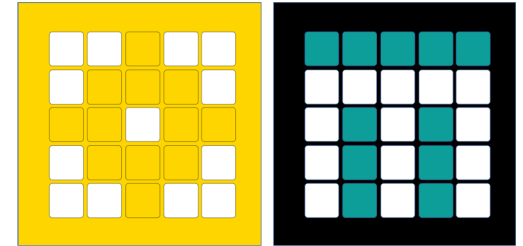


PRIME LESSONS

By the Makers of EV3Lessons



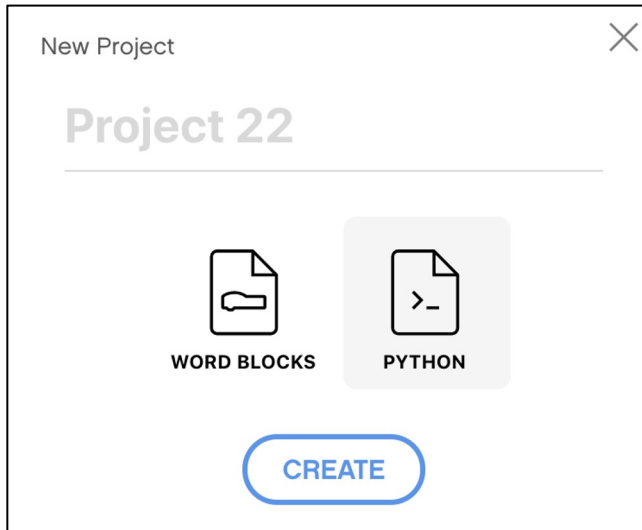
INTRODUCTION TO HUB & SOFTWARE (PYTHON)

