Variables and Data Types

What is a variable?

A named place in a computer's memory to store data

Can later retrieve or change the data
using the variable's name

Declaring variables

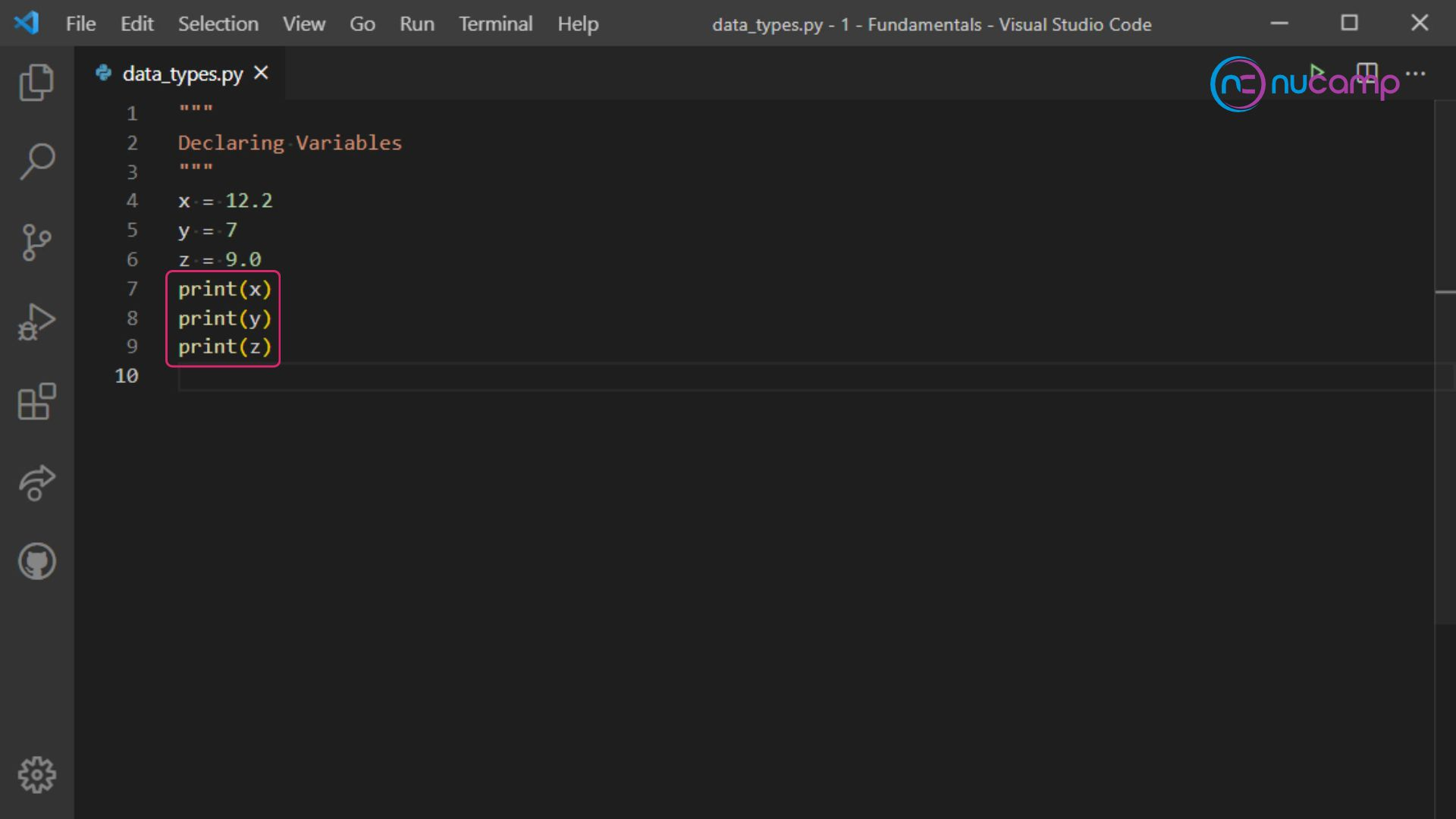
In Python, we use an assignment statement to declare a variable in this general format:

