

รายงานศึกษา python oop

โดย

นาย ชญานิน เลียงจินดาถาวร (ไม้โมก) รหัสนักศึกษา 63010177

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Object-Oriented Programming () x

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Object-Oriented Programming (OOP) in Python 3

by David Amos 99 Comments intermediate python

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```
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2# in Python 3.5+
3
4>>> x = {'a': 1, 'b': 2}
5>>> y = {'b': 3, 'c': 4}
6
7>>> z = {**x, **y}
8
9>>> z
10{'c': 4, 'a': 1, 'b': 3}
```

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85°F Partly cloudy 1:26 AM 8/10/2021

The screenshot shows a web browser window displaying the Real Python website. The page title is "What Is Object-Oriented Programming in Python?". The article text explains that object-oriented programming is a programming paradigm where properties and behaviors are bundled into individual objects. It gives examples like a person with properties (name, age, address) and behaviors (walking, talking, breathing, running), or an email with properties (recipient list, subject, body) and behaviors (adding attachments, sending). It also compares OOP to procedural programming, which structures a program like a recipe. A table of contents on the right lists the article sections: "What Is Object-Oriented Programming in Python?", "Define a Class in Python", "Instantiate an Object in Python", "Inherit From Other Classes in Python", and "Conclusion". Below the table of contents are social media sharing buttons for Twitter, Facebook, and Email, and a "Mark as Completed" button. A recommended video course, "Intro to Object-Oriented Programming (OOP) in Python", is also featured. The Real Python logo and navigation links are at the top, and a Windows taskbar is visible at the bottom.

Object-Oriented Programming (OOP) คือการเขียนโปรแกรมโดยมีโครงสร้างของข้อมูลเป็น Object โดยใน Object จะประกอบด้วย Properties คือ ข้อมูลภายใน Object นั้น ยกตัวอย่างเทียบกับชีวิตจริงเช่น ชื่อ อายุ และ Behaviors คือ ความสามารถต่างๆ ยกตัวอย่างเทียบกับชีวิตจริงเช่น การเดิน การวิ่ง การหายใจ

OOP(Object Oriented Programming) คือการเขียนโปรแกรมโดยมีโครงสร้างของข้อมูลเป็น Object โดยใน Object จะประกอบด้วย Properties คือ ข้อมูลภายใน Object นั้น ยกตัวอย่างเทียบกับชีวิตจริงเช่น ชื่อ อายุ และ Behaviors คือ ความสามารถต่างๆ ยกตัวอย่างเทียบกับชีวิตจริงเช่น การเดิน การวิ่ง การหายใจ

The screenshot shows a web browser window with the URL <https://realpython.com/python3-object-oriented-programming/>. The page title is "Define a Class in Python". The article text explains that primitive data structures like numbers, strings, and lists are designed to represent simple pieces of information. It then provides an example of tracking employees in an organization using lists. The code example shows three lists: `kirk`, `spock`, and `mccoy`, each containing a name, age, position, and ID. The article also mentions that there are issues with this approach, such as making larger code files more difficult to manage. On the right side, there is a "Table of Contents" with links to "What Is Object-Oriented Programming in Python?", "Define a Class in Python", "Instantiate an Object in Python", "Inherit From Other Classes in Python", and "Conclusion". Below the table of contents, there is a "Mark as Completed" button and social media sharing options (Twitter, Facebook, Email). At the bottom, there is a "Recommended Video Course" section titled "Intro to Object-Oriented Programming (OOP) in Python". The browser's address bar and the Windows taskbar are visible at the bottom of the screenshot.

Define a Class in Python

Primitive [data structures](#)—like numbers, [strings](#), and lists—are designed to represent simple pieces of information, such as the cost of an apple, the name of a poem, or your favorite colors, respectively. What if you want to represent something more complex?

For example, let's say you want to track employees in an organization. You need to store some basic information about each employee, such as their name, age, position, and the year they started working.

One way to do this is to represent each employee as a [list](#):