BY SANJAY AND ARVIND SESHAN

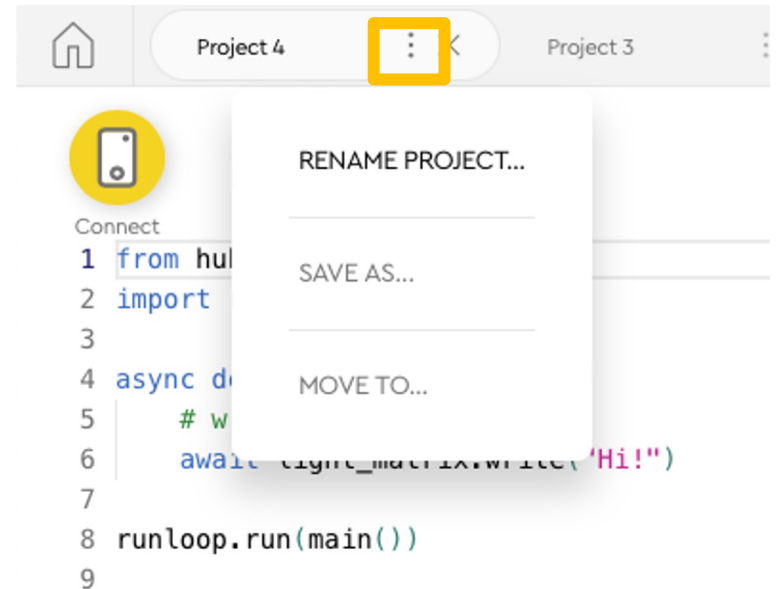
This lesson uses SPIKE 3 software

CREATING A PYTHON PROJECT

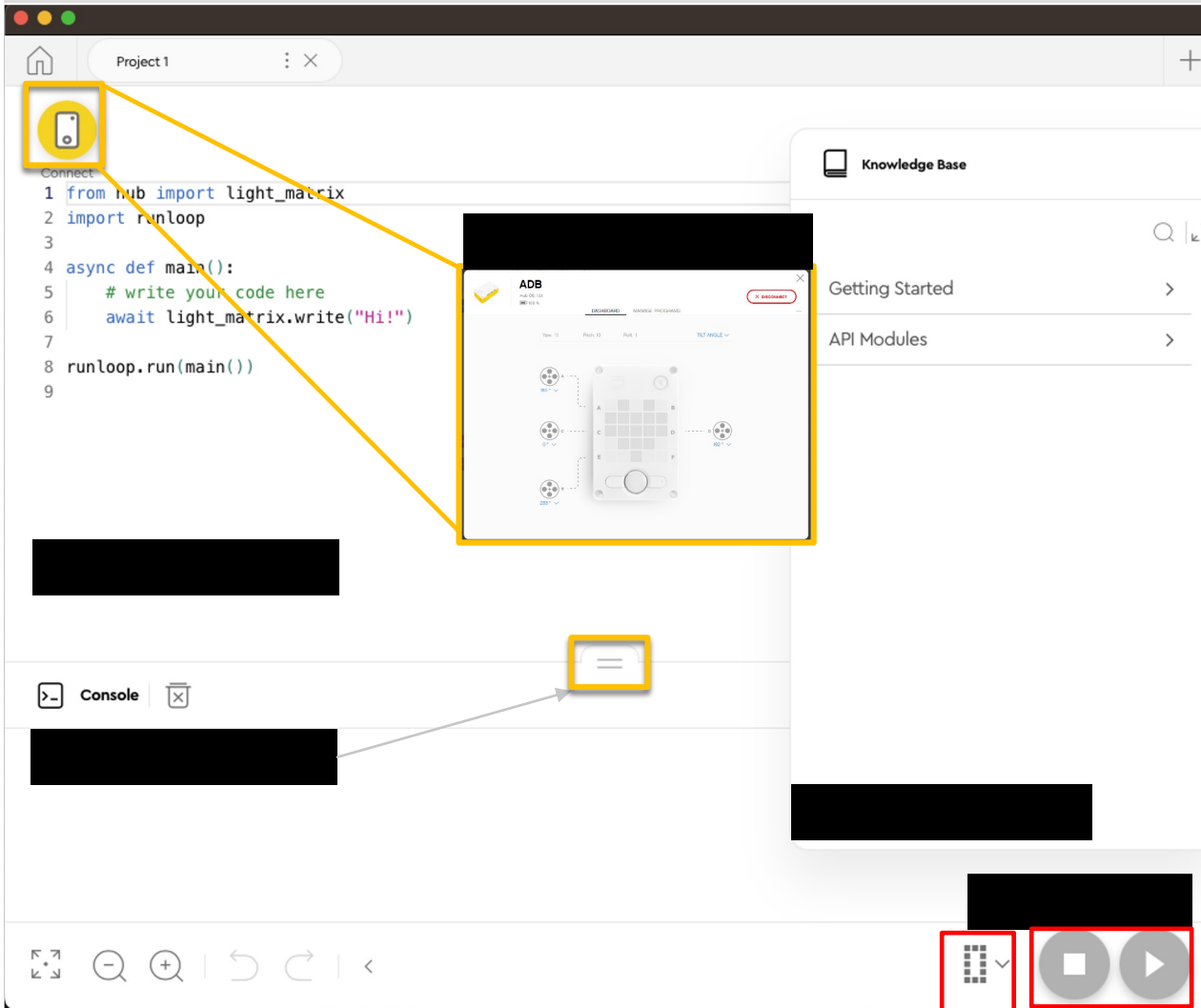
Select Python from the pop-up



Click on the three dots to change the file name



PROGRAMMING CANVAS



Knowledge Base:
MicroPython Tips

Programming Canvas: The
main programming canvas is
where you will create each
program (called 'Project')

The Connect Icon lets you
access the Hub Dashboard

Stop/Play Icon lets you pick
which slot to download the
code to and run your code

Console: Anything you print
as well as errors will show
up here

HUB DASHBOARD



You must connect your Hub to access this section

This section is very useful for:

