<AIDrone Manual>

AI Educational Drone

with Raspberry pi zero 2 w

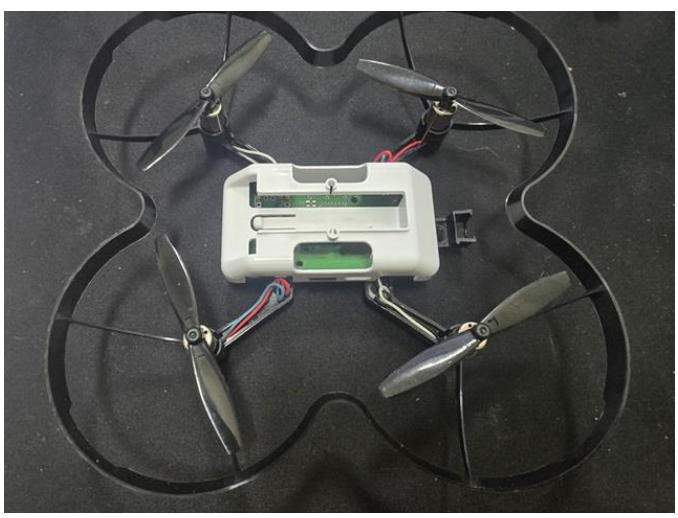
Parts List

1. Raspberry pi Zero 2 W and Camera
2. FC Board
3. Drone Body and Cover
4. DC Motor 4pcs (8520)
5. Prob 4pcs(65mm)
6. Li-po Battery (1000mAh)
7. Transmitter(Bluetooth)

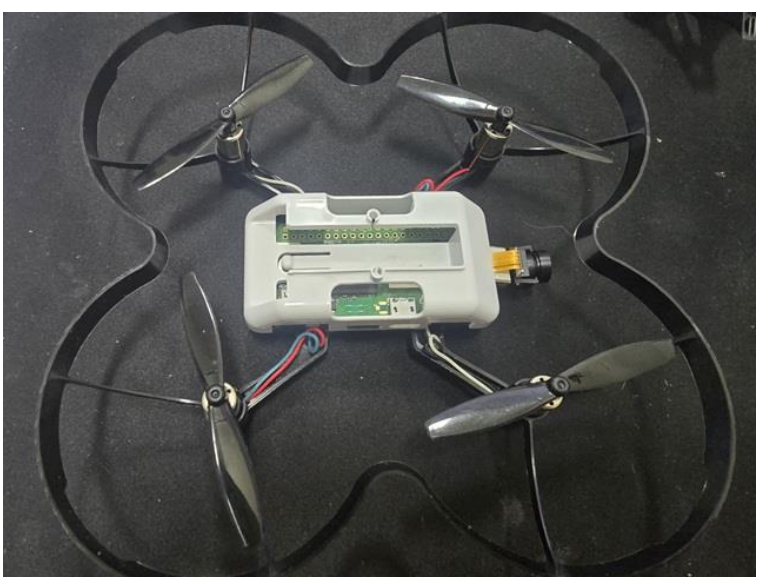
Instroduction

The AI drone is basically an educational drone that flies with a controller and can be controlled by coding with block-based apps, Scratch, and Python.

It is a DIY-type educational drone that can even provide AI education by combining Raspberry Pi Zero 2 w and a camera module.



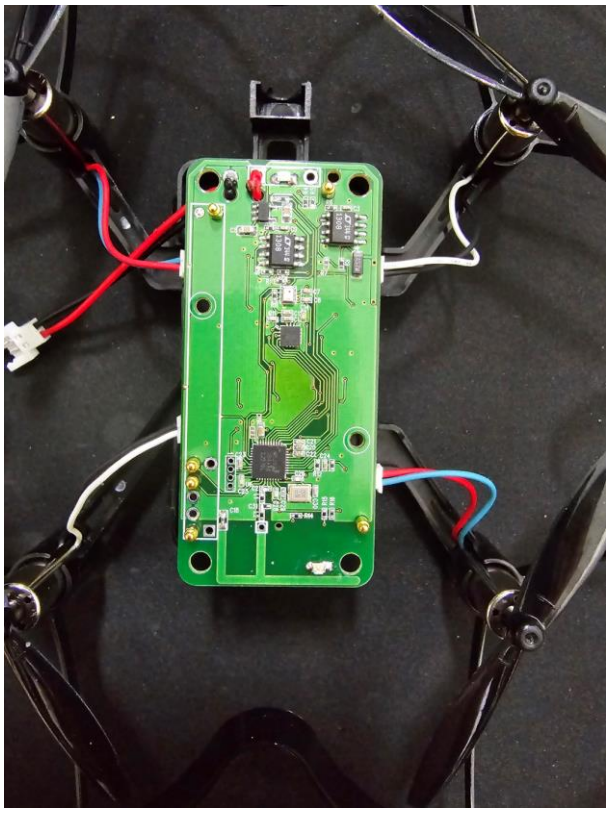
Coding Drone(Without Raspberry Pi Zero 2 W + Camera)



