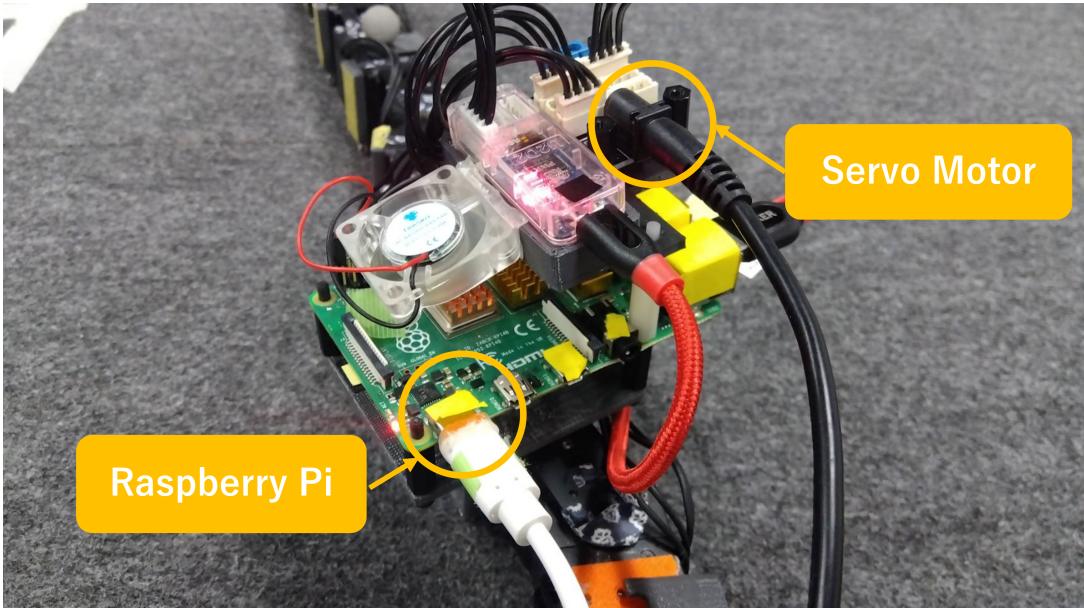


# How the Real Snake Robot Use

## Robot Setting

Connect 2 codes for power of RaspberryPi and motors as shown below.



## SSH connection

On your PC, open the terminal and input this command below.

```
ssh pi@192.168.0.112
```

You have to also input password.

Password is 'hayashibelab'.

```
hayashibelab
```

It is okay if you can get this message as shown below.

```
pi@walkrunrobo: ~          X + | v      - □ ×
C:\Users\3meko>ssh pi@192.168.0.112
pi@192.168.0.112's password:
Linux walkrunrobo 5.15.30-v7l+ #1536 SMP Mon Mar 28 13:51:42 BST 2022 armv
7l

The programs included with the Debian GNU/Linux system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*copyright.

Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
Last login: Tue Jul 18 14:35:46 2023 from 192.168.0.202
pi@walkrunrobo:~ $ |
```

## Activate the Environment

To run scripts that control the snake robot, you need to activate the environment.  
Input this command below.

```
source hirano-dev/envs/snake-robot-env/bin/activate
```

if '(snake-robot-env)' appears on the left side of your terminal (as shown below), it means you have successfully activated the environment.

```
pi@walkrunrobo:~ $ source hirano-dev/envs/snake-robot-env/bin/activate  
(snake-robot-env) pi@walkrunrobo:~ $
```

## Move to the Workspace

You need to move the workspace to control the snake robot.

Input the command below.

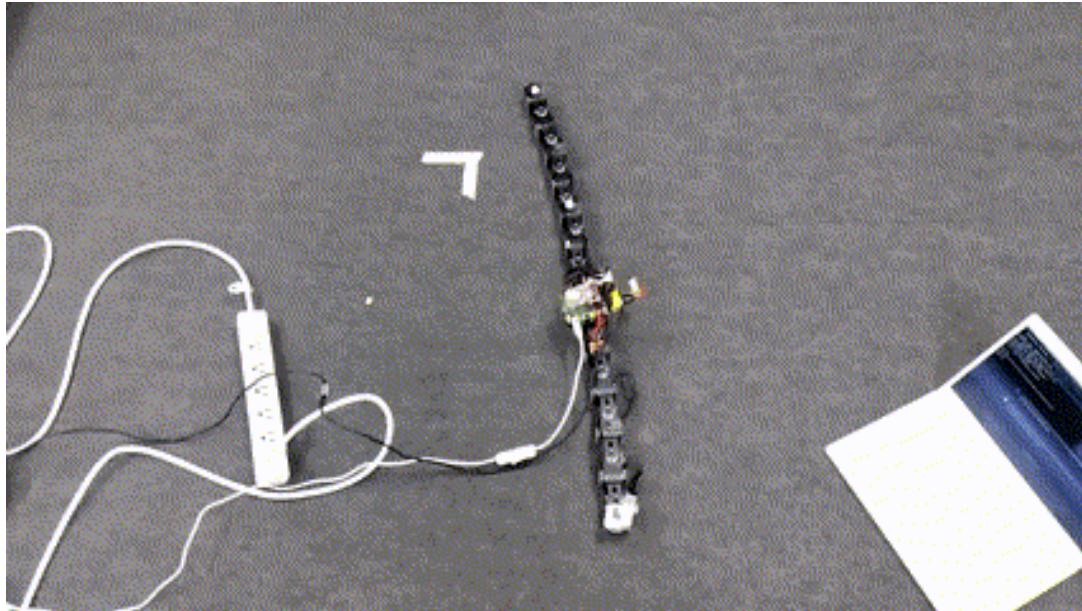
```
cd hirano-dev/projects/snake-robot-project/
```