- Checking battery level

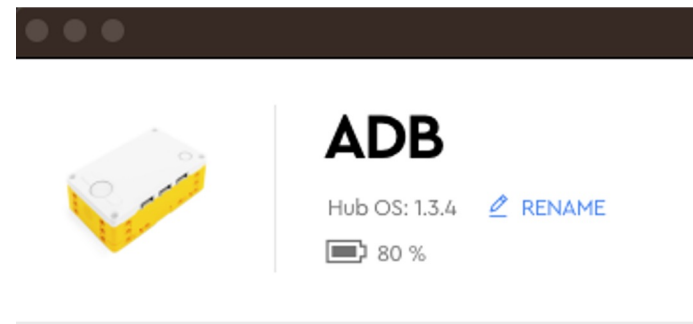
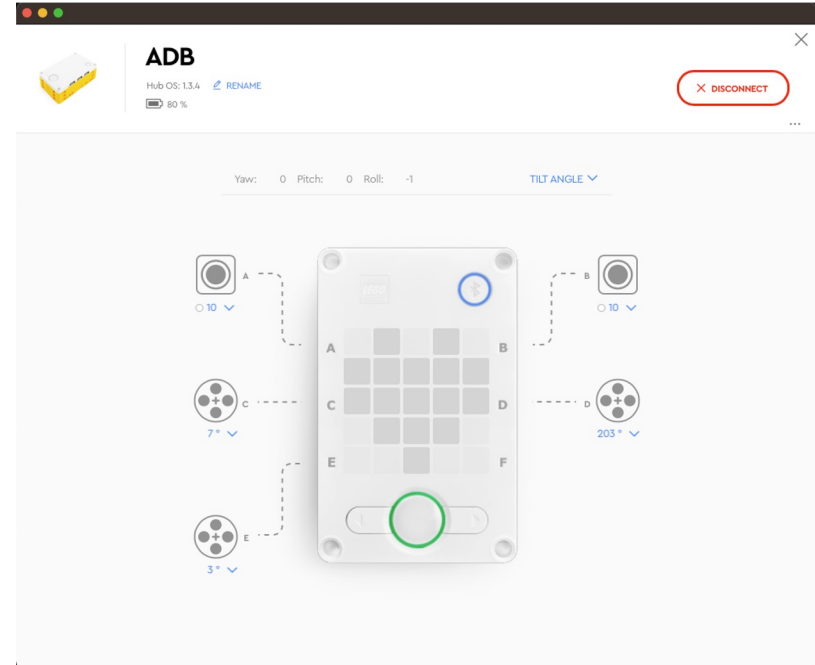
- Hub OS version

- Gyro Sensor Values

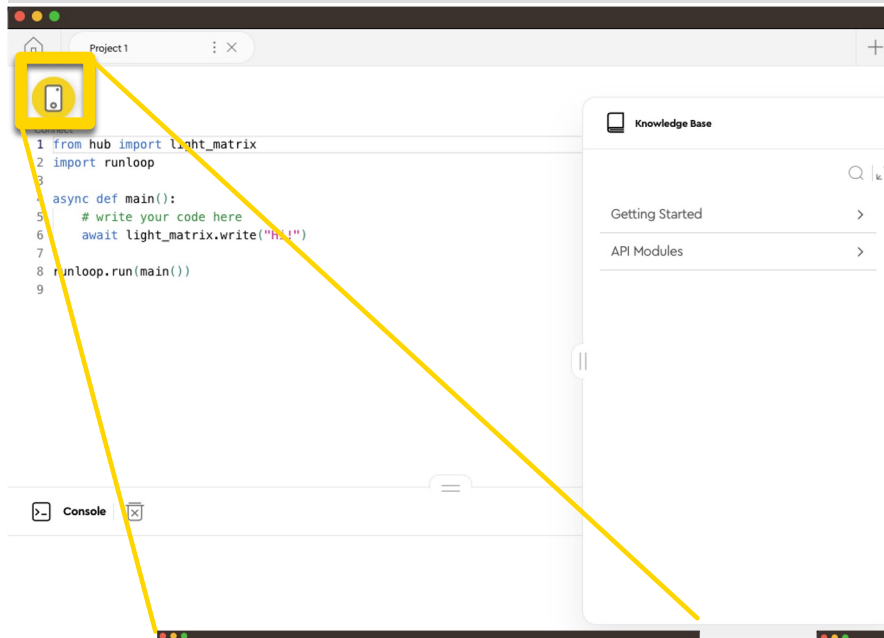
- See which motors and sensors are connected

- Get real time values from the motors and sensors

You can also rename your Hub in this panel by clicking on the blue **RENAME** link next to the Hub OS version number