```
Python
kirk = ["James Kirk", 34, "Captain", 2265]
spock = ["Spock", 35, "Science Officer", 2254]
mccoy = ["Leonard McCoy", "Chief Medical Officer", 2266]
```

There are a number of issues with this approach.

First, it can make larger code files more difficult to manage. If you reference `kirk[0]` several lines away from where the `kirk` list is declared, will you remember that the element with index `0` is the employee's name?

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Intro to Object-Oriented Programming (OOP) in Python

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ทำไมต้องประกาศ Class ใน Python ?

ตัวของ Python นั้นจะมีคลาสให้อยู่แล้วเช่น number(ตัวเลข) string(สายอักขระ) list ซึ่งการใช้คลาสที่มีให้อยู่แล้วใน Python นั้นอาจมีข้อจำกัดหลายอย่าง เช่น การดึงข้อมูลมาจาก Index ช่องหนึ่งของ list ได้อาจจะให้ข้อมูลเป็นคนละชุดกับอีก list หนึ่ง

The screenshot shows a web browser window with the URL <https://realpython.com/python3-object-oriented-programming/>. The page title is "Classes vs Instances". The content explains that classes are used to create user-defined data structures and define functions called **methods**. It mentions creating a `Dog` class. A table of contents on the right lists: "What Is Object-Oriented Programming in Python?", "Define a Class in Python" (highlighted), "Instantiate an Object in Python", "Inherit From Other Classes in Python", and "Conclusion". Below the table of contents are buttons for "Mark as Completed", "Tweet", "Share", and "Email". A "Recommended Video Course" section suggests "Intro to Object-Oriented Programming (OOP) in Python". At the bottom, there is a green banner that says "Improve Your Python". The Windows taskbar at the bottom shows the search bar, task view, and icons for Edge, File Explorer, and Word. The system tray shows the date and time as 1:37 AM on 8/10/2021.

Class และ Instance

Class คือ โครงสร้างข้อมูลที่ใช้งานประกาศออกมา โดยมีฟังก์ชันข้างใน Class เรียกว่า Method

Class นั้นเปรียบเสมือนพิมพ์เขียวของ Instance โดย Instance นั้นเป็น Object ที่ถูกสร้างจาก Class

The screenshot shows a web browser window with the URL <https://realpython.com/python3-object-oriented-programming/>. The page title is "Object-Oriented Programming". The main heading is "How to Define a Class". The text explains that class definitions start with the `class` keyword, followed by the class name and a colon. Any code indented below the class definition is part of the class's body. An example of a `Dog` class is shown with the `pass` keyword as a placeholder. A note states that Python class names are written in CapitalizedWords notation by convention, such as `JackRussellTerrier`. On the right, a "Table of Contents" lists links to "What Is Object-Oriented Programming in Python?", "Define a Class in Python" (highlighted), "Instantiate an Object in Python", "Inherit From Other Classes in Python", and "Conclusion". Below the table of contents are buttons for "Mark as Completed", "Tweet", "Share", and "Email". A "Recommended Video Course" section suggests "Intro to Object-Oriented Programming (OOP) in Python". At the bottom, a green banner says "Improve Your Python". The Windows taskbar at the bottom shows the search bar, task view, and system tray with weather and time information.

Object-Oriented Programming (x) +

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How to Define a Class

All class definitions start with the `class` keyword, which is followed by the name of the class and a colon. Any code that is indented below the class definition is considered part of the class's body.

Here's an example of a `Dog` class:

```
Python
class Dog:
    pass
```

The body of the `Dog` class consists of a single statement: the `pass` keyword. `pass` is often used as a placeholder indicating where code will eventually go. It allows you to run this code without Python throwing an error.

Note: Python class names are written in CapitalizedWords notation by convention. For example, a class for a specific breed of dog like the Jack Russell Terrier would be written as `JackRussellTerrier`.

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การประกาศ Class

การประกาศ Class นั้นจะเริ่มต้นด้วย *Keyword Class* เสมอต่อด้วยชื่อของ Class นั้น

The screenshot shows the Real Python website. The browser address bar displays 'https://realpython.com/python3-object-oriented-programming/'. The website header includes the Real Python logo, navigation links like 'Start Here', 'Learn Python', 'Store', and 'More', a search bar, and 'Join' and 'Sign-In' buttons. A banner at the top says 'Stuck at home? Enjoy free courses, on us →'. The main content area features a Python code block for a 'Dog' class with an '.__init__()' method. Below the code, there is an explanation of the method's indentation and its use of the 'self' variable. A 'Table of Contents' sidebar on the right lists topics like 'What Is Object-Oriented Programming in Python?', 'Define a Class in Python' (highlighted), 'Instantiate an Object in Python', 'Inherit From Other Classes in Python', and 'Conclusion'. At the bottom of the page, there is a green banner that says 'Improve Your Python'.