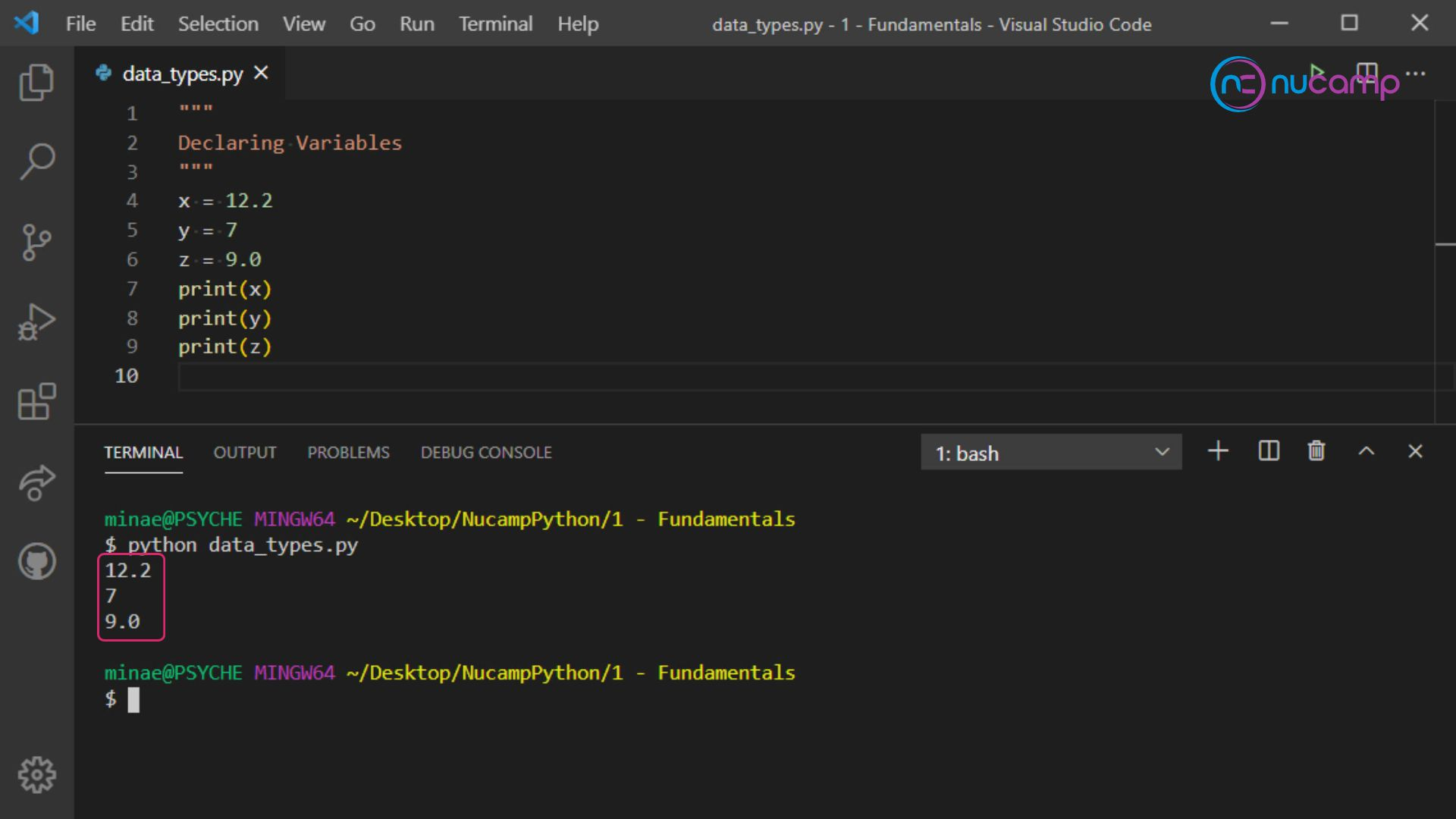
```
variable = expression
```

```
x = 3
```