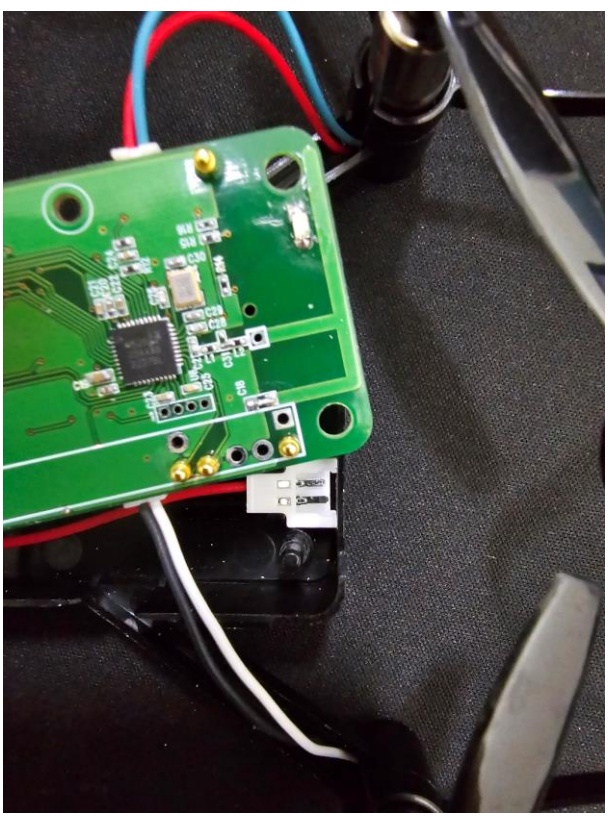
AIDrone With Raspberry Pi Zero 2 W + Camera)

1. 드론 조립하기

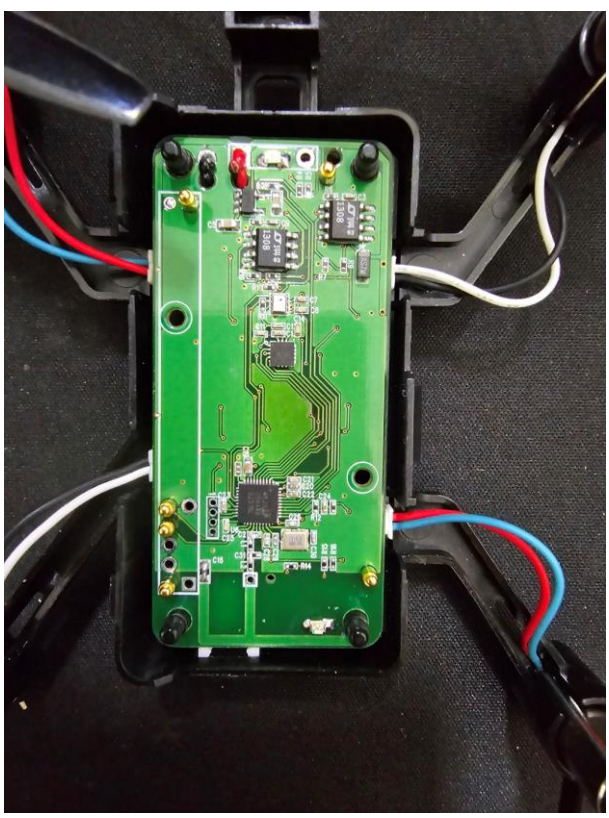
1. 드론 바디에 모터/프롭 연결



2. 모터에 FC 연결



3 배터리 컨넥터 바디에 위치



4. FC를 네 구멍에 바디 핀에 고정시킨다.

5. 라즈베리와 카메라 결합

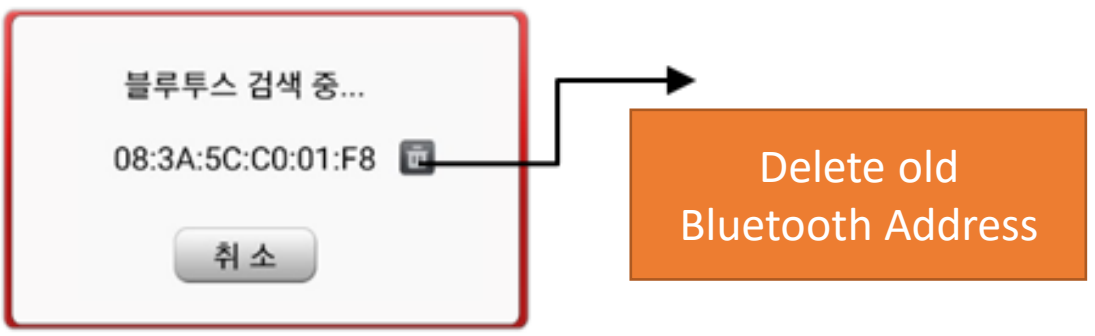
6. 드론 바디 커버를 덮고 배터리를 연결한다.

