

# Hands-on Lab: Unit Testing



## Unit Testing Lab

**Estimated time needed: 30 minutes**

## Objectives

After completing this lab you will be able to:

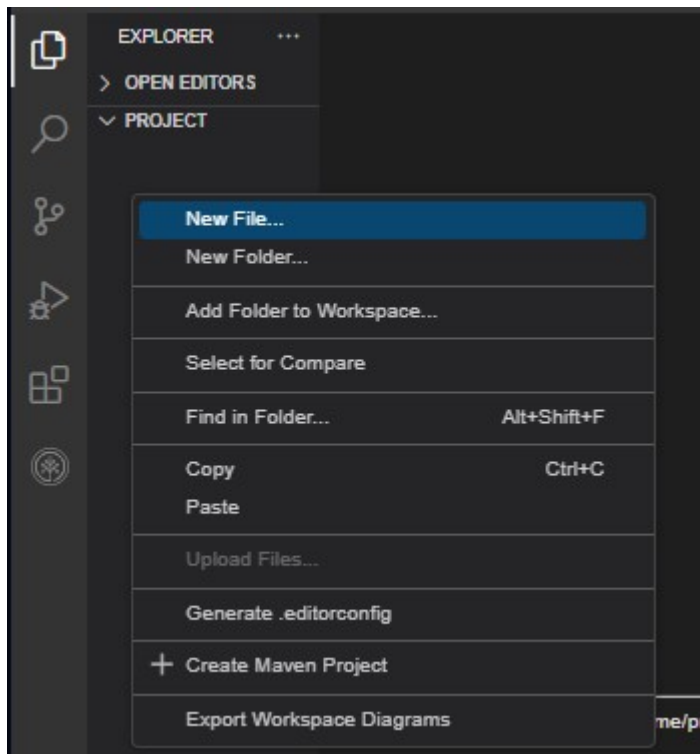
- Write unit tests to test a function.
- Run unit tests and interpret the results.

## About the lab environment

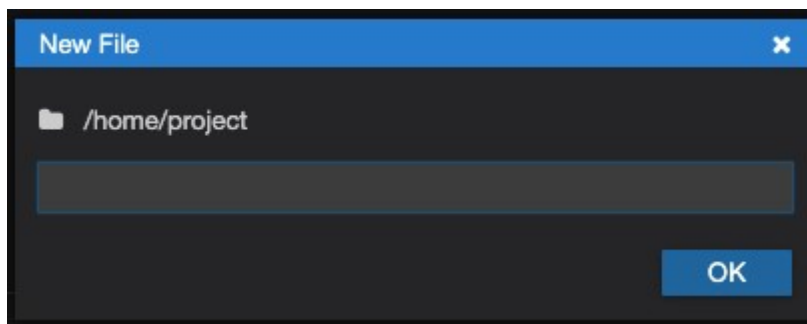
Cloud IDE is an open-source IDE(Integrated Development Environment), that can be run on desktop or on cloud. You will be using the Cloud IDE to do this lab. When you log into the Cloud IDE environment, you are presented with a 'dedicated computer on the cloud' exclusively for you. This is available to you as long as you work on the labs. Once you log off, this 'dedicated computer on the cloud' is deleted along with any files you may have created. So, it is a good idea to finish your labs in a single session. If you finish part of the lab and return to the Theia lab later, you may have to start from the beginning. Plan to work out all your Theia labs when you have the time to finish the complete lab in a single session.

## Create a new python file named mymodule.py

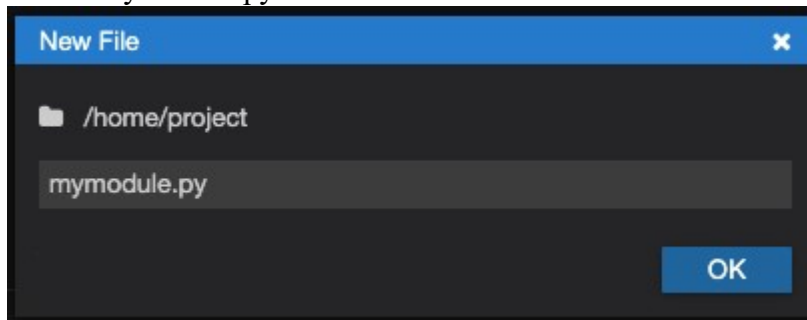
On the window, Right click on the **Explorer** and select **New File** option, as shown in the image below.



