

Sphero Research Project

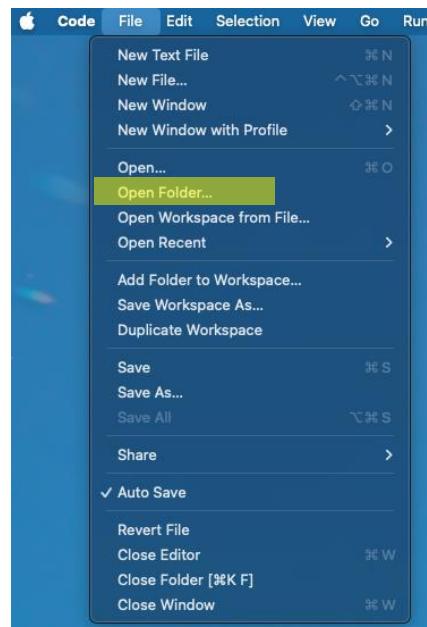
Setting Up Visual Studio Code & Sphero Code

FIRST TIME SETUP (VS CODE & GIT REPO):

1. Download and Install Microsoft Visual Studio Code (VS Code):

(Mac/Windows): <https://code.visualstudio.com/download>

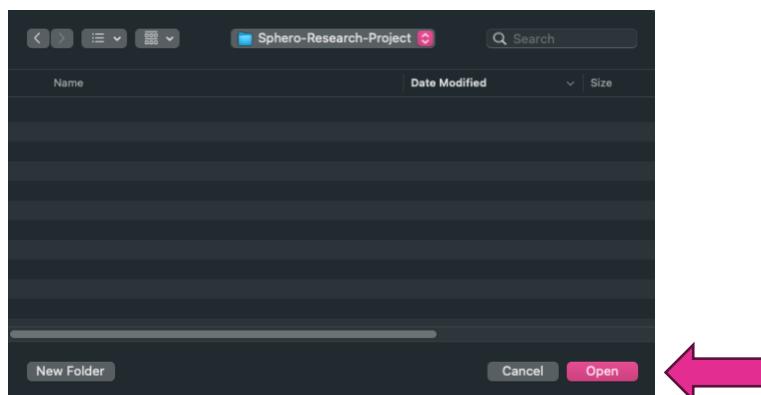
2. Open VS Code → File → Open Folder



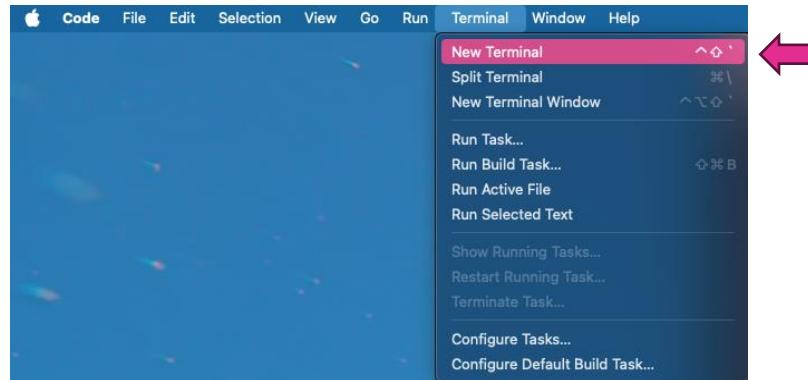
3. Create a New Folder:

- Make a new folder called “Sphero-Research-Project” wherever you would like to save the project files.