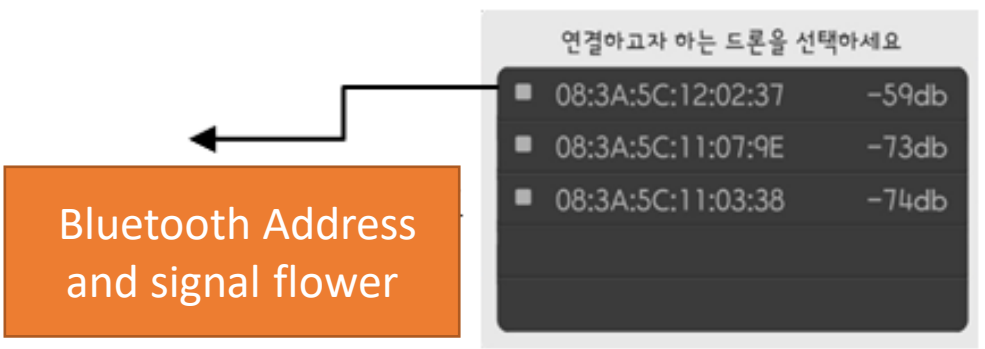
2. Control ZeroDrone with App

- Install JCBlock App from Google Play and ISO

- Open the JCBlock App and click the Bluetooth icon in right upper conner

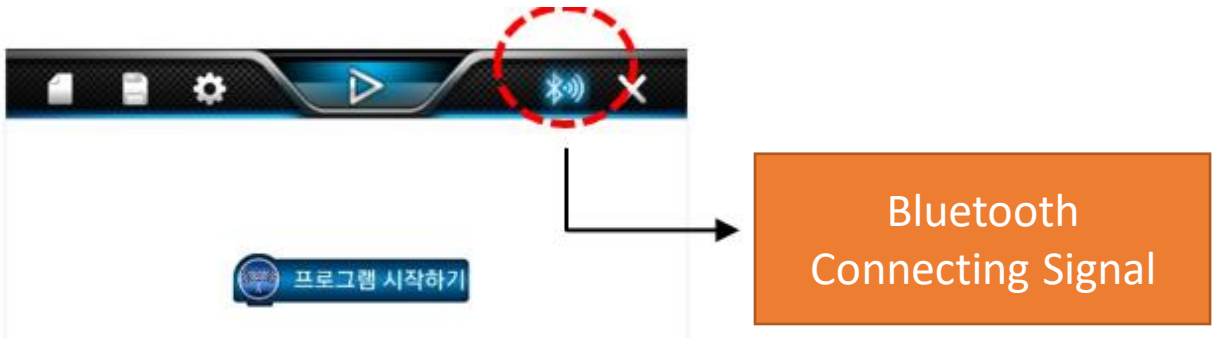
- If delete the Bluetooth address, click the address in upper position.





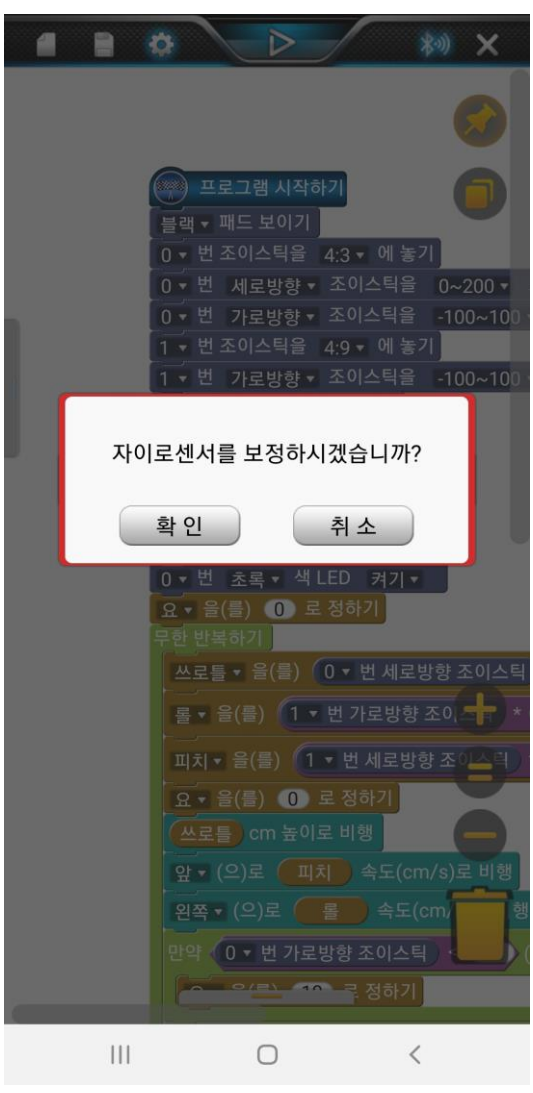
• If connected, Bluetooth image lightening

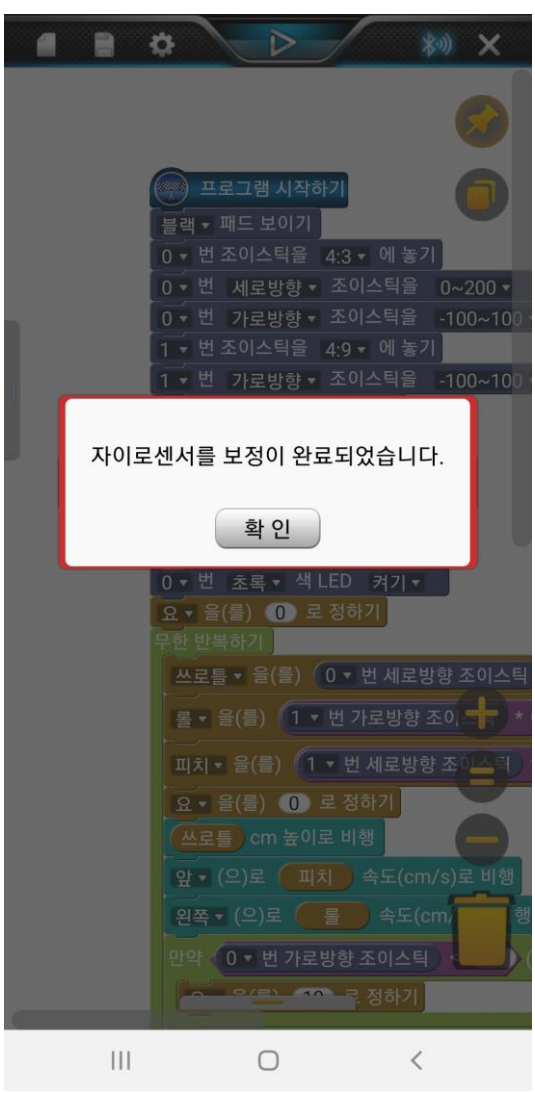
(put the drone in horizontal ground. and then click the setup for sensor Initialization)



• Confirm that the drone is placed horizontally and then press this button( )to calibrate the gyro sensor.