CONNECTING TO BRICK



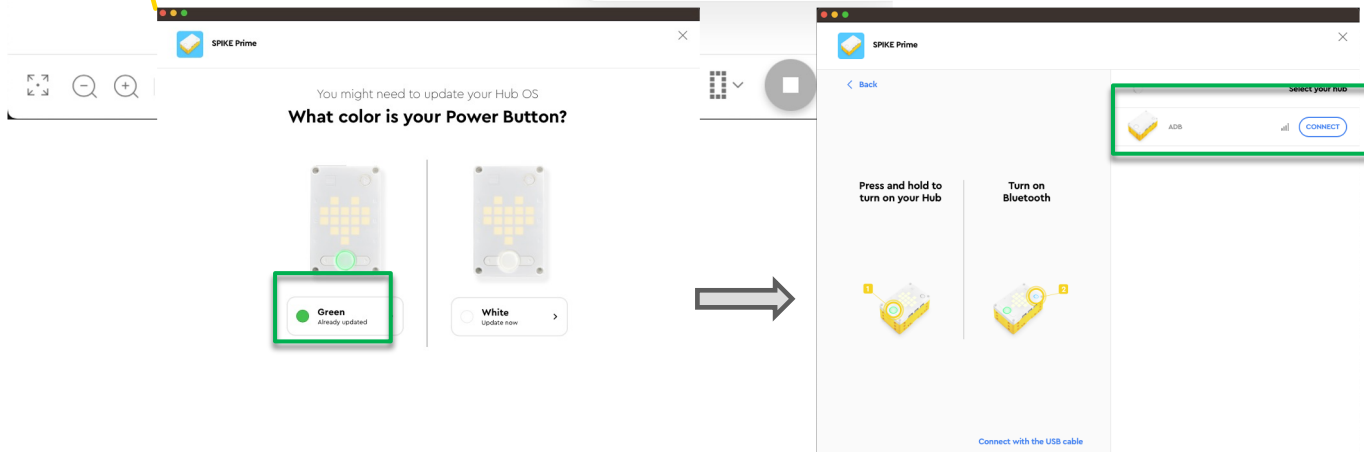
The software will auto-connect to the brick if you are using USB.

To connect over Bluetooth, click the connect icon in the software.

You'll get a panel asking what color your power button is. Choose the green power button. If your power button is not green, choose White if you want to update to Spike 3, or exit the app.

Enable Bluetooth by pressing the Bluetooth button on the brick.

Your hub will show on the right side. Click the connect button.



DEFAULT PYTHON CODE

All Python programs will begin with the following code by default

You will typically keep lines 2, 4 and 8: The runloop import, the main function, and the call to main.

You can add more imports to allow you to use the ports/sensors/motors/etc. in your programs



```
1 from hub import light_matrix
2 import runloop
3
4 async def main():
5     # write your code here
6     await light_matrix.write("Hi!")
7
8 runloop.run(main())
9
```

SPIKE 3 - ASYNC AND AWAIT

Spike 3 has introduced functionality to run coroutines using `async/await`. The Knowledge Base has good information on it.

These are very useful to run multiple functions concurrently without waiting for any to finish, if so desired

To wait for an `async` function to finish, simply call it with an `await`:

```
await myAsyncFunction()
```

```
doSomethingAfterWaiting() # will run when above function completes
```

To run a **built-in** `async` function without waiting, simply call it without waiting:

```
motor.run_for_degrees(port.A, 360, 200)
```

To run custom `async` function(s) without waiting, call it using the `runloop`:

```
# create two async function calls to send to the runloop
```

```
a = myAsyncFunction(<parameters>)
```

```
b = mySecondAsyncFunction(<parameters>)
```

```
# run both the functions together
```

```
runloop.run(*[a,b])
```