A pop up appears with title **New File**, as shown in the image below.



Enter “mymodule.py” as the file name and click **OK**.



A file “mymodule.py” will be created for you.

You are now ready to add code to mymodule.py

Copy and paste the below code into mymodule.py

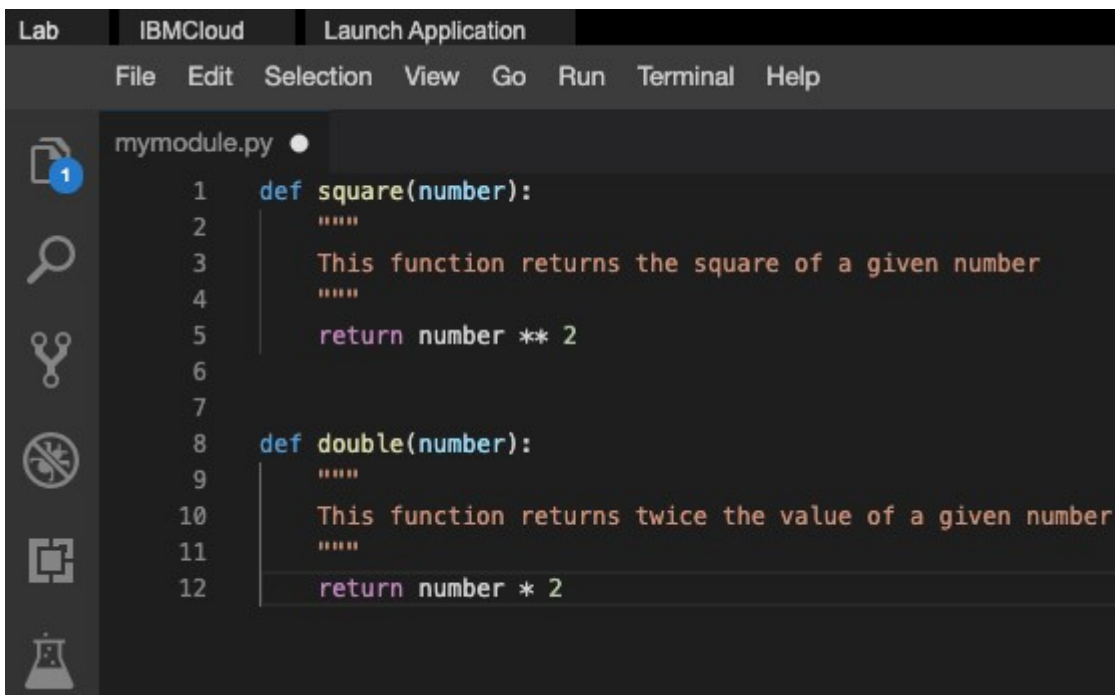
1. 1
2. 2
3. 3
4. 4
5. 5
6. 6
7. 7
8. 8

```
9. 9
10. 10
11. 11

1. def square(number):
2.     """
3.     This function returns the square of a given number
4.     """
5.     return number ** 2
6.
7. def double(number):
8.     """
9.     This function returns twice the value of a given number
10.    """
11.    return number * 2
```