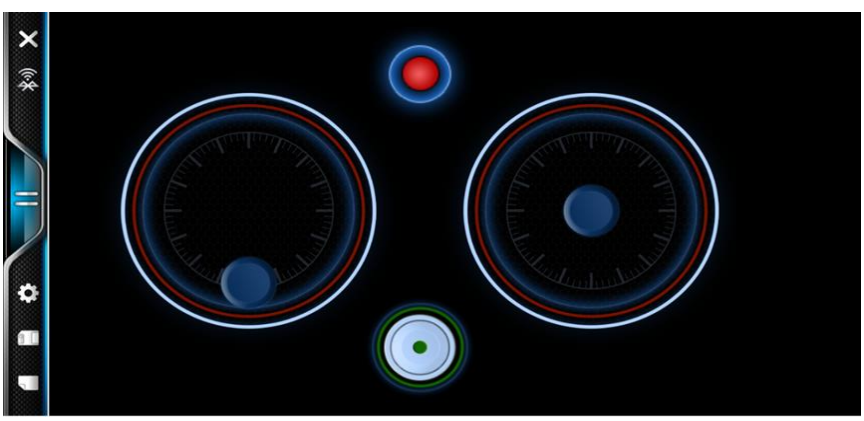
(The gyro sensor must be calibrated before the drone can fly. This only needs to be done the first time)

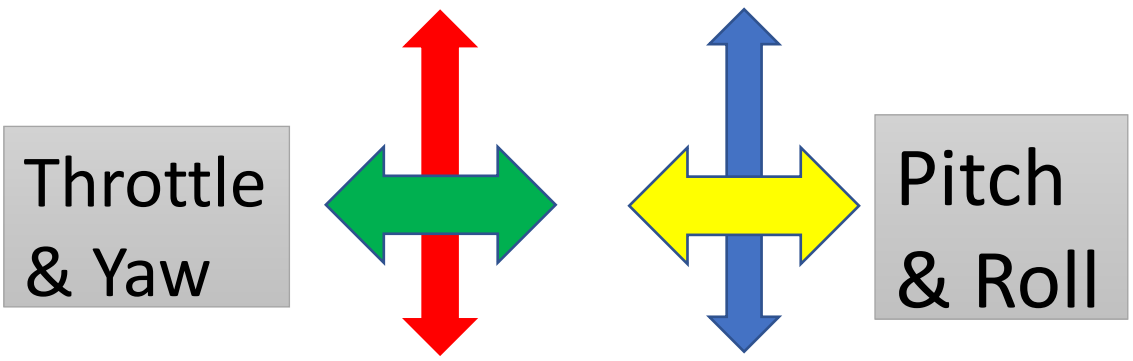




- Drag the left button to right, show the menu.
- Click the examples and click 1 number(drone flight).
- Click on number 25 and play code조종기)