Declaring variables


```
"""
Improper way of declaring variables
"""
1x = 123         # Improper way of declaring variables. Cannot begin with a digit
bob#-2 = "bob"   # Variable names can only use letters, digits, or underscores
```


File Edit Selection View Go Run Terminal Help
data_types.py - 1 - Fundamentals - Visual Studio Code
data_types.py
nucamp
"""
Declaring Variables
"""
x = 12.2
y = 7
z = 9.0
print(x)
print(y)
print(z)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TERMINAL OUTPUT PROBLEMS DEBUG CONSOLE
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minae@PSYCHE MINGW64 ~/Desktop/NucampPython/1 - Fundamentals
$ python data_types.py
12.2
7
9.0
minae@PSYCHE MINGW64 ~/Desktop/NucampPython/1 - Fundamentals
$

Primitive data types


```
name = "Bob"        # Storing a String value
age = 35            # Storing an Integer value
cash = 100.25       # Storing a Float value
retired = False     # Storing a Boolean value
```

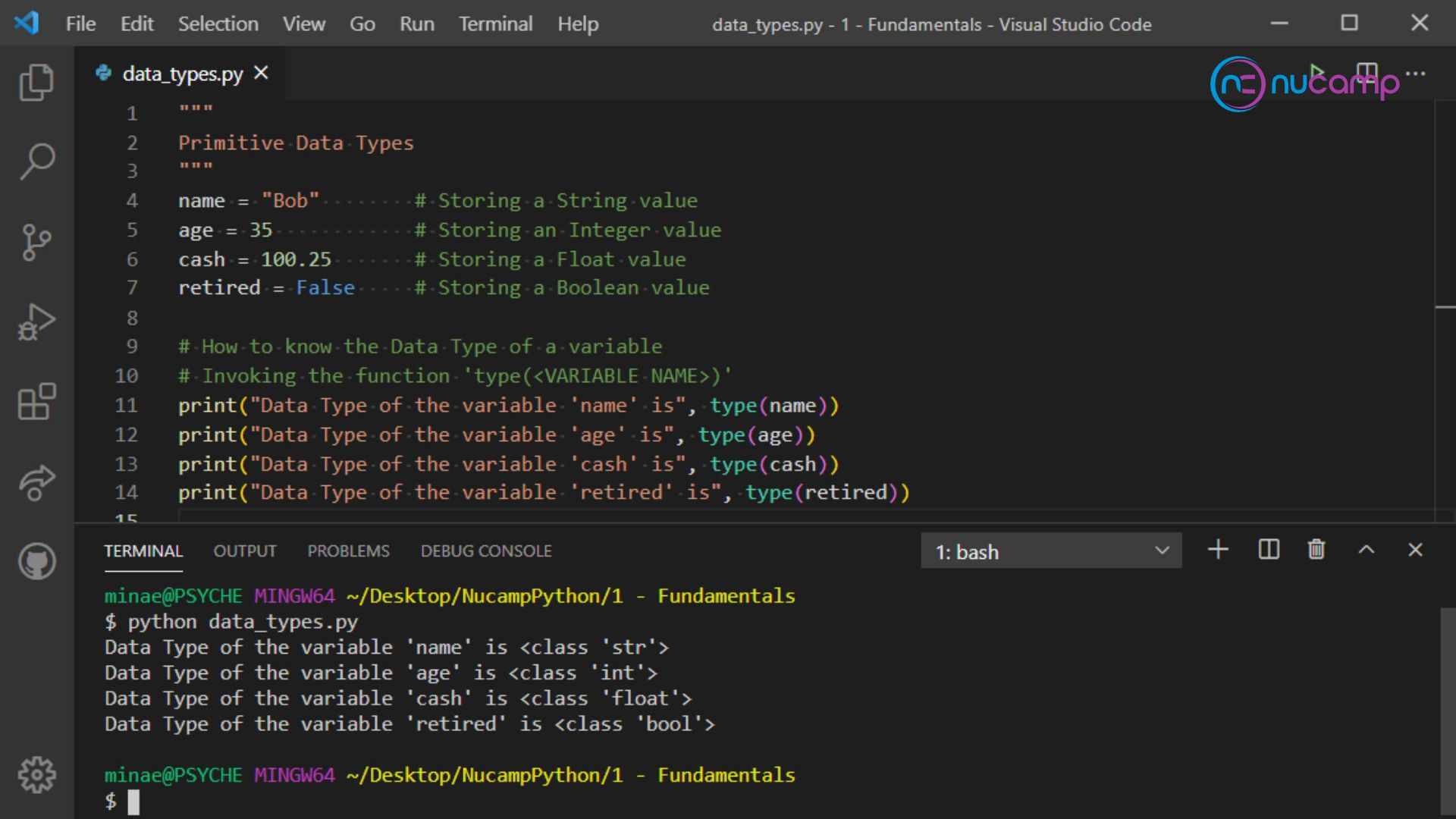
4 primitive (basic) data types in Python: Integer, Float, String, Boolean

