Pacific MESA Coding Challenge (Week 7)

This week we will continue using Tinkercad to connect our Arduino Circuit to a Sensor. As you may remember from week 4 we were looking to simulate coding a soap dispenser to dispense soap into our hands. To do this we will need to connect a sensor to a motor using Arduino. This is this weeks challenge. If you didn't do the activity in week 4, you'll want to start by attaching your motor to your Arduino. You can do this by following this tutorial: https://www.youtube.com/watch?v=7Zs6fsMg9K8&t=5s

JENTXON Automatic Soap Dispenser, Touchless Smart Foaming Soap Dispenser, Infrared Motion Sensor Hand Free Soap Dispenser Battery...

Basic Challenge: Use the following tutorial to learn how to connect a Potentiomenter to your breadboard and control your motor: https://www.youtube.com/watch?v=sjFsRCiA92k. Now a potentiometer won't sense your hand so you will need to swap out your potentiometer for a temperature sensor [TMP36]. Hint: The ground and power pins on the temperature sensor are not in the same place as on the potentiometer. Once you have completed this replacement press "Start Simulation", and explore how your motor axis changes with changing temperature. Congratulations! You have completed this activity unless you would like to go on to the advanced challenge…

Advanced Challenge: Instead of coding your motor to respond to a temperature sensor try coding it to an Ultrasonic Distance Sensor. Resources for doing this can be seen on the next page, but these are not step by step instructions- you will need to figure out most of the coding on your own. Good luck!

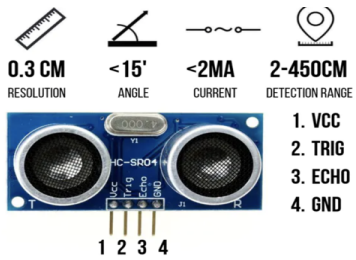
Submit your completed challenge (either the basic or advanced) here:

https://pacificmesaonline.wufoo.com/forms/r1dt67ye1khknsz/

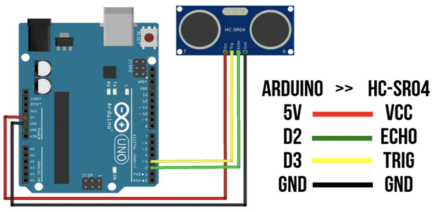
Resources for Advanced Challenge

Ultrasonic distance sensor:

This sensor is small, easy to use in any project and offers excellent non- contact range detection from 2 cm to 400 cm (that's about an inch to 13 feet). Two pictures below show the connection between Arduino UNO & the sensor:



Ultrasonic Sensor HC-SR04 Configuration and Specification



Connection of Arduino UNO and HC-SR04

For more information about this sensor and how it can detect human's hand, check out these tutorials: https://lastminuteengineers.com/arduino-sr04-ultrasonic-sensor-tutorial/ and https://create.arduino.cc/projecthub/abdularbi17/ultrasonic-sensor-hc-sr04-with-arduino-tutorial-327ff6

Here are more helpful videos showing how this sensor works; they use LED and buzzes to make sound when hand move close to the sensor:

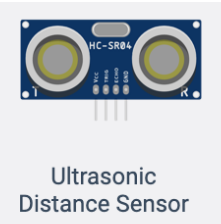
https://www.youtube.com/watch?v=gU8-LQjRk1o

https://www.youtube.com/watch?v=HynLoCtUVtU

Target: Your system should be able to receive the information from the sensor if you set the distance from 3 cm to 10 cm from the ultrasonic distance sensor to your hand. When there is an object around that distance, the sensor detects it and sends the signal to the microcontroller.

In your project, when the sensor sends signal to the microcontroller, the servos will turn

Hint: " if the object is around __ cm to __ cm, then send a signal to the microcontroller"



How to find sensor in Tinkercad?

At the searching box, you type in "sensor" and find " Ultrasonic Distance Sensor"

Now connect the sensor to your circuit

This is the simplest connection:

Watch the video below for more suggestion:

https://www.youtube.com/watch?v=Yy31jBjiLpE