- Press this button( ). Excute this coding



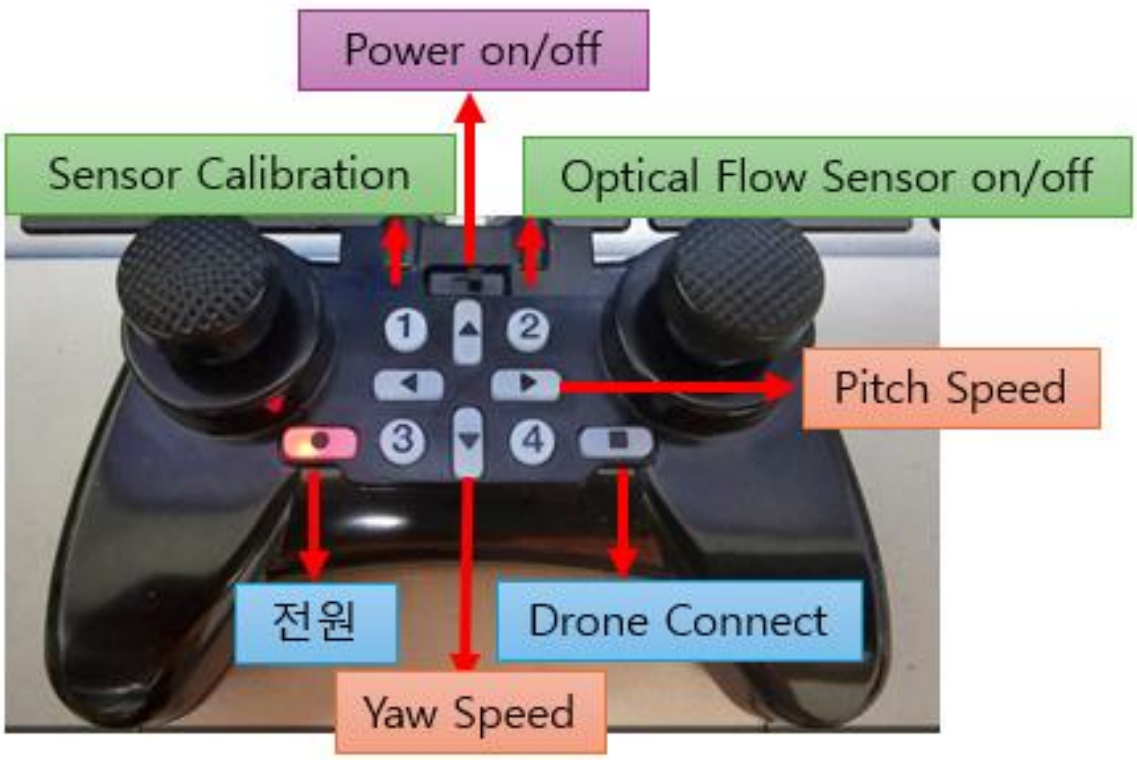


3. Connect With Transmitter

• How to connect the Drone with the Transmitter

1. Turn on the power(red LED) by moving the slide switch from right to left.

2. Press the connection button(green LED) for about 3 seconds. The green LED will stay on without blinking.



3. Press the number 1 to calibrate the drone (If you didn't calibrate the gyro sensor before, you have to do that)

4. If you connect the transmitter to a new drone, press the square button(green LED) for about 3 seconds. It will connect to the new drone.

(Caution: Other drones around must have the power turned off at this time)

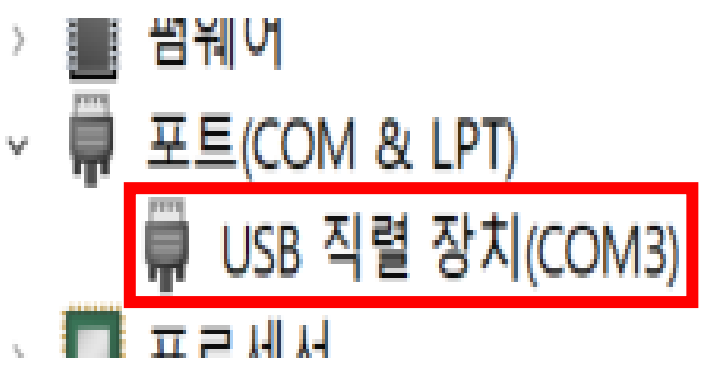
- **How to connect the controller to the PC**

1. Connect the controller, which is linked to the drone, to the PC with a USB cable.
2. Download and install ch340g driver

   (Select the driver according to your OS)

   https://github.com/irbrain/AIDrone-Controller-USBdriver

3. After install, Check up Serial Port Number



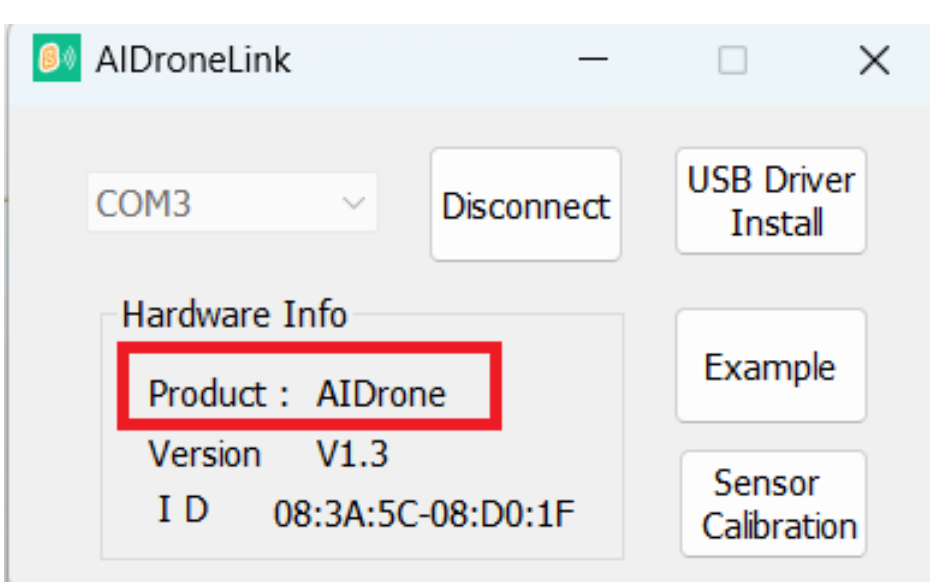
4. Connect Scratch

- Connect the controller, which is linked to the drone, to the PC with a USB cable.
- Download and install ‘setupApp.msi’ from the link below. After installation, the following icons will appear on your desktop window.