4. Click Open: to use this empty folder as your project directory.



5. Click Terminal → New Terminal



6. Clone the Git Repository: get a local copy of all necessary files at this link:

<https://github.com/amanda-pang/Sphero-Research-Participants>

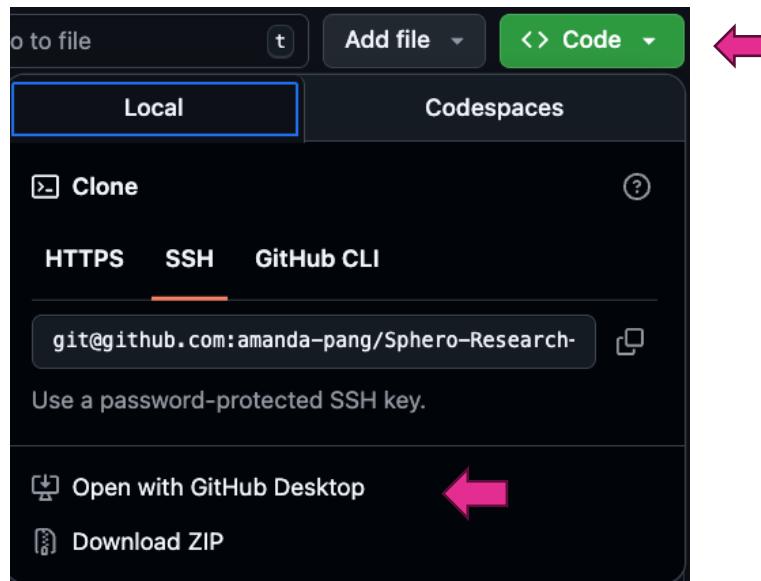
METHOD 1:

- Copy and paste this into your new terminal:

git clone https://github.com/amanda-pang/Sphero-Research-Participants.git

METHOD 2:

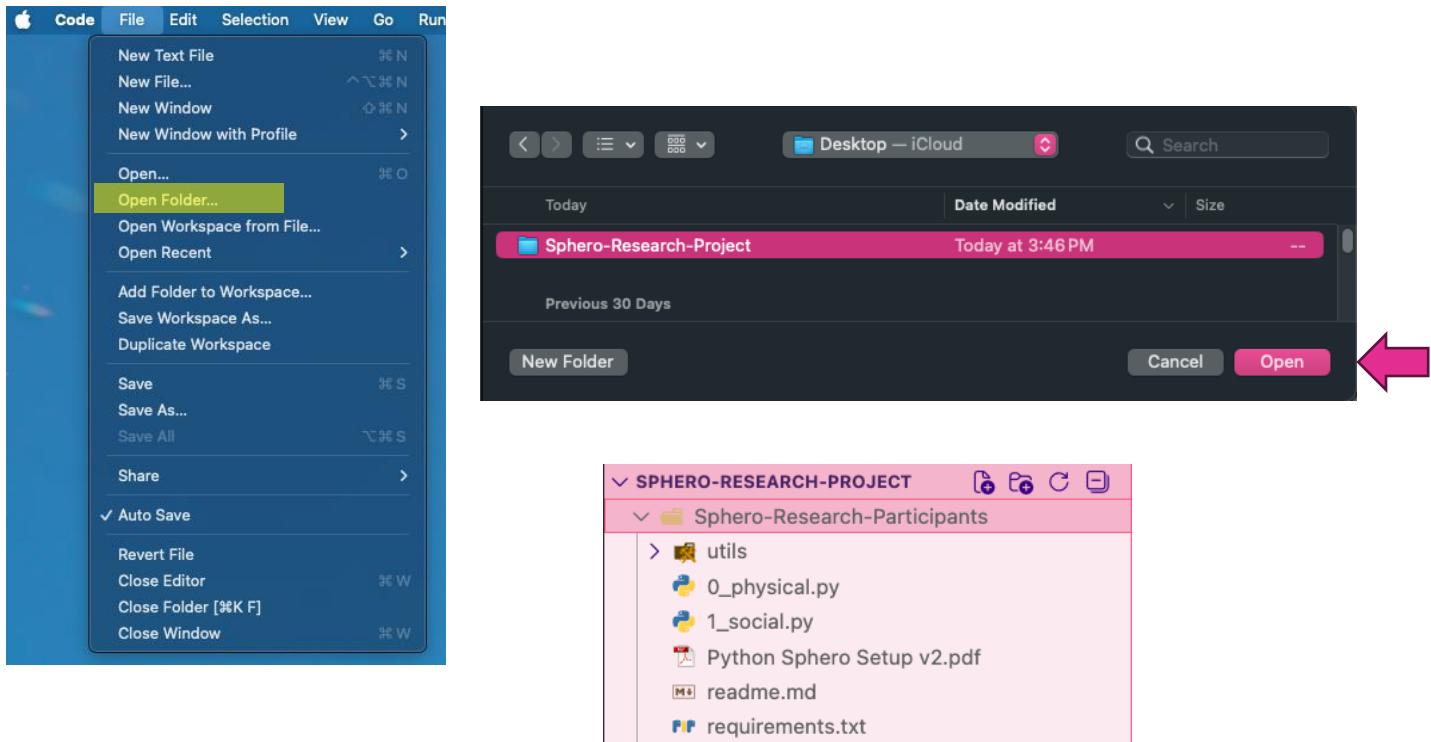
- **Go to this link:** <https://github.com/amanda-pang/Sphero-Research-Participants>
- Download github desktop
- Click on the “Code” button and Select “Open with GitHub Desktop”