```
Python

class Dog:
    def __init__(self, name, age):
        self.name = name
        self.age = age
```

Notice that the `.__init__()` method's signature is indented four spaces. The body of the method is indented by eight spaces. This indentation is vitally important. It tells Python that the `.__init__()` method belongs to the `Dog` class.

In the body of `.__init__()`, there are two statements using the `self` variable:

1. `self.name = name` creates an attribute called `name` and assigns to it the value of the `name` parameter.
2. `self.age = age` creates an attribute called `age` and assigns to it the value of the `age` parameter.

Attributes created in `.__init__()` are called **instance attributes**. An instance attribute's value is specific to a particular instance of the class. All `Dog` objects have a `name` and an `age`, but the values for the `name` and `age` attributes will vary depending on the `Dog` instance.

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Method `__init__()` คือ method ที่เกิดขึ้นจากการสร้าง Instance จาก Class นั้น ด้านใน method จึงควรมีค่าที่จำเป็นต้องใช้งานต่ออยู่

The screenshot shows the Real Python website. The main content area displays a Python class definition for a Dog:

```
class Dog:
    # Class attribute
    species = "Canis familiaris"

    def __init__(self, name, age):
        self.name = name
        self.age = age
```

Below the code, there is an explanation of class attributes and a recommendation for a video course titled "Intro to Object-Oriented Programming (OOP) in Python". The right sidebar contains a "Table of Contents" with links to various topics, including "Define a Class in Python".

การประกาศ Attributes

การประกาศ Attributes จะทำให้ Instance ที่สร้างโดย Class มี Properties ตามที่ได้ประกาศไว้โดยการประกาศ Attributes นั้นควรจะใช้กับค่าที่ไม่เปลี่ยนแปลงเมื่อสร้างแต่ละ Instance

The screenshot shows a web browser window with the URL <https://realpython.com/python3-object-oriented-programming/>. The page title is "Instantiate an Object in Python". The article content includes a Python code snippet for creating a class and instantiating an object.

Python

```
>>> class Dog:
...     pass
```

This creates a new Dog class with no attributes or methods.

Creating a new object from a class is called **instantiating** an object. You can instantiate a new Dog object by typing the name of the class, followed by opening and closing parentheses:

```
>>> Dog()
<__main__.Dog object at 0x106702d30>
```

You now have a new Dog object at 0x106702d30. This funny-looking string of letters and numbers is a **memory address** that indicates where the Dog object is stored in your computer's memory. Note that the address you see on your screen will be different.

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การสร้าง Instance

สร้างได้โดยเรียกใช้ ชื่อClassตามด้วย()ในกรณีที่ไม่มีกำหนดค่าใน__init__()

The screenshot shows the Real Python website with the URL <https://realpython.com/python3-object-oriented-programming/>. The page features a dark blue header with the Real Python logo and navigation links: Start Here, Learn Python, Store, and More. A search bar and Join/Sign-In buttons are also present. A banner at the top reads "Stuck at home? Enjoy free courses, on us →".

The main content area includes a Python code snippet:

```
>>> a = Dog()
>>> b = Dog()
>>> a == b
False
```

Below the code, a paragraph explains: "In this code, you create two new Dog objects and assign them to the variables a and b. When you compare a and b using the == operator, the result is False. Even though a and b are both instances of the Dog class, they represent two distinct objects in memory."

The next section is titled "Class and Instance Attributes". It states: "Now create a new Dog class with a class attribute called .species and two instance attributes called .name and .age:". Below this is another Python code snippet:

```
>>> class Dog:
...     species = "Canis familiaris"
...     def __init__(self, name, age):
...         self.name = name
...         self.age = age
```

On the right side, there is a "Table of Contents" with links: What Is Object-Oriented Programming in Python?, Define a Class in Python, Instantiate an Object in Python (highlighted), Inherit From Other Classes in Python, and Conclusion. Below this is a "Mark as Completed" button and social media sharing options (Tweet, Share, Email). A "Recommended Video Course" section suggests "Intro to Object-Oriented Programming (OOP) in Python". At the bottom, a green banner says "Improve Your Python".

The Windows taskbar at the bottom shows the search bar, task view button, and several open applications. The system tray on the right displays the weather (85°F, Partly cloudy), language (ENG), and time (1:54 AM, 8/10/2021).

การตั้งชื่อของตัวแปร Instance ซึ่งสร้างจาก Class สามารถทำได้เหมือนกับการตั้งชื่อตัวแปรที่ Python มีให้

The screenshot shows the Real Python website with the URL `https://realpython.com/python3-object-oriented-programming/`. The page features a dark blue header with the Real Python logo and navigation links: `Start Here`, `Learn Python`, `Store`, and `More`. A search bar and `Join`/`Sign-In` buttons are also present. A banner at the top reads "Stuck at home? Enjoy free courses, on us →".

The main content area includes a Python code editor with the following code:

```
Python >>>
>>> buddy.name
'Buddy'
>>> buddy.age
9

>>> miles.name
'Miles'
>>> miles.age
4
```

Below the code, a text block states: "You can access class attributes the same way:"