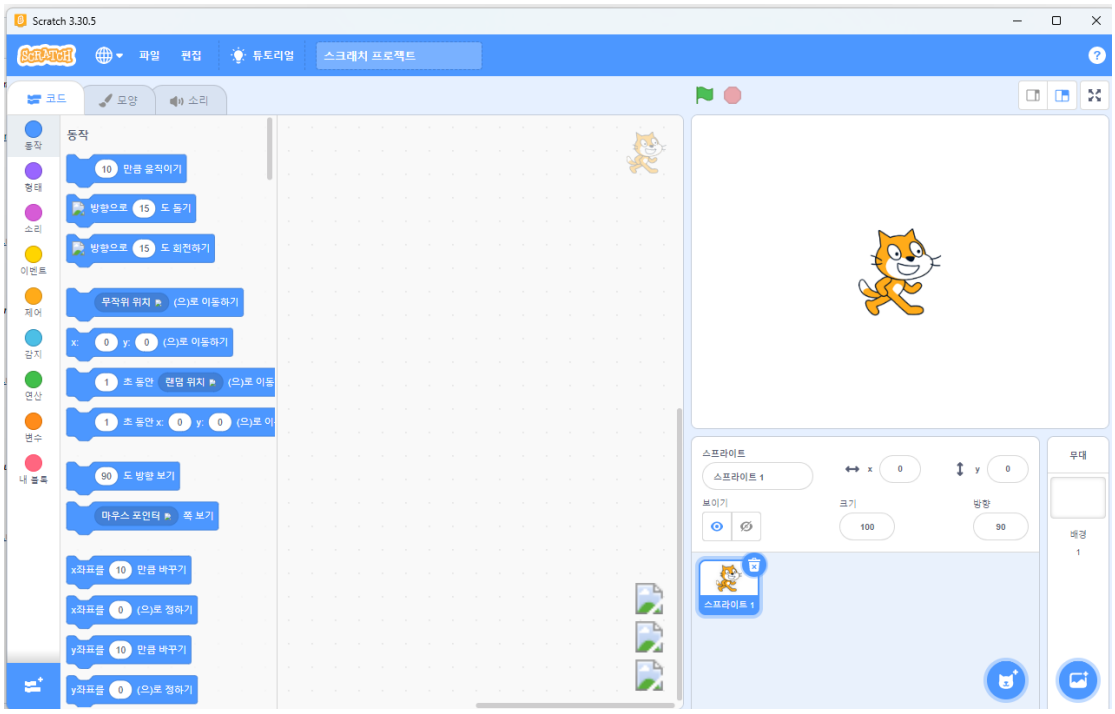
https://drive.google.com/file/d/19mDcPZ8vACHmRV8rNDy-l9Iu3M4zK7KA/view?usp=sharing

- Run the AIDroneLink communication program to connect the drone, which is linked to the controller, to the PC.

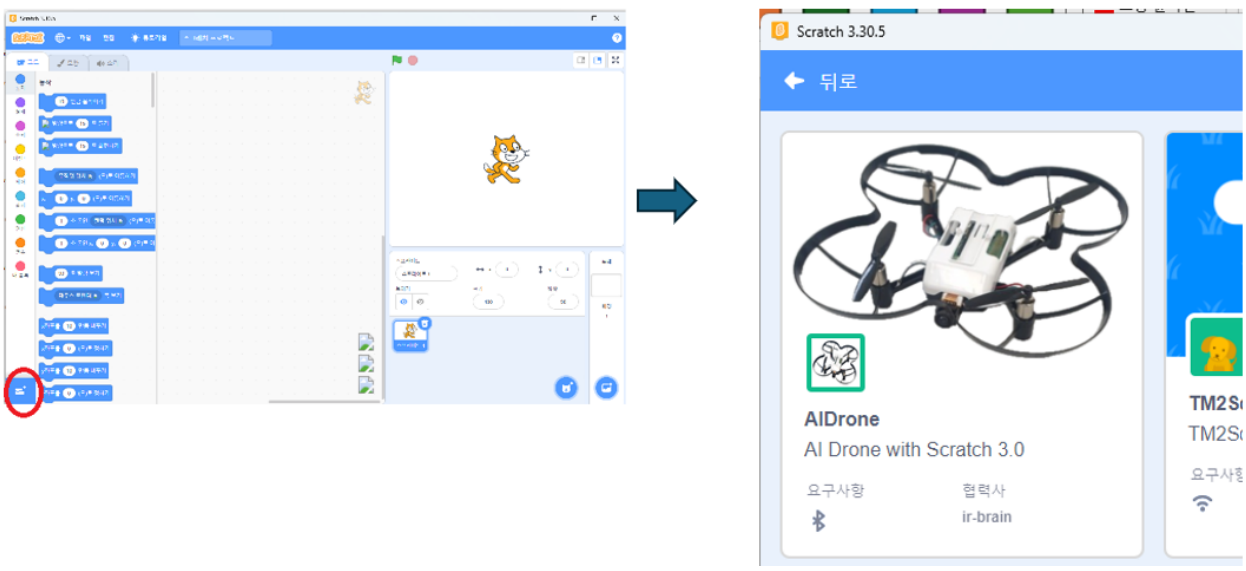
[Choose the port] -> [Connect]



- Run Scratch 3



- Click on the extension button at the bottom left of Scratch, Select AIDrone on Hardware List, and click Connect.

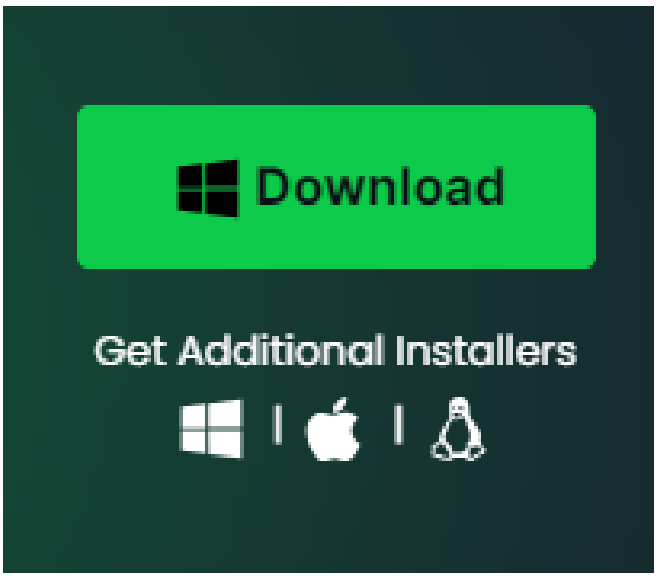


- Do Scratch coding with AIDrone block.