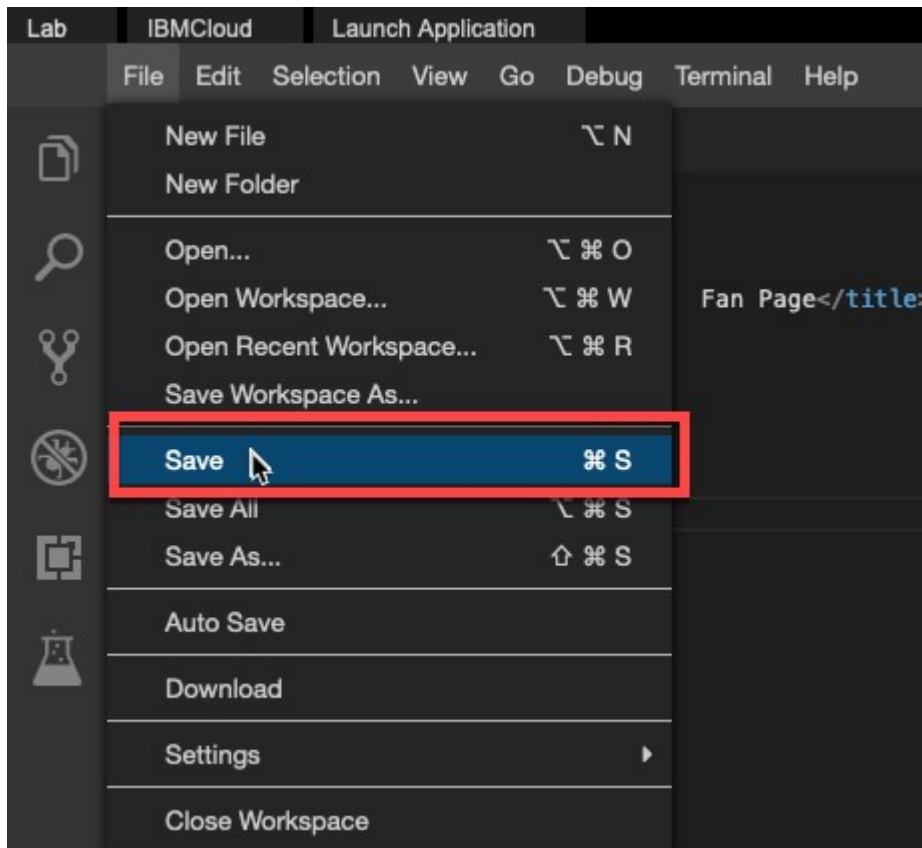
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You should see a screen like this now.

The screenshot shows the IBM Cloud Launch Application interface. At the top, there are tabs for 'Lab', 'IBMCloud', and 'Launch Application'. Below these is a menu bar with 'File', 'Edit', 'Selection', 'View', 'Go', 'Run', 'Terminal', and 'Help'. On the left side, there is a sidebar with icons for file management, search, and other tools. The main area is a code editor showing a file named 'mymodule.py'. The code in the editor is as follows:

```
1  def square(number):
2      """
3      This function returns the square of a given number
4      """
5      return number ** 2
6
7
8  def double(number):
9      """
10     This function returns twice the value of a given number
11     """
12     return number * 2
```

Save the file by using the Save option in the File Menu.



## Write Unit Tests

### Write the unit tests for square function

Let us write test cases for these three scenarios.

- When 2 is given as input the output must be 4.
- When 3.0 is given as input the output must be 9.0.
- When -3 is given as input the output must not be -9.

### Write the unit tests for double function

Let us write test cases for these three scenarios.

- When 2 is given as input the output must be 4.
- When -3.1 is given as input the output must be -6.2.
- When 0 is given as input the output must be 0.