```
Python >>>
>>> buddy.species
'Canis familiaris'
```

Following this, a paragraph explains: "One of the biggest advantages of using classes to organize data is that instances are guaranteed to have the attributes you expect. All Dog instances have `.species`, `.name`, and `.age` attributes, so you can use those attributes with confidence knowing that they will always return a value."

To the right, a "Table of Contents" sidebar lists:

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Below the table of contents are buttons for "Mark as Completed", "Tweet", "Share", and "Email". A "Recommended Video Course" section highlights "Intro to Object-Oriented Programming (OOP) in Python". At the bottom, a green banner says "Improve Your Python". The Windows taskbar at the bottom shows the search bar, task icons, and system tray with weather (85°F, Partly cloudy) and date/time (1:57 AM, 8/10/2021).

การเข้าถึง Properties ภายใน Instance

ทำได้โดยเรียก ชื่อของตัวแปรตามด้วย. และ Properties

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Instance Methods

Instance methods are functions that are defined inside a class and can only be called from an instance of that class. Just like `__init__()`, an instance method's first parameter is always `self`.

Open a new editor window in IDLE and type in the following `Dog` class:

```
Python

class Dog:
    species = "Canis familiaris"

    def __init__(self, name, age):
        self.name = name
        self.age = age

    # Instance method
    def description(self):
        return f"{self.name} is {self.age} years old"

    # Another instance method
    def speak(self, sound):
        return f"{self.name} says {sound}"
```

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การสร้าง Instance Method

ประกาศได้โดยใช้ `def` ตามด้วยชื่อ method และ `(self, variable1, variable2, ...)`

การ return string

ใช้ `f""` โดยภายใน string สามารถใช้ `{}` เพื่อส่งค่าตัวแปรในการ return

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When you `print(miles)`, you get a cryptic looking message telling you that `miles` is a `Dog` object at the memory address `0x00aeff70`. This message isn't very helpful. You can change what gets printed by defining a special instance method called `__str__()`.

In the editor window, change the name of the `Dog` class's `.description()` method to `__str__()`:

```
Python
class Dog:
    # Leave other parts of Dog class as-is

    # Replace .description() with __str__()
    def __str__(self):
        return f'{self.name} is {self.age} years old'
```

Save the file and press `F5`. Now, when you `print(miles)`, you get a much friendlier output:

```
Python
>>> miles = Dog("Miles", 4)
>>> print(miles)
'Miles is 4 years old'
```

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Def `__str__(self)`

การสร้าง method นี้จะทำให้เมื่อถูกเรียกชื่อของ Instance โดยไม่ระบุ Properties หรือ method จะทำการ return ค่าภายใน method นี้



การสืบทอดของ Class ใน Python

Parent คือชื่อเรียกของ Class ที่ถูกสืบทอด

Child คือชื่อเรียกของ Class ที่ได้รับการสืบทอด

การที่เลือกให้ Class สืบทอดจะทำให้ Child Class ได้รับ Attributes และ method ทั้งหมดใน Parent Class

The screenshot shows the Real Python website at the URL <https://realpython.com/python3-object-oriented-programming/>. The page features a dark blue header with the Real Python logo, navigation links (Start Here, Learn Python, Store, More), a search bar, and buttons for Join and Sign-In. A banner below the header says "Stuck at home? Enjoy free courses, on us →".

The main content area includes a code block titled "Python" with the following code:

```
>>> buddy.speak("Yap")
'Buddy says Yap'

>>> jim.speak("Woof")
'Jim says Woof'

>>> jack.speak("Woof")
'Jack says Woof'
```

Below the code block, the text explains that passing a string to every call to `.speak()` is repetitive and inconvenient. It suggests that the string representing the sound should be determined by the `.breed` attribute, but here you have to manually pass the correct string to `.speak()` every time it's called.

The text continues: "You can simplify the experience of working with the Dog class by creating a child class for each breed of dog. This allows you to extend the functionality that each child class inherits, including specifying a default argument for `.speak()`."

On the right side, there is a "Table of Contents" section with the following links:

- What Is Object-Oriented Programming in Python?
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Below the table of contents, there is a "Mark as Completed" button and social media sharing options (Tweet, Share, Email). A "Recommended Video Course" section highlights "Intro to Object-Oriented Programming (OOP) in Python".

At the bottom of the page, there is a footer with a search bar, a quote: "I wished I had access to a book like this when I started learning Python many years ago", and buttons for "Learn More" and "Improve Your Python". The Windows taskbar at the bottom shows the date and time as 2:14 AM on 8/10/2021.

การประกาศให้สืบทอด

ทำได้โดยการเปลี่ยน (self) เป็น (Parent Class)

Object-Oriented Programming (x)
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Press **F5** to save and run the file. With the child classes defined, you can now instantiate some dogs of specific breeds in the interactive window:

