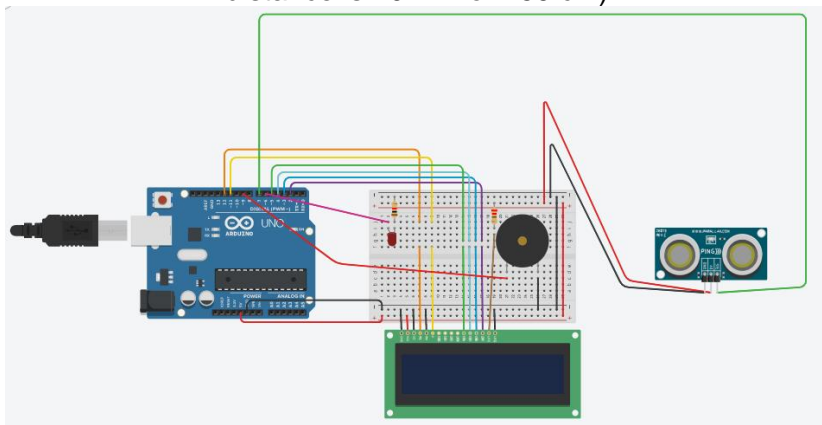


Figure 3. The complete Arduino circuit.



ArduinoVideo.mp4