

Pi-Top Workshop #2

Introduction to Programming
Pi-Tops in Python and using
the vision sensor

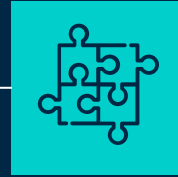
Workshop #1 Agenda



01

PYTHON

Learn to code
Pi-Tops with
Python.



02

VISION SENSOR

Program the vision
sensor and attempt
the challenge.

SETTING UP PYTHON

```
3 from pitop import Pitop
4 from pitop.robotics.drive_controller import DriveController
5 from time import sleep
6
7 robot = Pitop()
8 # Notice that the objects in our code, match the physical object itself
  (the robot)
9 drive = DriveController(left_motor_port="M3", right_motor_port="M0")
10 robot.add_component(drive)
```

FORWARD

```
11
12 robot.drive.forward(0.5)
13 sleep(0.25)
14
15 robot.drive.stop()
```

Remember

- The variable for robot.drive.forward changes speed
- The variable for sleep changes distance

REVERSE



```
11  
12 robot.drive.forward(-0.5)|  
13 sleep(0.25)  
14  
15 robot.drive.stop()
```

Remember

- Making the variable for robot.drive.forward to negative makes the robot move in reverse

CHANGING SPEED >>

```
12 robot.drive.forward (speed_factor = 0.5)
13
14 sleep(2)
15 robot.drive.stop()
```

- Speed is changed by changing the value for “robot.drive.forward (speed_factor = ...)”

CHANGING SPEED >>

Explanation

This is a line of code called a speed variable. When a variable is made, it tells the computer that something exists, and it assigns data to it. In this case, the line of code is telling the computer that the speed factor is equal to a value.

```
speed_factor =
```

The value is
written here.

This line tells the rover to move forward and uses the speed_factor variable to determine how fast to go.

```
robot.drive.forward(speed_factor)
```

```
sleep(1)
```

```
robot.drive.stop()
```

This line tells the computer to run the code or move the rover forward (at the speed noted in the variable) for a specified amount of time.

TURNING RIGHT

```
12 ***** Loop *****
13 while True:
14     robot.drive.right(0.1)
15     sleep(0.1)
```


TURNING LEFT

```
12 ***** Loop *****
13 while True:
14     robot.drive.left(0.1)
15     sleep(0.1)
```

CHANGING RPM



```
6 # Setup the motor
7 motor = EncoderMotor("M0", ForwardDirection.COUNTER_CLOCKWISE)
8
9 rpm_speed =
10 for _ in range(4):
11     motor.set_target_rpm(rpm_speed)
12     sleep(1)
13
14 motor.stop()
15
```

CHANGING RPM



Explanation

This line imports the libraries and modules needed to use the encoder motor with a forward direction.

```
# import libraries
from pitop import (EncoderMotor, ForwardDirection,)
from time import sleep

# set up the motor
motor = EncoderMotor("M0", ForwardDirection.COUNTER_CLOCKWISE)

rpm_speed = 
for _ in range(4):
    motor.set_target_rpm(rpm_speed)
    sleep(1)

motor.stop()
```

Port

Rover Direction

Direction to rotate the motor

Rotations per minute variable

Loops through the body of code a set number of times, here it is 4 times.

Run the motor at a specified target RPM, using the value declared in the variable.

VISION CHALLENGE

Objective: modify the program to have the robot use the vision sensor to follow the colored path.

Go to:

1. Robot Vision

<https://further.pi-top.com/courses/60e453caa648150015a9cd23/challenges/606cb169aa58a40014b0066a>

2. Path Finder

<https://further.pi-top.com/courses/60e453caa648150015a9cd23>