An **Integer** is any whole number

A **String** is a sequence of characters enclosed in quotes (single or double)

A **Float** is any decimal number

A **Boolean** is a special value that can only be True or False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nucamp
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Primitive Data Types
"""
name = "Bob" # Storing a String value
age = 35 # Storing an Integer value
cash = 100.25 # Storing a Float value
retired = False # Storing a Boolean value
# How to know the Data Type of a variable
# Invoking the function 'type(<VARIABLE NAME>)'
print("Data Type of the variable 'name' is", type(name))
print("Data Type of the variable 'age' is", type(age))
print("Data Type of the variable 'cash' is", type(cash))
print("Data Type of the variable 'retired' is", type(retired))
TERMINAL OUTPUT PROBLEMS DEBUG CONSOLE
1: bash
minae@PSYCHE MINGW64 ~/Desktop/NucampPython/1 - Fundamentals
$ python data_types.py
Data Type of the variable 'name' is <class 'str'>
Data Type of the variable 'age' is <class 'int'>
Data Type of the variable 'cash' is <class 'float'>
Data Type of the variable 'retired' is <class 'bool'>
minae@PSYCHE MINGW64 ~/Desktop/NucampPython/1 - Fundamentals
$

Composite data types


```
nucamp_locations = ["Seattle", "Tacoma", "Bellevue"]                    # List
Bob_Info = {"name": "Bob", "age": 35, "cash": 100.25, "retired": False} # Dictionary
my_tuple = ("apple", "banana", "cherry")                                # Tuple
my_set = {"cats", "dogs", "birds"}                                      # Set
```

Data structures composed of one or more items stored in a single variable

Items can be of different data types and are comma separated

List: Ordered sequence of multiple values

Tuple: Similar to a list, but immutable

Dictionary: Unordered collection of key-value pairs

Set: Unordered collection of immutable, unique values

data_types.py

```
"""
Composite Data Types
"""
nucamp_locations = ["Seattle", "Tacoma", "Bellevue"]                    # Storing a List
Bob_Info = {"name": "Bob", "age": 35, "cash": 100.25, "retired": False}  # Storing a Dictionary
my_tuple = ("apple", "banana", "cherry")                                # Storing a Tuple
my_set = {"cats", "dogs", "birds"}                                      # Storing a Set

print("Data Type of the variable 'nucamp_locations' is", type(nucamp_locations))
print("Data Type of the variable 'Bob' is", type(Bob_Info))
print("Data Type of the variable 'my_tuple' is", type(my_tuple))
print("Data Type of the variable 'my_set' is", type(my_set))

```

TERMINAL OUTPUT PROBLEMS DEBUG CONSOLE 1: bash

```
minae@PSYCHE MINGW64 ~/Desktop/NucampPython/1 - Fundamentals
$ python data_types.py
Data Type of the variable 'nucamp_locations' is <class 'list'>
Data Type of the variable 'Bob' is <class 'dict'>
Data Type of the variable 'my_tuple' is <class 'tuple'>
Data Type of the variable 'my_set' is <class 'set'>

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```

Comments


```
# The "#" symbol is a way to cause a line to be ignored when the program is run