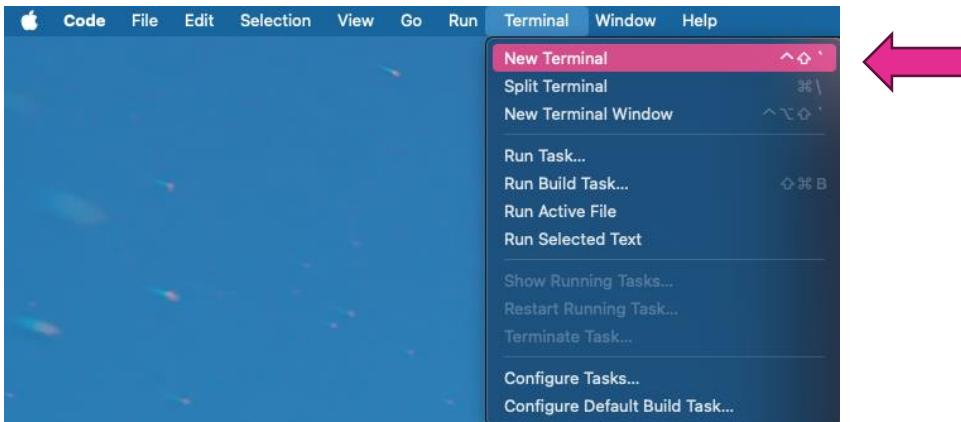
RUNNING YOUR SPHERO (FIRST TIME)

1. Open VS Code → File → Open Folder → Sphero-Research-Project

- Open the folder where you've saved all the project files



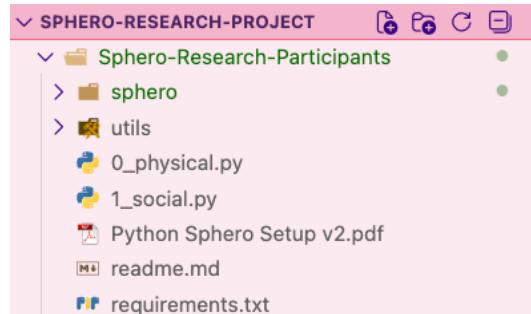
2. Click Terminal → New Terminal



- 3. Install your virtual environment:** Move into the Sphero-Research-Participants directory and execute the following commands one by one in your terminal:

MacOS:

- `cd Sphero-Research-Participants`
- `Python -m venv sphero`
- `source sphero/bin/activate`
- `pip install -r requirements.txt`
 - (or if this doesn't work, try `pip3 install -r requirements.txt`)