### Create a new file and name it as test\_mymodule.py

Copy and paste the below code into test\_mymodule.py

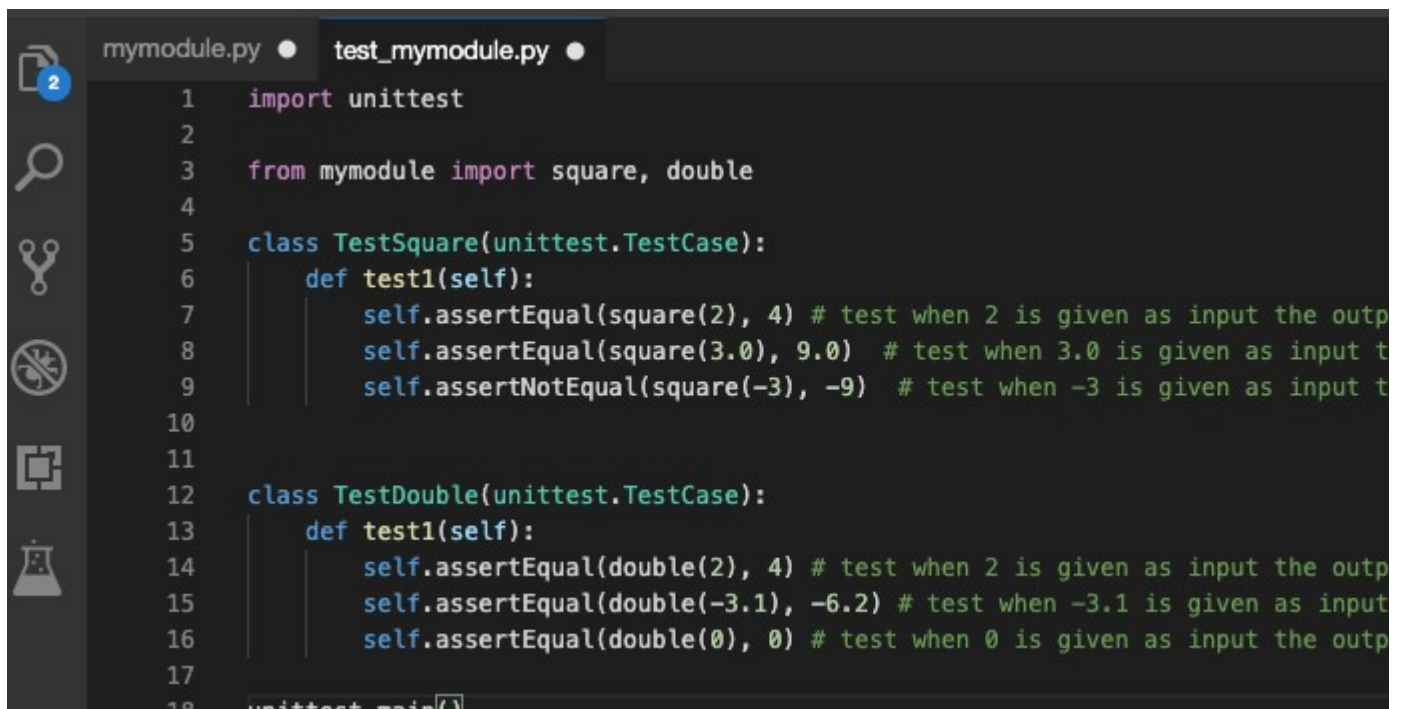
- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.

```
8. 8
9. 9
10. 10
11. 11
12. 12
13. 13
14. 14
15. 15
16. 16
17. 17
18. 18
```

```
1. import unittest
2.
3. from mymodule import square, double
4.
5. class TestSquare(unittest.TestCase):
6.     def test1(self):
7.         self.assertEqual(square(2), 4) # test when 2 is given as input the output is 4.
8.         self.assertEqual(square(3.0), 9.0) # test when 3.0 is given as input the output is
9.         self.assertNotEqual(square(-3), -9) # test when -3 is given as input the output is
10.
11.
12. class TestDouble(unittest.TestCase):
13.     def test1(self):
14.         self.assertEqual(double(2), 4) # test when 2 is given as input the output is 4.
15.         self.assertEqual(double(-3.1), -6.2) # test when -3.1 is given as input the output
16.         self.assertEqual(double(0), 0) # test when 0 is given as input the output is 0.
17.
18. unittest.main()
```