"""
For multi-line comments,
surround the text with triple quotes
"""
```

As programs get bigger and more complicated, they get more difficult to read

Comments let you write notes in your code that are ignored at program execution

They can be used to temporarily disable some code for testing

Comments


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# The "#" symbol is a way to cause a line to be ignored when the program is run

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For multi-line comments,
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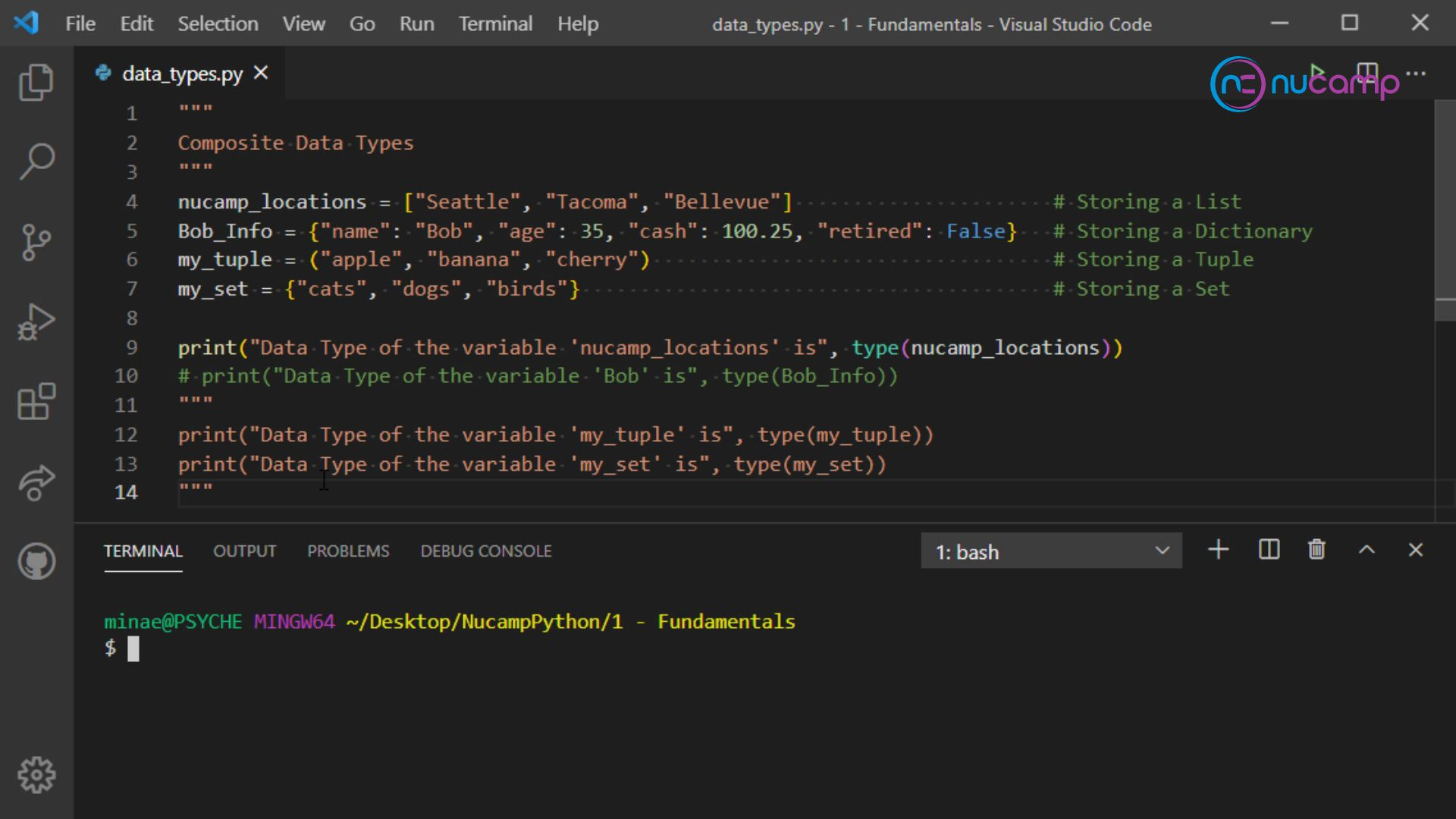
Create a single-line comment by using a # - all following text on that line will be ignored

Create a multi-line comment by surrounding the text you want to "comment out" with a pair of three quotes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nucamp
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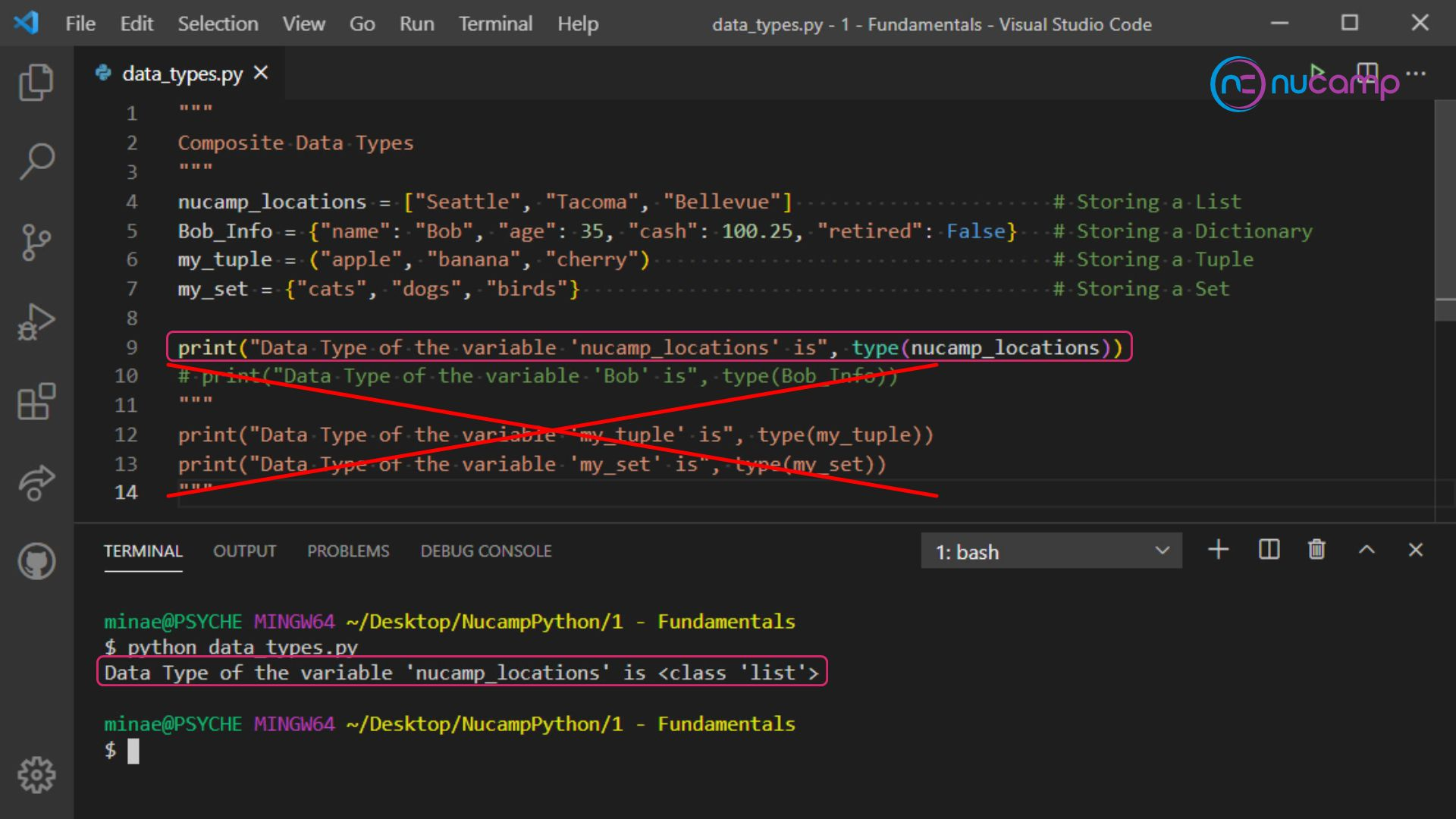
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