

# ECSE211 PROJECT STARTER CODE

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*Read this entire document before doing anything.*

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## Getting Started

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The RaspberryPi is a computer. Hence, it is possible for us to write code directly on it instead of writing it on a laptop and "loading" the code on the brick. In the lab, you will find monitors with an HDMI cable connection, mice and keyboards. Connect your brick to the monitor using the HDMI port and connect the mouse and keyboard using the Brick's USB ports. Make sure the Brick is connected to power and turn it on.

Next, we will open one of the IDEs that are already installed on the brick. On the RaspberryPi desktop, if you click on the Raspberry icon, then `Programming`, you can choose from a couple of Python IDEs. They are all very similar, but we suggest using ThonnyIDE.

You're ready to start coding! Transfer the starter code on the Brick using a USB stick or a file transfer software (instructions on myCourses under Content > Project Resources). Open the Python files you want to edit into Thonny. When your program is ready, click "Run" to execute it.

## Starter Code Setup

**On the brick:** Double-click `robot_setup.sh` and select "Run in terminal" to install the simpleaudio library.

**On your computer/laptop:** Run this command in the terminal to install matplotlib, a library for plotting graphs:

```
python3 -m pip install matplotlib
```

## BrickPi Documentation

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Can be found [here](#).

## Extra Information:

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### Project Organization

In this section, we go over the files and folders included in this lab, listed in alphabetical order. The files you need to modify in Lab 2 are shown in **bold**.

- `data_analysis`
  - `us_sensor_cont_visualization.py`: visualize the distance measurements collected by the ultrasonic sensor. Run this on your computer. You are allowed to modify this file, eg, to change the plot color, but you are not required to.
  - `color_sensor_visualization.py`: visualize the color measurements collected by the color sensor as RGB intensity Gaussian distributions, as shown in class. Run this on your computer.
- `lib`: contains the simpleaudio sound library.
- `project`: all Python files in this folder run on the robot.
  - `doc`: documentation for the brick API (Application Programming Interface), ie, the classes and functions you can use to work with the robot.
  - `utils`: brick-related utilities for this project. See the other project files to see examples of how to use these modules.
    - `brick.py`: the main module for interacting with the brick hardware.
    - `sound.py`: module that allows you to play sounds. It depends on the simpleaudio library.
  - `collect_color_sensor_data.py`: a script to collect data from the color sensor. **Complete the function definition in this file.**
  - `collect_us_sensor_data.py`: a script to collect data from the ultrasonic sensor. **Just use this file to collect data. It is complete.**
  - `speaker_button.py`: a script to play music when the speaker button is pressed. **Complete the function definition in this file.**
- `scripts`:
  - `reset_brick.py`: If your program does not exit correctly, eg, if you are stuck in an infinite loop, run this script on the brick to reset it.
- `deploy_to_robot.py`: a script to deploy the code to the robot from your computer. It offers the following options:
  - Deploy DPM Project on Robot without running: copy the `lab2` folder to the robot.
  - Deploy and run DPM Project on Robot: copy the `lab2` folder to the robot and run the file specified in `project_info.json`.
  - Reset Robot: reset the robot.
- `project_info.json`: a file containing information about the project.
- `robot_setup.sh`: a script to install the simpleaudio library on the brick as described above.