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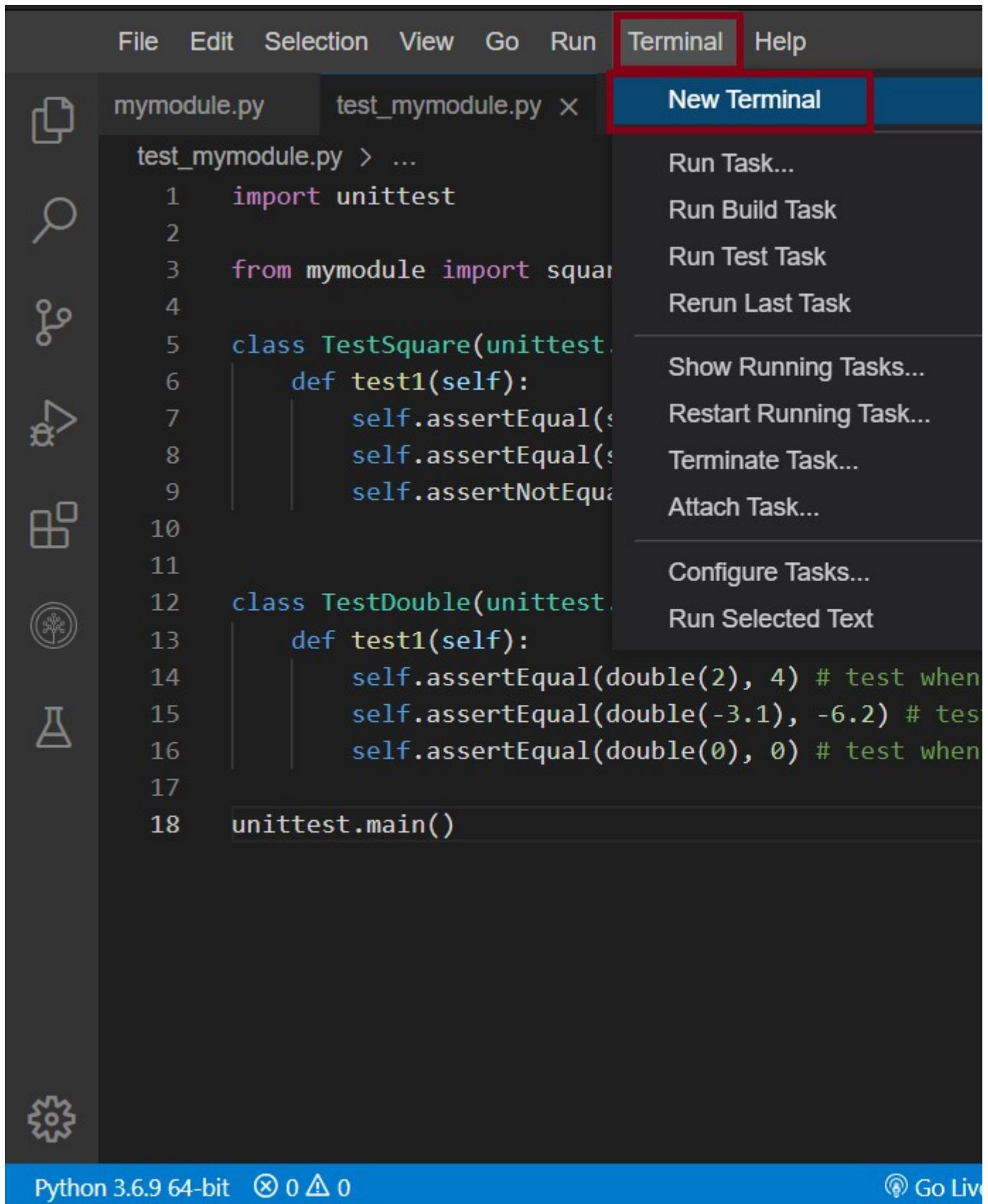
You should see a screen like this now.



```
mymodule.py • test_mymodule.py •
1  import unittest
2
3  from mymodule import square, double
4
5  class TestSquare(unittest.TestCase):
6      def test1(self):
7          self.assertEqual(square(2), 4) # test when 2 is given as input the outp
8          self.assertEqual(square(3.0), 9.0) # test when 3.0 is given as input t
9          self.assertNotEqual(square(-3), -9) # test when -3 is given as input t
10
11
12  class TestDouble(unittest.TestCase):
13      def test1(self):
14          self.assertEqual(double(2), 4) # test when 2 is given as input the outp
15          self.assertEqual(double(-3.1), -6.2) # test when -3.1 is given as input
16          self.assertEqual(double(0), 0) # test when 0 is given as input the outp
17
18  unittest.main()
```