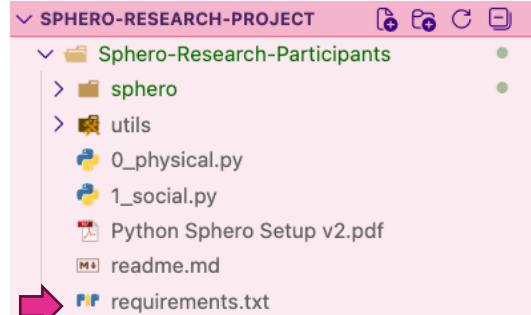
```
● (base) amanda_mac@Amandas-MacBook-Pro Sphero-Research-Participants % source sphero/bin/activate
○ (sphero) (base) amanda_mac@Amandas-MacBook-Pro Sphero-Research-Participants %
(sphero) (base) amanda_mac@Mac Sphero-Research-Participants % pip install -r requirements.txt
```

Windows:

1. **Create & Activate virtual environment:** will create a new folder “sphero”
 - `cd Sphero-Research-Participants`
 - `Python -m venv sphero`
 - `.\sphero\Scripts\Activate.ps1`

2. **Replace requirements.txt file with this:**

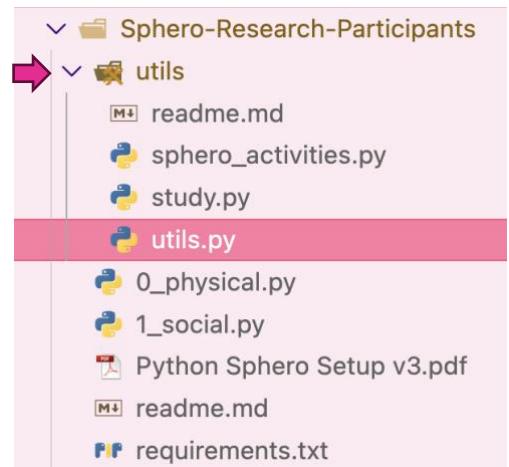
```
bleak==1.1.1
certifi==2025.8.3
charset-normalizer==3.4.3
click==8.1.8
gTTS==2.5.4
idna==3.10
numpy==2.3.3
requests==2.32.5
spheroV2==0.12.1
transforms3d==0.4.2
typing_extensions==4.15.0
urllib3==2.5.0
```



- **Type this into your terminal:**
 - `pip install -r requirements.txt`

3. Make 2 changes to **utils.py**

- **Uncomment out line 18**
- **Comment out line 15**



```

9  def speak(text):
10     text_to_speak = text
11     tts = gTTS(text=text_to_speak, lang='en')
12     tts.save("speech.mp3")
13
14     # macos
15     os.system("afplay speech.mp3")
16
17     # windows
18     # os.system('start "" "speech.mp3"')      Y(
19

```



```

9  def speak(text):
10     text_to_speak = text
11     tts = gTTS(text=text_to_speak, lang='en')
12     tts.save("speech.mp3")
13
14     # macos
15     # os.system("afplay speech.mp3")
16
17     # windows
18     os.system('start "" "speech.mp3"')
19

```

4. Make one change to the spheroV2 library following instructions in the screenshot below:

The spheroV2 library on PyPI has a bug where collision events produce an error before the on_collision callback is reached.