```
Python >>> miles = JackRussellTerrier("Miles", 4)
>>> buddy = Dachshund("Buddy", 9)
>>> jack = Bulldog("Jack", 3)
>>> jim = Bulldog("Jim", 5)
```

Instances of child classes inherit all of the attributes and methods of the parent class:

```
Python >>> miles.species
'Canis familiaris'

>>> buddy.name
'Buddy'

>>> print(jack)
Jack is 3 years old

>>> jim.speak("Woof")
'Jim says Woof'
```

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ตัวอย่างการเรียกใช้ Properties ที่สืบทอดมา

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The main content area includes a Python code block showing the `type()` function:

```
Python >>> type(miles)
<class '__main__.JackRussellTerrier'>
```

Below this, a text block explains: "What if you want to determine if `miles` is also an instance of the `Dog` class? You can do this with the built-in `isinstance()`:"

Another Python code block shows the `isinstance()` function:

```
Python >>> isinstance(miles, Dog)
True
```

Text below explains: "Notice that `isinstance()` takes two arguments, an object and a class. In the example above, `isinstance()` checks if `miles` is an instance of the `Dog` class and returns `True`." It then states: "The `miles`, `buddy`, `jack`, and `jim` objects are all `Dog` instances, but `miles` is not a `Bulldog` instance, and `jack` is not a `Dachshund` instance:"

A third Python code block shows:

```
Python >>> isinstance(miles, Bulldog)
False
```

On the right side, there is a "Table of Contents" with links: [What Is Object-Oriented Programming in Python?](#), [Define a Class in Python](#), [Instantiate an Object in Python](#), [Inherit From Other Classes in Python](#) (highlighted), and [Conclusion](#). Below this is a "Mark as Completed" button and social media sharing options (Tweet, Share, Email). A "Recommended Video Course" section lists "Intro to Object-Oriented Programming (OOP) in Python". At the bottom, there is a green banner that says "Improve Your Python".

type จะเรียกชื่อ Class ออกมา

`isinstance` ให้ผลลัพธ์เป็น Boolean ใช้เพื่อตรวจสอบว่าตัวแปร Instance นั้นเกิดจากการสร้างด้วย Class นั้นหรือเปล่า โดยจะนับรวมการสืบทอดจาก Parent Class ด้วย

The screenshot shows a web browser window with the Real Python website. The page title is "Object-Oriented Programming". The URL is "https://realpython.com/python3-object-oriented-programming/". The page content includes a code snippet for a Python class `JackRussellTerrier` that inherits from `Dog` and overrides the `speak` method. The code uses `super()` to call the parent class's `speak` method. The text explains that `super()` is used to access the parent class from inside a method of a child class. It also shows an interactive window where the `JackRussellTerrier` class is instantiated and the `speak` method is called, resulting in the output "Miles barks: Arf". The page includes a "Table of Contents" on the right side, a "Mark as Completed" button, and a "Recommended Video Course" section. The bottom of the page shows a Windows taskbar with various application icons and a system tray with weather and time information.

inside of the child class's `.speak()` using the same arguments that you passed to `JackRussellTerrier.speak()`.

You can access the parent class from inside a method of a child class by using `super()`:

```
Python
class JackRussellTerrier(Dog):
    def speak(self, sound="Arf"):
        return super().speak(sound)
```

When you call `super().speak(sound)` inside `JackRussellTerrier`, Python searches the parent class, `Dog`, for a `.speak()` method and calls it with the variable `sound`.

Update `dog.py` with the new `JackRussellTerrier` class. Save the file and press `F5` so you can test it in the interactive window:

