

| Mission 10 Assignment Log | Name: | | | | | | | | | | |
|---|--|------------------------|---------------------------|--|--|--|--|--|--|--|--|
| Pre-Mission Preparation | | | | | | | | | | | |
| <p>In previous missions you used an object sensor and a motion sensor. Both are digital input devices and can detect the presence of something, but they don't give any details. For this mission you want to if there is an object AND how far away it is. What are some examples of when knowing the distance is essential?</p> | <p>Answers will vary.</p> | | | | | | | | | | |
| Mission 10 Checks | | | | | | | | | | | |
| <p>Objective #1 What are the parts you will use for this mission?</p> | <ul style="list-style-type: none"> • Breadboard • Red and amber LED • 2 resistors • Ultrasonic distance sensor • Jumper wires | | | | | | | | | | |
| <p>Objective #2 Label the missing parts of the diagram:</p> <p>A. Transmitter B. Receiver C. Original wave D. Reflected wave (echo)</p> | <p>The diagram shows an ultrasonic sensor module on the left. Label A points to the top circular transducer (transmitter). Label B points to the bottom circular transducer (receiver). A red arrow labeled C points from the transmitter towards a vertical black bar on the right labeled 'OBJECT'. Blue dashed curved arrows labeled D point from the object back towards the receiver.</p> | | | | | | | | | | |
| <p>Objective #3 What time measurement is used by the ultrasonic sensor?</p> <p>What formula is used to calculate the distance?</p> <p>Create a chart when running code to check the accuracy of the ultrasonic sensor.</p> <p>< Answers will be individual ></p> | <p>Microseconds</p> <p>Distance = rate * time / 2</p> <table border="1" data-bbox="797 1465 1468 1772"> <thead> <tr> <th>Object Actual Distance</th> <th>Ultrasonic Sensor Reading</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> </tbody> </table> | Object Actual Distance | Ultrasonic Sensor Reading | | | | | | | | |
| Object Actual Distance | Ultrasonic Sensor Reading | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

| | | | | | | | | | |
|---|--|----------|----------|--------------|----------|-----------|----------|--------------|--------|
| <p>Objective #4 What programming technique is used to stop the loop if no object is detected?</p> <p>What is returned if no object is detected?</p> | <p>A time out feature in the loop Use the CodeX's internal timer to keep track of the time the loop waits. If the loop waits too long, break the loop and return a value.</p> <p>-1</p> | | | | | | | | |
| <p>Objective #5 Why do you need to use resistors with LEDs?</p> | <p>LEDs don't respond well when voltage fluctuates, and minor voltage increases can lead to significant increases in current. This can damage the LED.</p> | | | | | | | | |
| <p>Objective #6 On the LED: The long end is _____ and is connected to the _____. The short end is _____ and is connected to the _____.</p> | <table border="1"> <tr> <td data-bbox="797 480 1019 541">Long end</td> <td data-bbox="1019 480 1466 541">positive</td> </tr> <tr> <td data-bbox="797 541 1019 602">Connected to</td> <td data-bbox="1019 541 1466 602">resistor</td> </tr> <tr> <td data-bbox="797 602 1019 663">Short end</td> <td data-bbox="1019 602 1466 663">negative</td> </tr> <tr> <td data-bbox="797 663 1019 724">Connected to</td> <td data-bbox="1019 663 1466 724">ground</td> </tr> </table> | Long end | positive | Connected to | resistor | Short end | negative | Connected to | ground |
| Long end | positive | | | | | | | | |
| Connected to | resistor | | | | | | | | |
| Short end | negative | | | | | | | | |
| Connected to | ground | | | | | | | | |
| <p>Objective #7 After typing in the code and running it, what do you notice about the alarm system? Does it work the way you expect it to?</p> | <p>The LEDs stay on after coming on. They don't go off when the states change.</p> | | | | | | | | |
| <p>Objective #8 What code did you add during this objective?</p> | <p>Turn off the LEDs when they shouldn't be on. Added an else: to turn off all lights if a warning or alert is not set off.</p> | | | | | | | | |
| <p>Objective #9 What code did you add during this objective?</p> | <p>Added code to display an image or picture on the CodeX display screen. Added a siren for the alarms.</p> | | | | | | | | |
| <p>Objective #10 What code did you add during this objective?</p> | <p>Added a power off function to turn off everything when a button is pressed.</p> | | | | | | | | |
| <p>Post-Mission Reflection</p> | | | | | | | | | |
| <p>Warning systems are very common in real-world applications. What warning systems do you see or use? What data do they use for the warning?</p> | <p>Answers will vary</p> | | | | | | | | |