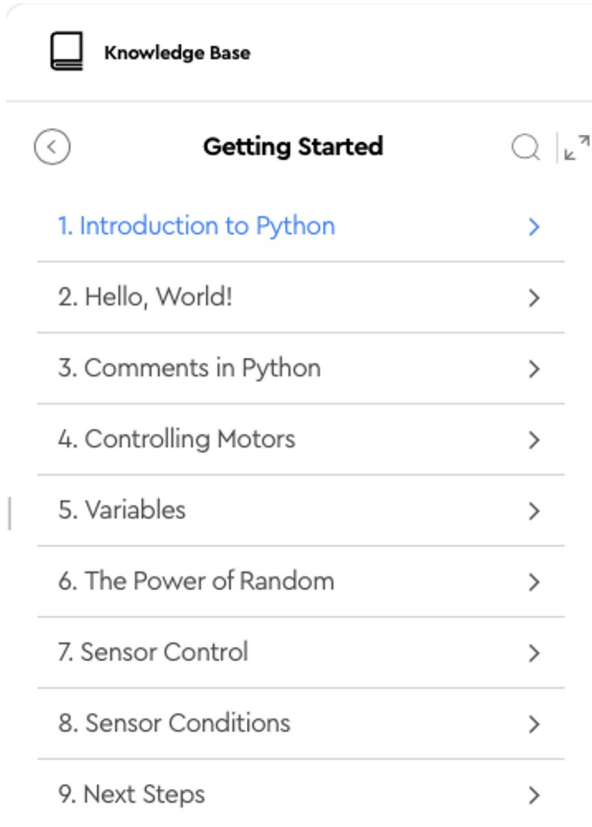
More examples are available in the Functions Lesson

SPIKE 3 PYTHON RESOURCES

The Knowledge base has two sections you should explore:

Getting Started – great if you are new to Python

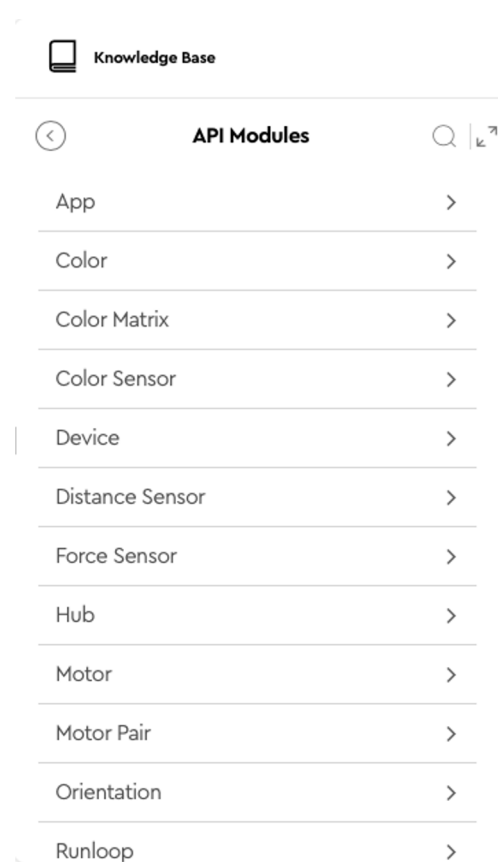
API



The screenshot shows the 'Knowledge Base' header with a book icon. Below it is a navigation bar with a back arrow, the title 'Getting Started', and a search icon. A list of nine items follows, each with a right-pointing chevron:

- 1. Introduction to Python
- 2. Hello, World!
- 3. Comments in Python
- 4. Controlling Motors
- 5. Variables
- 6. The Power of Random
- 7. Sensor Control
- 8. Sensor Conditions
- 9. Next Steps

API Modules – details on Spike 3



The screenshot shows the 'Knowledge Base' header with a book icon. Below it is a navigation bar with a back arrow, the title 'API Modules', and a search icon. A list of API modules follows, each with a right-pointing chevron:

- App
- Color
- Color Matrix
- Color Sensor
- Device
- Distance Sensor
- Force Sensor
- Hub
- Motor
- Motor Pair
- Orientation
- RunLoop

OTHER PYTHON RESOURCES

Note: No endorsement is implied.

[W3Schools](#) is a good, free resource for getting started with Python coding online. It has its own Python editor so you do not need to install Python on your machine. Here are some useful sections to get started if you are new to Python:

[Python Intro](#)

[Python Syntax](#)

[Python Comments](#)

[Python Variables](#)

[Python Numbers](#)

[Python Booleans](#)

[Python If...Else](#)

[Python While Loops](#)

[Python For Loops](#)

[Python Functions](#)

[Python Scope](#)

[Python Math](#)

CREDITS

This lesson was created by Sanjay and Arvind Seshan for Prime Lessons

Additional contributions by FLL Share & Learn community members.

More lessons are available at www.primelessons.org



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