```
Python
>>> miles = JackRussellTerrier("Miles", 4)
>>> miles.speak()
'Miles barks: Arf'
```

Now when you call `miles.speak()`, you'll see output reflecting the new formatting in the class.

Table of Contents

- What Is Object-Oriented Programming in Python?
- Define a Class in Python
- Instantiate an Object in Python
- **Inherit From Other Classes in Python**
- Conclusion

Mark as Completed

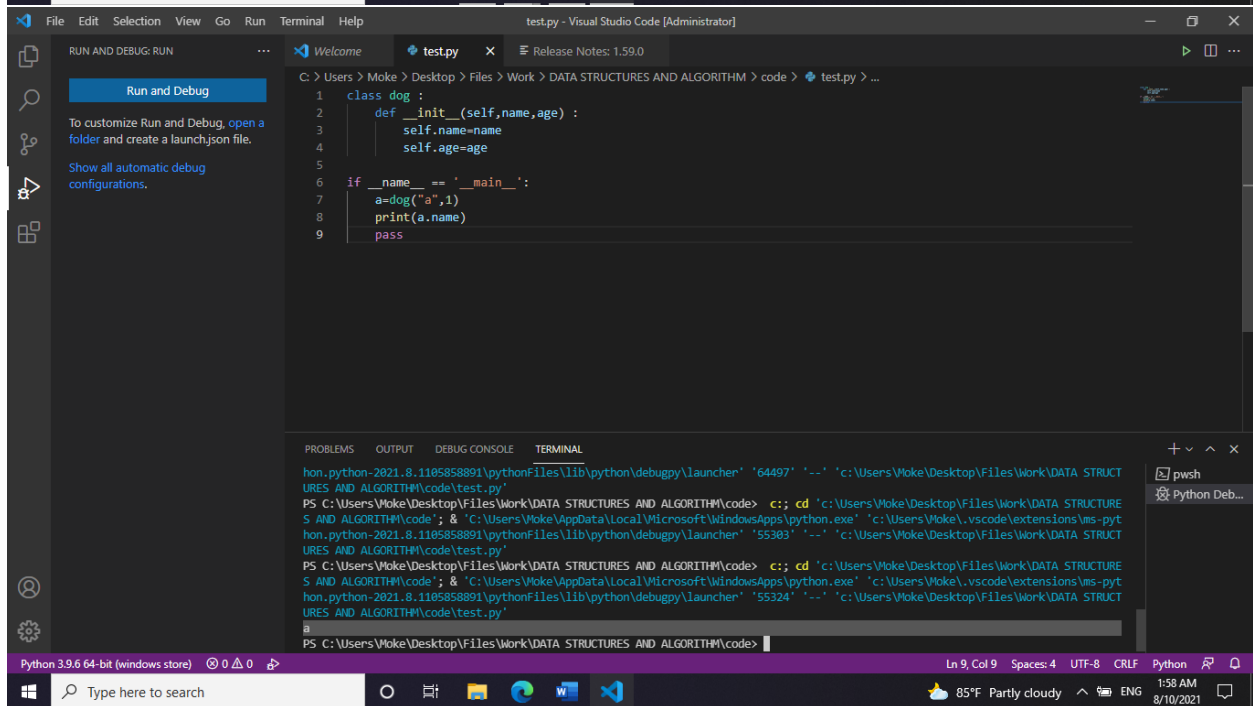
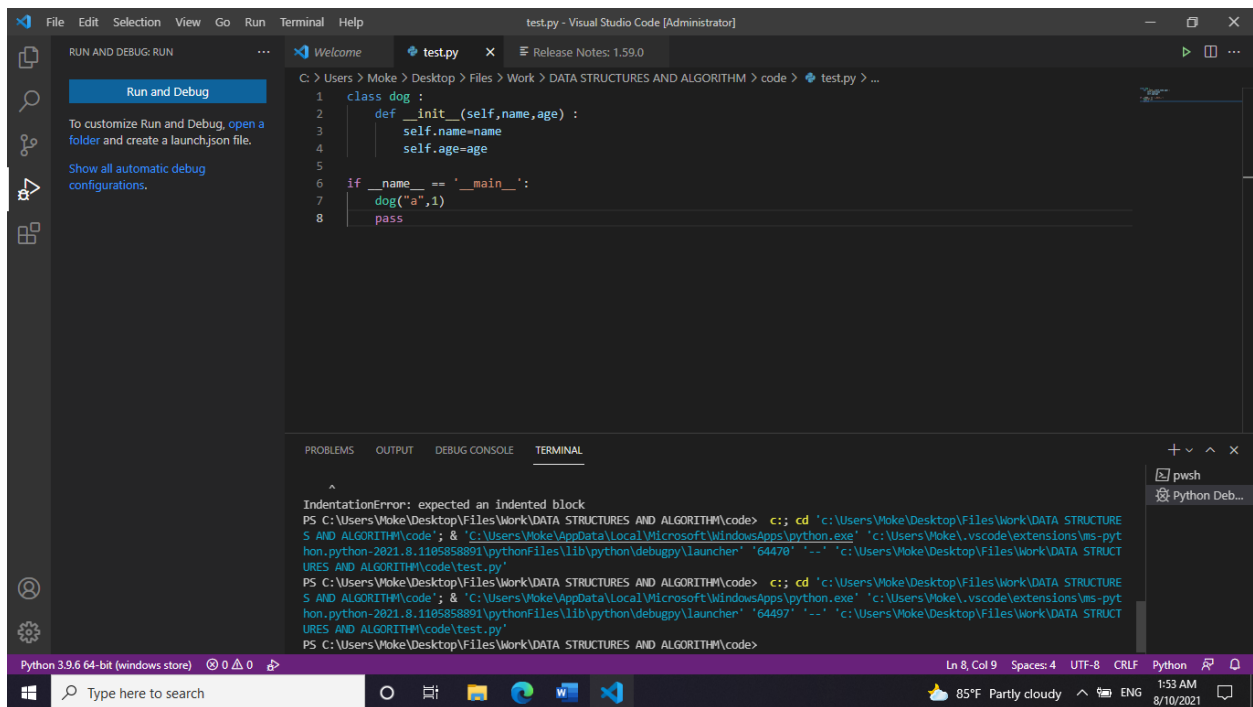
Recommended Video Course
Intro to Object-Oriented Programming (OOP) in Python

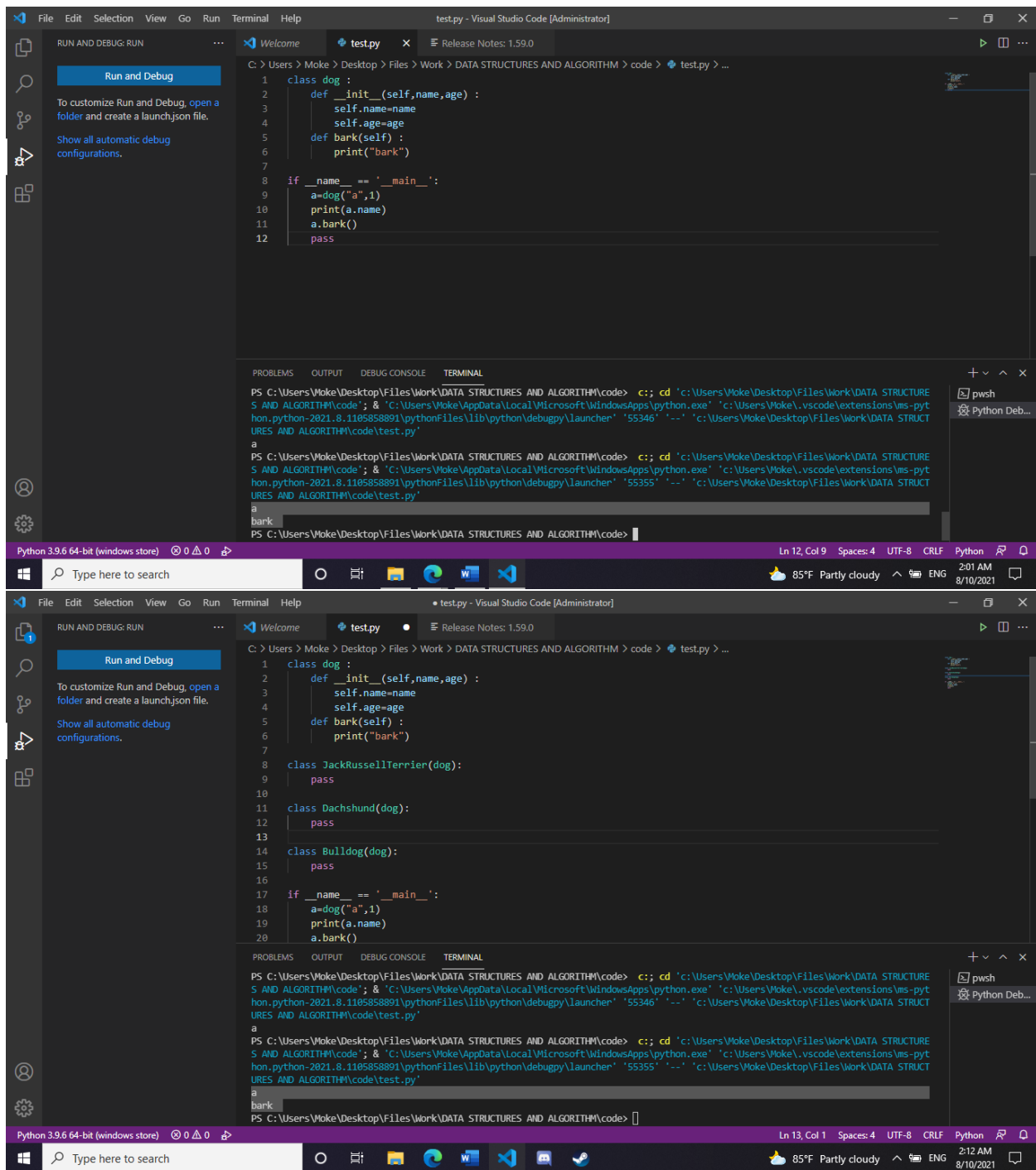
Improve Your Python

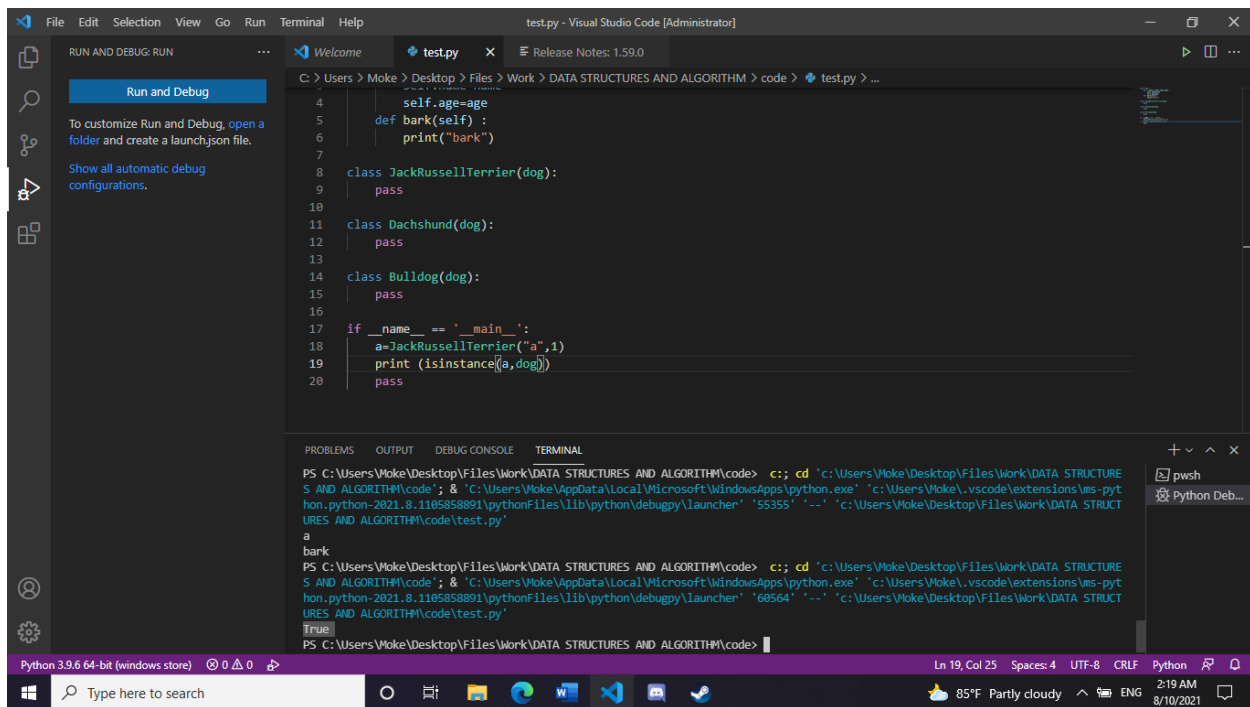