You can make a manual change to the `sensor.py` file in the library to get collisions working locally. Assuming you have a virtual environment running and the library is already installed, open this file:

```
1. `venv\lib\site-packages\spheroV2\commands\sensor.py`  

2. Go to line 116 and change the last letter in the string from 'L' to 'h'.  

`unpacked = struct.unpack(">3hB3hBh", packet.data)`  

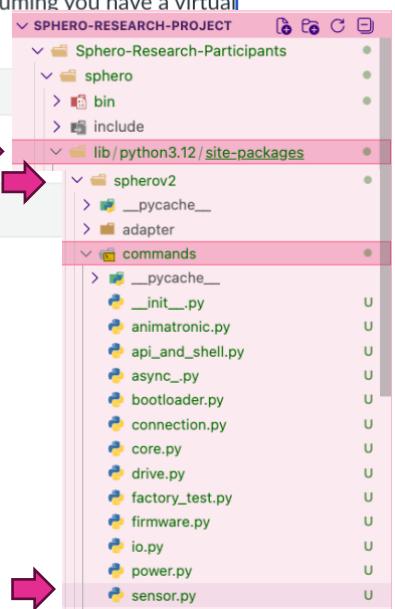
115 2. ...def __collision_detected_notify_helper(listener, packet):  

116     unpacked = struct.unpack('>3hB3hBL', packet.data)  

115     def __collision_detected_notify_helper(listener, packet):  

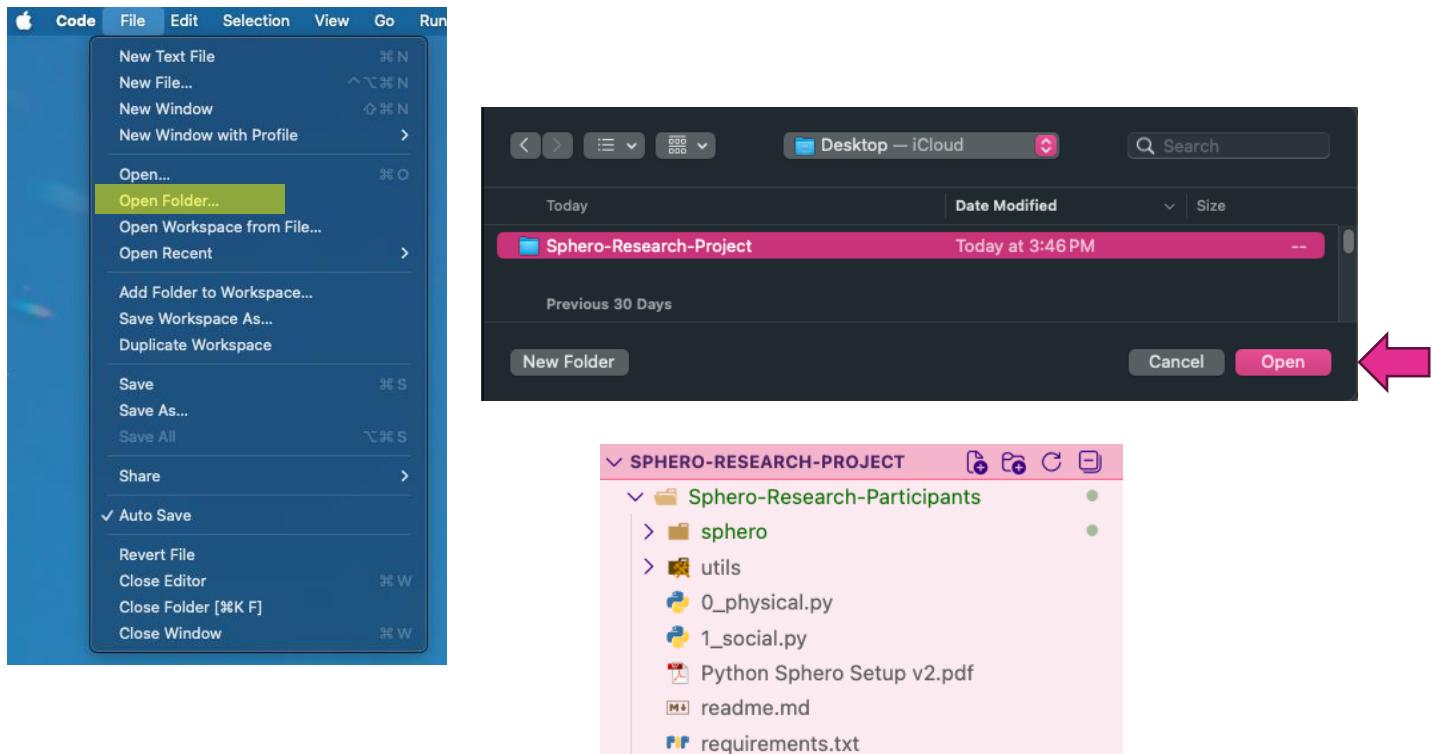
116         unpacked = struct.unpack('>3hB3hBh', packet.data)
```