## Snake Robot Test

### 1. Simple Control

Input following command to test controlling the snake robot.

```
python app/test_snake_control.py
```



### 2. Send Signals and Control

To control the snake robot, you need to send control signals from your PC.  
You can use Socket system with python.

At first, install 'keyboard' that is a library to recognize keyboard inputs on your PC.

```
pip install keyboard
```

Then, copy and paste following script, and save it as 'test\_socket.py'.

```
from socket import socket,AF_INET,SOCK_DGRAM
import time
import keyboard
from math import pi

PORT=5000
CLIENT="192.168.0.112"

def main():
    sock=socket(AF_INET,SOCK_DGRAM)

    while True:

        try:
            #'msg' is each servo motor's angle[rad]. Maximum value is |pi/9.2|.
            if keyboard.read_key()=="d":
                msg=f"{pi/9.2},0,0,0,0,0,0,0,0,0,0"
            elif keyboard.read_key()=="a":
                msg=f"{-pi/9.2},0,0,0,0,0,0,0,0,0,0"
            else:
                msg="0,0,0,0,0,0,0,0,0,0,0"

            sock.sendto(msg.encode("utf-8"),(CLIENT,PORT))

        except KeyboardInterrupt:
            break

        print("your message : ",msg)
        time.sleep(0.1)

if __name__=="__main__":
    main()
```

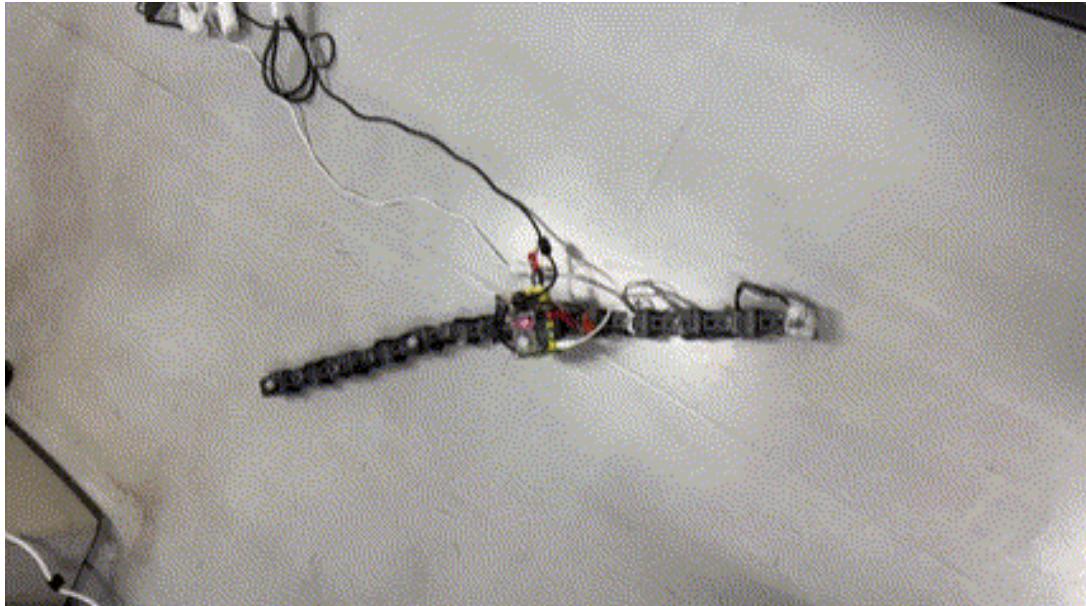
Run above script with following command on your PC.

```
python test_socket.py
```

And input following command on RaspberryPi.

```
python app/snake_control_by_signal.py
```

You can control the head servo motor by keyboard.



## Turn Off the Snake Robot

---

Input following command.

```
sudo poweroff
```

you are required to input password.

Password is 'hayashibelab'

```
hayashibelab
```