Keyword super

การใช้ keyword super จะช่วยให้เข้าถึง Attributes และ Methods ใน Parent Class ได้

ทดลองใช้ใน Visual Studio Code







ลองทำโจทย์ในHackerRank

Classes: Dealing with Complex N

https://www.hackerrank.com/challenges/class-1-dealing-with-complex-numbers/problem

You have earned 20.00 points!
You are now 95 points away from the 4th star for your python badge.

14%

125/220

Congratulations
You solved this challenge. Would you like to challenge your friends?
[Next Challenge](#)

Earn a certificate in Python
Kudos on your progress! Take the HackerRank Skills Certification test and enrich your profile
[Get Certified](#)

Test case 0

Test case 1

Test case 2

Test case 3

Test case 4

Test case 5

Compiler Message

Success

Input (stdin)

1	2	1
2	5	6

Expected Output

1	7.00+7.00i
2	-3.00-5.00i

Class 2 - Find the Torsional Angle

https://www.hackerrank.com/challenges/class-2-find-the-torsional-angle/problem

You have earned 20.00 points!
You are now 75 points away from the 4th star for your python badge.

32%

145/220

Congratulations
You solved this challenge. Would you like to challenge your friends?
[Next Challenge](#)

Test case 0

Test case 1

Test case 2

Test case 3

Test case 4

Test case 5

Compiler Message

Success

Input (stdin)

1	0	4	5
2	1	7	6
3	0	5	9
4	1	7	2

Expected Output