5. Setting Up a python development Environment on Pc

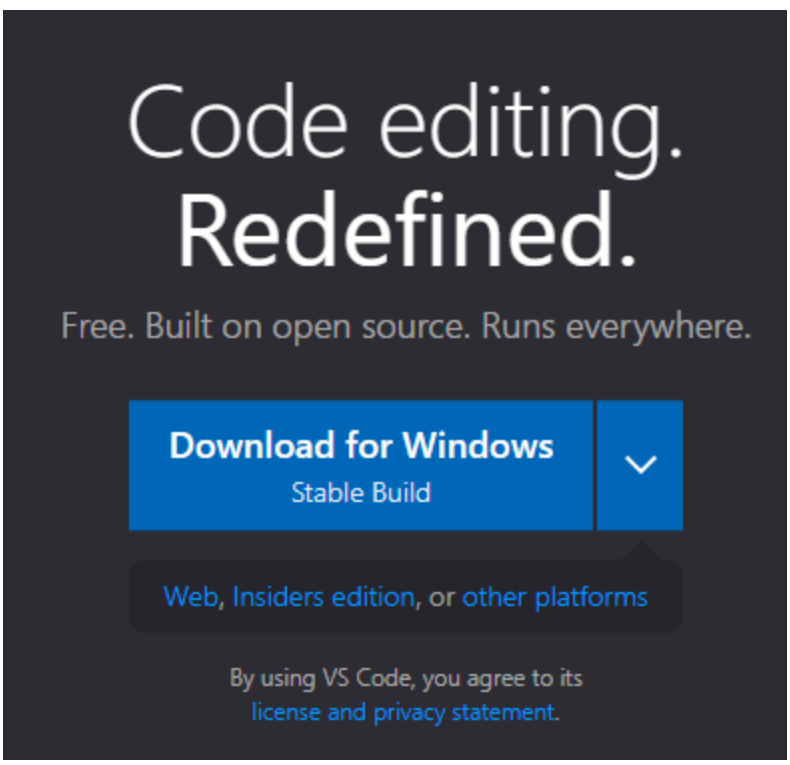
- Download and install Annaconda from the link below.

  https://www.anaconda.com/download

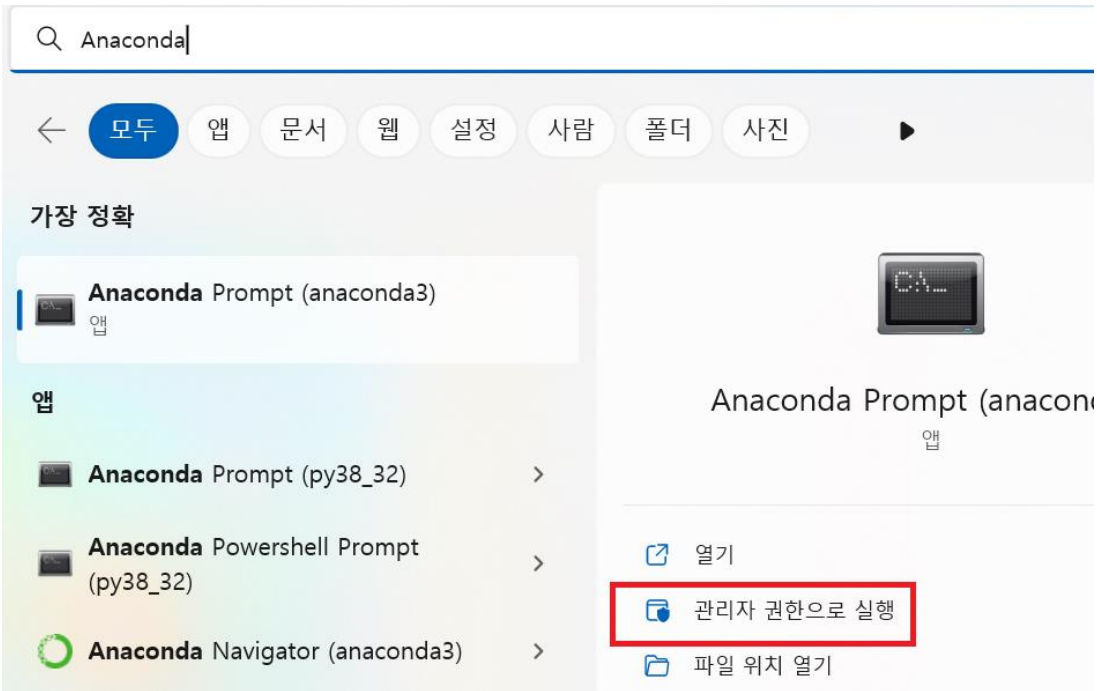


- Download and install VisualStudio Code from the link below

  https://code.visualstudio.com/



- After installing Anaconda, run Anaconda Prompt as an administrator and set up the virtual environment.