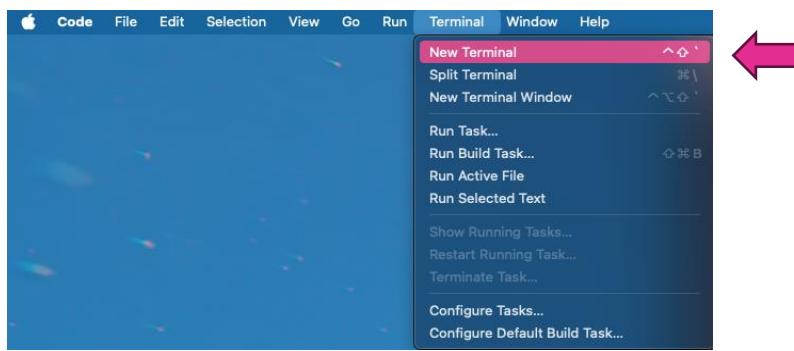
RUNNING YOUR SPHERO (EVERY TIME)

1. Open VS Code → File → Open Folder → Sphero-Research-Project

- Open the folder where you've saved all the project files



2. Click Terminal → New Terminal



3. **Activate your Virtual Environment:** type these commands one by one into your terminal

MacOS:

- cd Sphero-Research-Participants
- source sphero/bin/activate

Windows:

- cd Sphero-Research-Participants
- .\sphero\Scripts\Activate.ps1

4. **Running Physical / Social:** Sphero Research Conditions

4a. If you are currently in the “**Physical**” arm, type this command in the terminal:

- python 0_physical.py

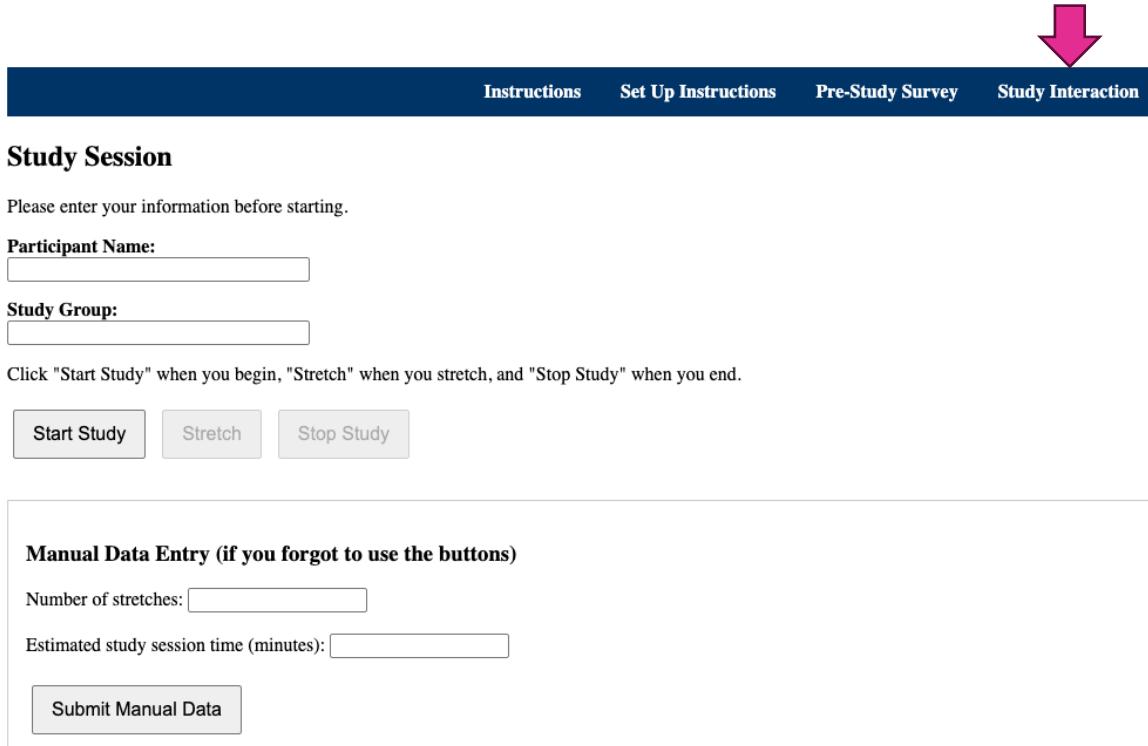
```
(sphero) (base) amanda_mac@Mac Sphero-Research-Participants % python 0_physical.py
```

