# Lab 8: Sensors
BMEn 2151 "Introductory Medical Device Prototyping"
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Exercise 8.1: Sensor Kit V2.0 for Arduino

Objective: Download the SunFounder Sensor Kit V2.0 for Arduino manual and Arduino Library, and copy the Sensor Kit V2.0 library to your personal Arduino libraries folder.

1. Start by going to the **SunFounder** website: https://www.sunfounder.com/.

2. Select the menu tab "**Learn**". Under **Arduino** select "**Sensor Kit V2.0 for Arduino**". Download the user manual Sensor kit_V2.0_for_Arduino_User_Manual. Read through the preface, brose through the sensor pictures and read the "Get Started Section". (Although each of the available modules is described in the manual, we will return to the website in Exercise 8.2 to read further, and download specific module sketches.)

3. Download the Sensor Kit V2.0 for Arduino libraries and save to a file on your computer that you can easily find. Browse to the folder containing the Sensor Kit V2.0 for Arduino that you just downloaded. Locate and open the "Library" folder. Copy all of the libraries

4. Next add the sensor library to your personal Arduino library. To do this first determine the path. With the Arduino IDE open, under "File" select "Preferences," the dialog below appears:
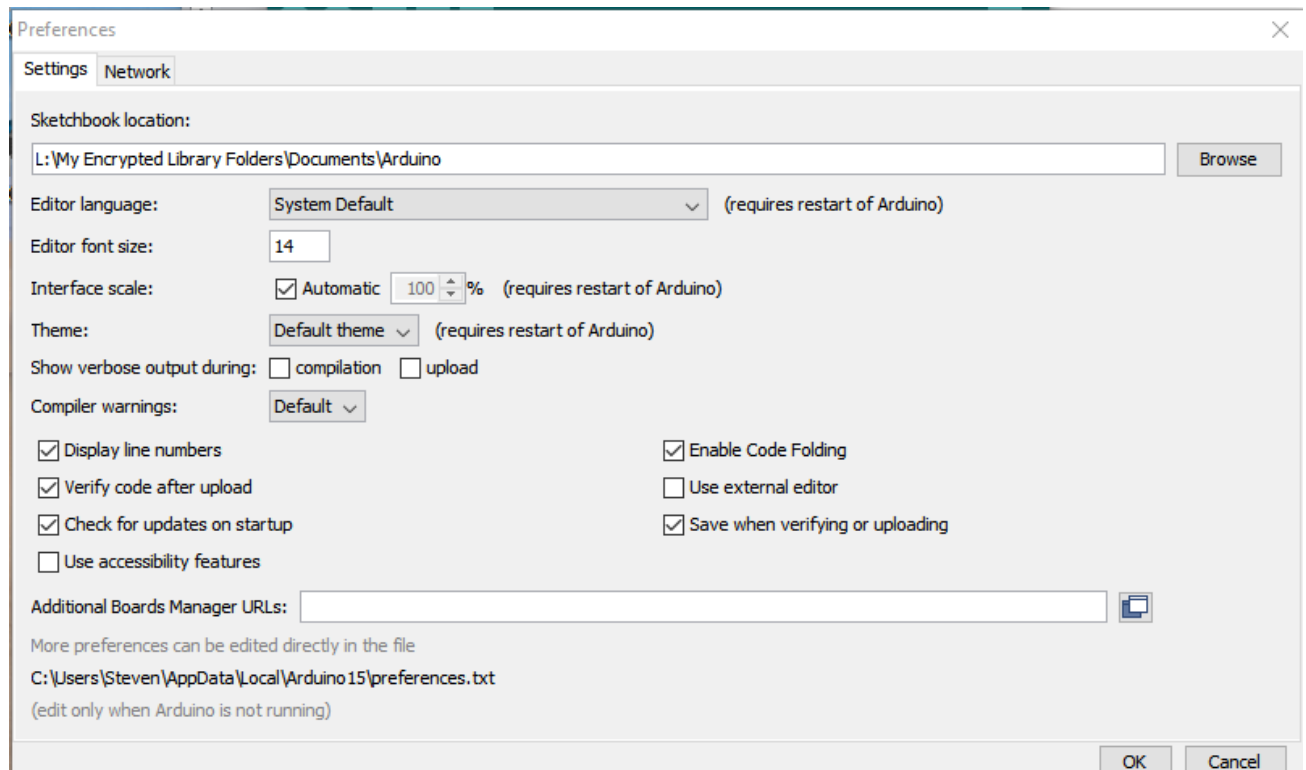
Note the "Sketchbook Location" above, cancel the dialog, and find the location using Explorer. Open the Arduino file and locate the "Libraries Folder". Open this folder and paste the files you had previously copied from the Sensor Kit V2.0 for Arduino.

You will now have added the latest SunFounder sensor library to your Arduino libraries.

Exercise 8.2: Sensor Exercise

Objective: Learn the procedures setting up a SunFounder module and/or Force Sensing Resistor.

1. Your Home Lab Box contains a small breadboard, USB cable, and all of the versions of the Dupont jumper wires. These have rectangular ends, and include m-m, m-f, or f-f types. Depending on the module, there may be other components and interconnecting wires included in your Lab 8 part bag. LCD modules may require adjustment of the contrast potentiometer on back.

2. You will have received a SunFounder module and/or Force Sensing Resistor

3. If you received a SunFounder module, do the following:
 a) Return to the SunFounder website **Tutorials:**   https://learn.sun-founder.com/category/sensor-kit-v2-0-for-arduino/
  b) Find the lesson/tutorial that corresponds with your module and you will see the description, theory, assembly steps *and code*.

4. If you received a *Force Sensitive Resistor*, then download from the course website (Prototyping/BMEN 2151 Demos, Shop and Lab Workbooks/Additional Lab items), the following:
 a) Force sensing Resistor Lab 8 Exercise.
 b) Force Sensing Resistor Arduino Code. Copy & paste this into the Arduino IDE.
 c) Follow the steps provided and copy & paste the code into the Arduino IDE.
 d) Visit the tutorial website to copy and paste additional code for the other two examples described: https://www.makerguides.com/fsr-arduino-tutorial/.

Task
1. Explain in a few paragraphs about the device you are working with and your findings.
2. Include a photograph of your setup.

Exercise 8.3: Optional Exercise

Depending on time and part availability you may choose to work on another sensor project of interest to you. These do not necessarily come as modules or with code, and you may need to look through the MDC part inventory to find specific supporting components (resistors, capacitors, ICs etc.). Working with raw sensors usually requires finding specification sheets and example applications on the web, and writing your own code.

Let me know what interests you and I will see if we have it or can get it on short notice.