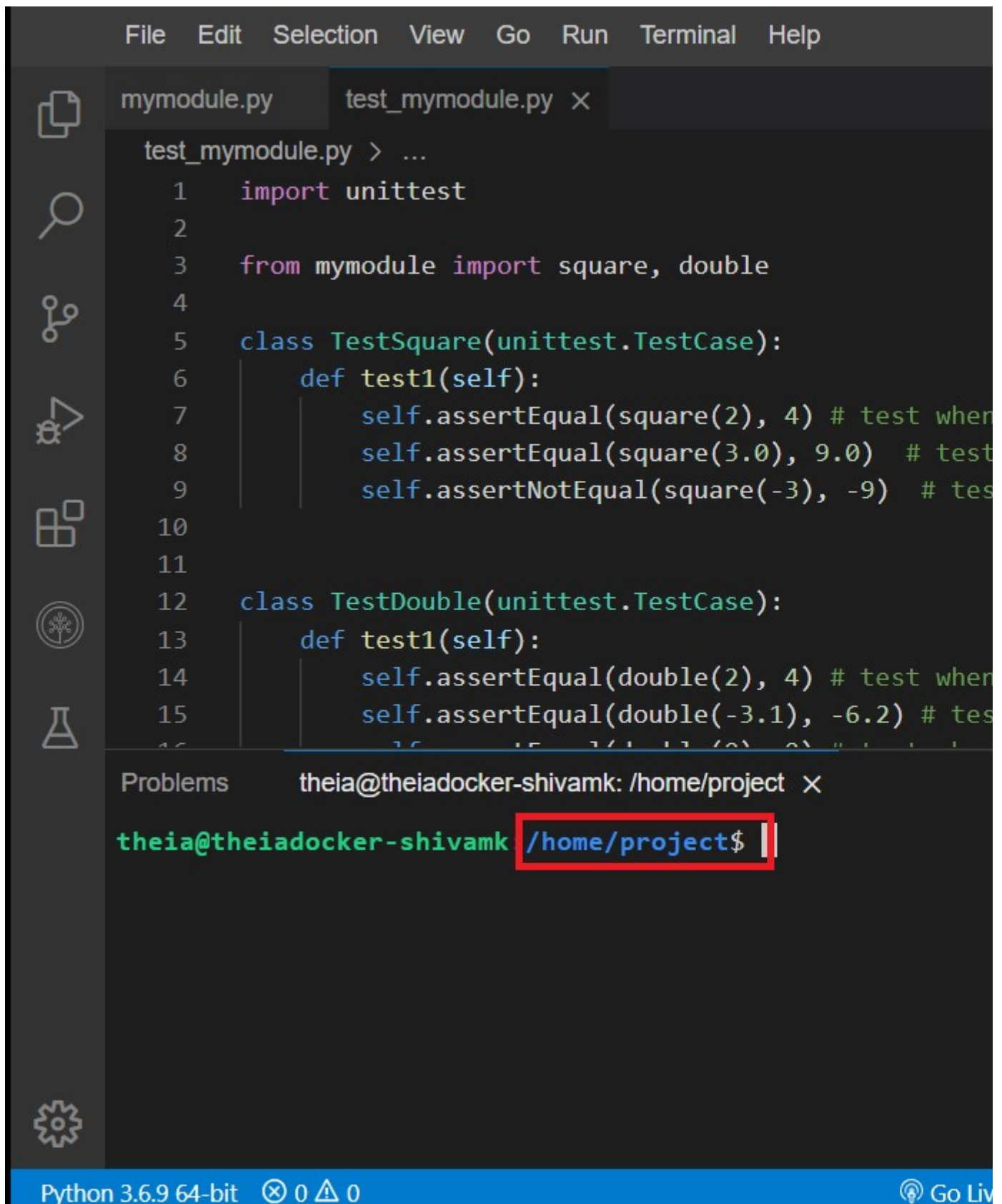
## Run tests

To run tests, click on the “Terminal” and then click on the “New Terminal”



It will open the terminal





The screenshot shows a code editor with a dark theme. The top menu bar includes File, Edit, Selection, View, Go, Run, Terminal, and Help. The editor has two tabs: `mymodule.py` and `test_mymodule.py`. The `test_mymodule.py` file is open, showing a Python script that uses `unittest` to test a module named `mymodule`. The script defines two test classes: `TestSquare` and `TestDouble`, each with a `test1` method. The `TestSquare` class tests the `square` function, and the `TestDouble` class tests the `double` function. The terminal window at the bottom shows the command prompt `theia@theiadocker-shivamk: /home/project` and the command `python3 test_mymodule.py` being executed. The terminal output shows the command being run and the resulting output.