4b. If you are currently in the “**Social**” arm, type this command in the terminal:

- python 1_social.py

```
(sphero) (base) amanda_mac@Mac Sphero-Research-Participants % python 1_social.py
```

5. Use our **website** to track the ***start*** and ***end*** of your study session via the “**Study Interaction**” tab.
 - **Log** when you complete a stretch by clicking “**Stretch**”.
 - If you forget track any part of your study session, you may also enter this data manually



The screenshot shows the 'Study Session' page of the website. At the top, there is a dark blue header bar with four tabs: 'Instructions', 'Set Up Instructions', 'Pre-Study Survey', and 'Study Interaction'. A pink arrow points down to the 'Study Interaction' tab. Below the header, the page title 'Study Session' is displayed. A message says 'Please enter your information before starting.' There are input fields for 'Participant Name' and 'Study Group'. Below these, a note says 'Click "Start Study" when you begin, "Stretch" when you stretch, and "Stop Study" when you end.' Three buttons are shown: 'Start Study' (highlighted with a pink arrow), 'Stretch', and 'Stop Study'. A section titled 'Manual Data Entry (if you forgot to use the buttons)' contains fields for 'Number of stretches:' and 'Estimated study session time (minutes:)'. A 'Submit Manual Data' button is at the bottom of this section.

6. That's it! Just leave your Sphero buddy nearby while you work, and leave **VS Code open** with the program running in the background.
7. **Every day when you try to rerun the code, you'll need to activate your virtual environment first, then execute the file.**

Paste this command into your terminal to activate virtual environment:

- | | |
|---------|--|
| Mac | ▪ <code>source sphero/bin/activate</code> |
| Windows | ▪ <code>.\sphero\Scripts\Activate.ps1</code> |
| | ▪ <code>python "your_arm.py"</code> |

Disconnect & End

- When you are **done** with your studying/working session:

- **Disconnect** your Sphero and **quit** the program by typing this into your terminal:

Mac

- **Ctrl z**

Windows

- **Ctrl c**

```
❸ (sphero) (base) amanda_mac@Mac Sphero-Research-Participants % python 0_physical.py
^Z
zsh: suspended  python 0_physical.py
```

- **deactivate**

- optional: to exit the virtual environment

- Navigate to our **website**, and click “End Study Session”.

- If you forgot to log any events (start/end time, or a stretch break), you may manually enter this information on the “*Manual Entry*” tab.



Instructions Set Up Instructions Pre-Study Survey Study Interaction

Study Session

Please enter your information before starting.

Participant Name:

Study Group:

Click "Start Study" when you begin, "Stretch" when you stretch, and "Stop Study" when you end.



Start Study

Stretch

Stop Study

Manual Data Entry (if you forgot to use the buttons)

Number of stretches:

Estimated study session time (minutes):

Submit Manual Data

Thank you for participating in our study!!