- Create a virtual environment for Anaconda users to use.

```
(base) C:₩Windows₩System32>conda crate -n aidrone python=3.9
```

- Enter the virtual environment you created

```
(base) C:₩Windows₩System32>conda activate aidrone
```

- Upgrade python pip.

```
(aidrone) C:₩Windows₩System32>python -m pip install --upgrade pip
```

- Install Python aidrone module. (pyaidrone)

```
(aidrone) C:₩Windows₩System32>pip install pyaidrone
```

6. Contorl Drone Motor by Python

- Coding after connecting the python's virtual environment that you make in Visual Studio Code

(If you don't know how to use Visual Studio Code, please learn about that in person)

- Control Drone Motor (motor.py)

```python
from time import sleep
from pyaidrone.aiDrone import *


if __name__ == '__main__':

    aidrone = AIDrone()
    aidrone.Open("COM3")
    aidrone.setOption(0)
    sleep(0.5)

    aidrone.motor(0, 10)
    sleep(2)
    aidrone.motor(1, 20)
    sleep(2)
    aidrone.motor(2, 30)
    sleep(2)
    aidrone.motor(3, 40)
    sleep(2)
    aidrone.Close()
```

7. Drone Fight Control by Python

- Control Drone flight(move.py)

```python
from time import sleep
from pyaidrone.aiDrone import *
from pyaidrone.deflib import *

ready = -1

def receiveData(packet):
    global ready
    ready = packet[7] & 0x03


if __name__ == '__main__':

    aidrone = AIDrone(receiveData)
    aidrone.Open("COM3")
    aidrone.setOption(0)
    sleep(0.5)

    while ready != 0:
        sleep(0.1)

    aidrone.takeoff()
    sleep(5)
    aidrone.move(FRONT, 200)
    sleep(5)
    aidrone.move(BACK, 200)
    sleep(5)
    aidrone.landing()
    sleep(3)
    aidrone.Close()
```

- Coding the control of Drone rotation (rotation.py)

```python
from time import sleep
from pyaidrone.aiDrone import *
from pyaidrone.deflib import *

ready = -1

def receiveData(packet):
    global ready
    ready = packet[7] & 0x03

if __name__ == '__main__':

    aidrone = AIDrone(receiveData)
    aidrone.Open("COM3")
    aidrone.setOption(0)
    sleep(0.5)

    while ready != 0:
        sleep(0.1)

    aidrone.takeoff()
    sleep(5)
    aidrone.rotation(90)
    sleep(5)
    aidrone.rotation(-90)
    sleep(5)
    aidrone.landing()
    sleep(3)
    aidrone.Close()
```

- Coding the control of Drone altitude (up_down.py)

```python
from time import sleep
from pyaidrone.aiDrone import *
from pyaidrone.deflib import *

ready = -1

def receiveData(packet):
    global ready
    ready = packet[7] & 0x03


if __name__ == '__main__':

    aidrone = AIDrone(receiveData)
    aidrone.Open("COM3")
    aidrone.setOption(0)
    sleep(0.5)

    while ready != 0:
        sleep(0.1)

    aidrone.takeoff()
    sleep(5)
    aidrone.altitude(150)
    sleep(8)
    aidrone.altitude(50)
    sleep(8)
    aidrone.altitude(100)
    sleep(8)
    aidrone.landing()
    sleep(3)
    aidrone.Close()
```

- Coding the control of Drone velocity (velocity.py)

```python
from time import sleep
from pyaidrone.aiDrone import *
from pyaidrone.deflib import *

ready = -1

def receiveData(packet):
    global ready
    ready = packet[7] & 0x03

if __name__ == '__main__':

    aidrone = AIDrone(receiveData)
    aidrone.Open("COM3")
    aidrone.setOption(0)
    sleep(0.5)

    while ready != 0:
        sleep(0.1)

    aidrone.takeoff()
    sleep(5)
    aidrone.velocity(FRONT, 100)
    sleep(2)
    aidrone.velocity(FRONT, 0)
    sleep(5)
    aidrone.velocity(BACK, 100)
    sleep(2)
    aidrone.velocity(BACK, 0)
    sleep(5)
    aidrone.landing()
    sleep(5)
    aidrone.Close()
```

8. Control Drone Flight by Keyboard

- Coding how to control drone flight by keyboard (rc.py)

```python
from time import sleep
from pyaidrone.aiDrone import *
from pyaidrone.deflib import *
from pyaidrone.ikeyevent import *

Height = 70
Degree = 0

if __name__ == '__main__':
    aidrone = AIDrone()
    ikey = IKeyEvent()
    aidrone.Open("COM4")
    aidrone.setOption(0)
    sleep(0.5)

    while not ikey.isKeyEscPressed():
        if ikey.isKeyEnterPressed():
            aidrone.takeoff()
        if ikey.isKeySpacePressed():
            aidrone.landing()

```

```
        if ikey.isKeyUpPressed():
            aidrone.velocity(FRONT, 100)
        elif ikey.isKeyDownPressed():
            aidrone.velocity(BACK, 100)
        else:
            aidrone.velocity(FRONT, 0)

        if ikey.isKeyRightPressed():
            aidrone.velocity(RIGHT, 100)
        elif ikey.isKeyLeftPressed():
            aidrone.velocity(LEFT, 100)
        else:
            aidrone.velocity(RIGHT, 0)


        if ikey.isKeyWPressed():
            Height += 10
            aidrone.altitude(Height)
        elif ikey.isKeyXPressed():
            Height -= 10
            aidrone.altitude(Height)

        if ikey.isKeyDPressed():
            Degree = Degree + 10
            aidrone.rotation(Degree)
        elif ikey.isKeyAPressed():
            Degree = Degree - 10
            aidrone.rotation(Degree)

        sleep(0.1)
    aidrone.Close()
```