```
File Edit Selection View Go Run Terminal Help

mymodule.py test_mymodule.py x

test_mymodule.py > ...
1  import unittest
2
3  from mymodule import square, double
4
5  class TestSquare(unittest.TestCase):
6      def test1(self):
7          self.assertEqual(square(2), 4) # test when
8          self.assertEqual(square(3.0), 9.0) # test
9          self.assertNotEqual(square(-3), -9) # tes
10
11
12  class TestDouble(unittest.TestCase):
13      def test1(self):
14          self.assertEqual(double(2), 4) # test when
15          self.assertEqual(double(-3.1), -6.2) # tes
16

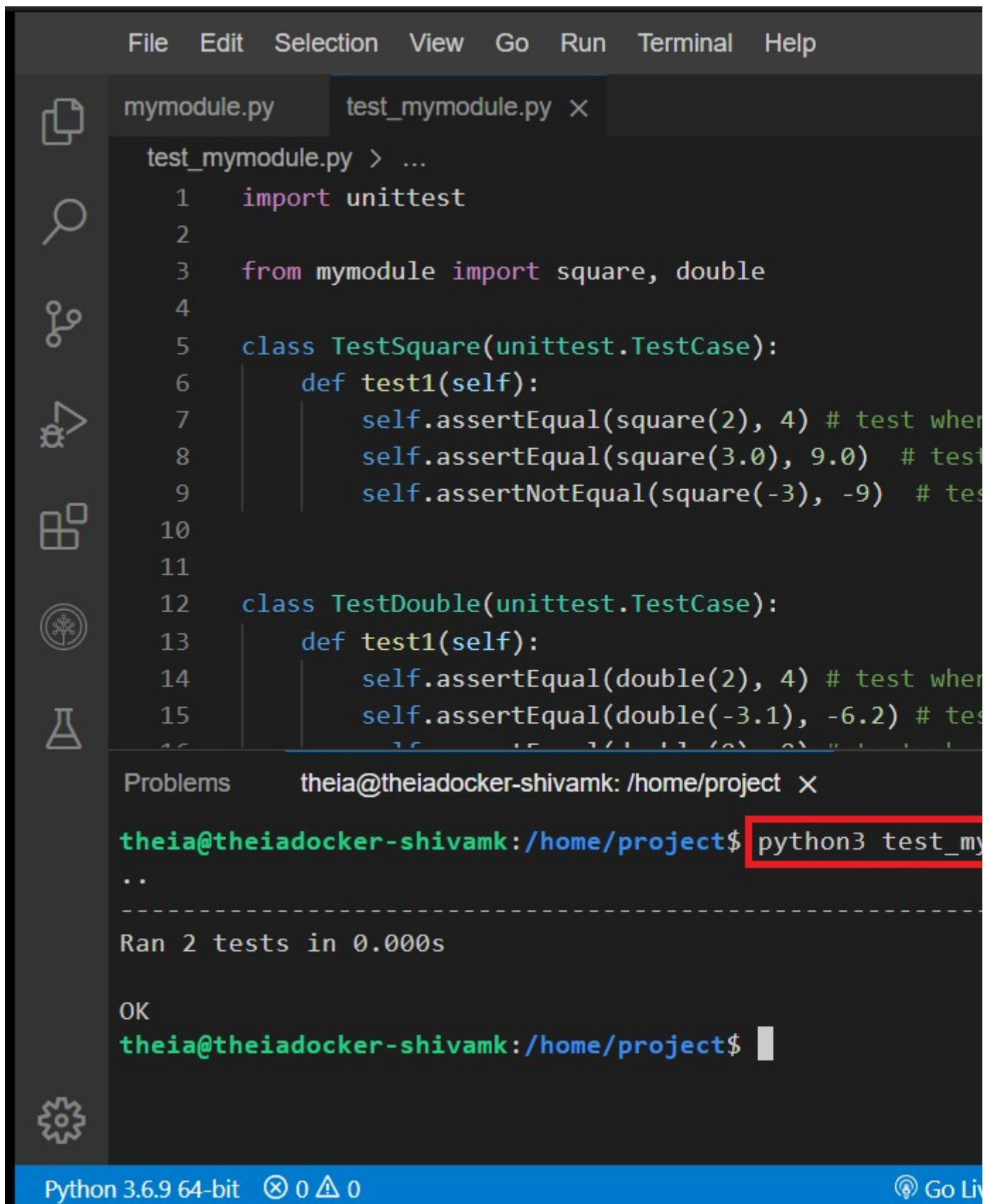
Problems theia@theiadocker-shivamk: /home/project x

theia@theiadocker-shivamk /home/project$
```

Python 3.6.9 64-bit 0 0 Go Live

Run command `python3 test_mymodule.py` and this will run the tests.

You should see a screen like this now.



```
File Edit Selection View Go Run Terminal Help

test_mymodule.py > ...
1 import unittest
2
3 from mymodule import square, double
4
5 class TestSquare(unittest.TestCase):
6     def test1(self):
7         self.assertEqual(square(2), 4) # test when
8         self.assertEqual(square(3.0), 9.0) # test
9         self.assertNotEqual(square(-3), -9) # tes
10
11
12 class TestDouble(unittest.TestCase):
13     def test1(self):
14         self.assertEqual(double(2), 4) # test when
15         self.assertEqual(double(-3.1), -6.2) # tes
16
```

Problems theia@theiadocker-shivamk: /home/project x

```
theia@theiadocker-shivamk:/home/project$ python3 test_my
..
-----
Ran 2 tests in 0.000s

OK
theia@theiadocker-shivamk:/home/project$
```

Python 3.6.9 64-bit 0 0 Go Live

An OK in the last line indicates that all tests passed successfully.

FAILED in the last line indicates that at least one test has failed, and python prints which test or tests failed.

## Write unit tests for the given function

Here is a function that accepts two arguments and returns their sum.



Copy and paste the below code into mymodule.py and the save the file.

```
1. 1
2. 2
3. 3
4. 4
5. 5

1. def add(a,b):
2.     """
3.     This function returns the sum of the given numbers
4.     """
5.     return a + b
```

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- When 2 and 4 are given as input the output must be 6.
- When 0 and 0 are given as input the output must be 0.
- When 2.3 and 3.6 are given as input the output must be 5.9.
- When the strings 'hello' and 'world' are given as input the output must be 'helloworld'.
- When 2.3000 and 4.300 are given as input the output must be 6.6.
- When -2 and -2 are given as input the output must **not** be 0. (Hint : Use assertNotEqual)

## Author(s)

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## Other Contributors

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