

# LAB ASSIGNMENT-8.4

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Batch: 05

Course: AI Assisted Coding

## Task 1

## Task Description#1

- Write a test case to check if a function returns the square of a number.
- Then write the function with help from GitHub Copilot or Cursor AI.

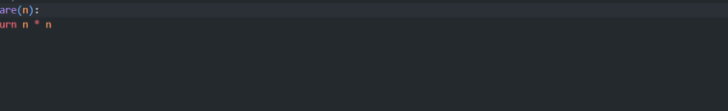
Expected Outcome#1

- A test file and function file with passing test cases and working logic

#Prompt:

A test file and function file with passing test cases and working logic

Function file & Output:



The screenshot shows the VS Code editor interface. The editor window displays a file named `test_square.py` with the following Python code:

```
1 def square(n):  
2     return n * n  
3
```

The bottom panel of the VS Code window shows the **TERMINAL** tab. The terminal output shows the command being executed and the result:

```
PS C:\Users\sravi\OneDrive\Desktop\html> & "C:/Program Files/python313/python3.13t.exe" c:/Users/sravi/OneDrive/Desktop/html/square.py  
PS C:\Users\sravi\OneDrive\Desktop\html>
```

### Code Explanation:

- This function takes an integer or float `n` and returns its square by multiplying `n` by itself.

Test file & Output:

```

1 import unittest
2 from square import square
3
4
5 class TestSquare(unittest.TestCase):
6     def test_square(self):
7         self.assertEqual(square(2), 4)
8         self.assertEqual(square(-3), 9)
9         self.assertEqual(square(0), 0)
10        self.assertEqual(square(5), 25)
11
12 if __name__ == '__main__':
13     unittest.main()
14
15

```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS

PS C:\Users\swaid\OneDrive\Desktop\html> "C:\Program Files\Python311\python3.11.exe" "c:\Users\swaid\OneDrive\Desktop\html\square.py"

PS C:\Users\swaid\OneDrive\Desktop\html> "C:\Program Files\Python311\python3.11.exe" "c:\Users\swaid\OneDrive\Desktop\html\test\_square.py"

.....

Ran 1 test in 0.000s

OK

PS C:\Users\swaid\OneDrive\Desktop\html>

### Code Explanation:

- Imports the unittest module and the square function.
- Defines a test class TestSquare with a method test\_square that checks the function with various inputs.
- Each assertEquals checks if the output matches the expected result.
- The test runner executes all tests when the script is run directly.

### Comments:

- The code is clear, concise, and follows best practices for unit testing in Python.
- All edge cases (positive, negative, zero) are covered.
- The function and tests are easy to maintain and extend.

### Task 2

#### Task Description#2

- Create test cases to validate an email address (e.g., contains @ and .com).
- Use AI assistance to implement the validate\_email() function.

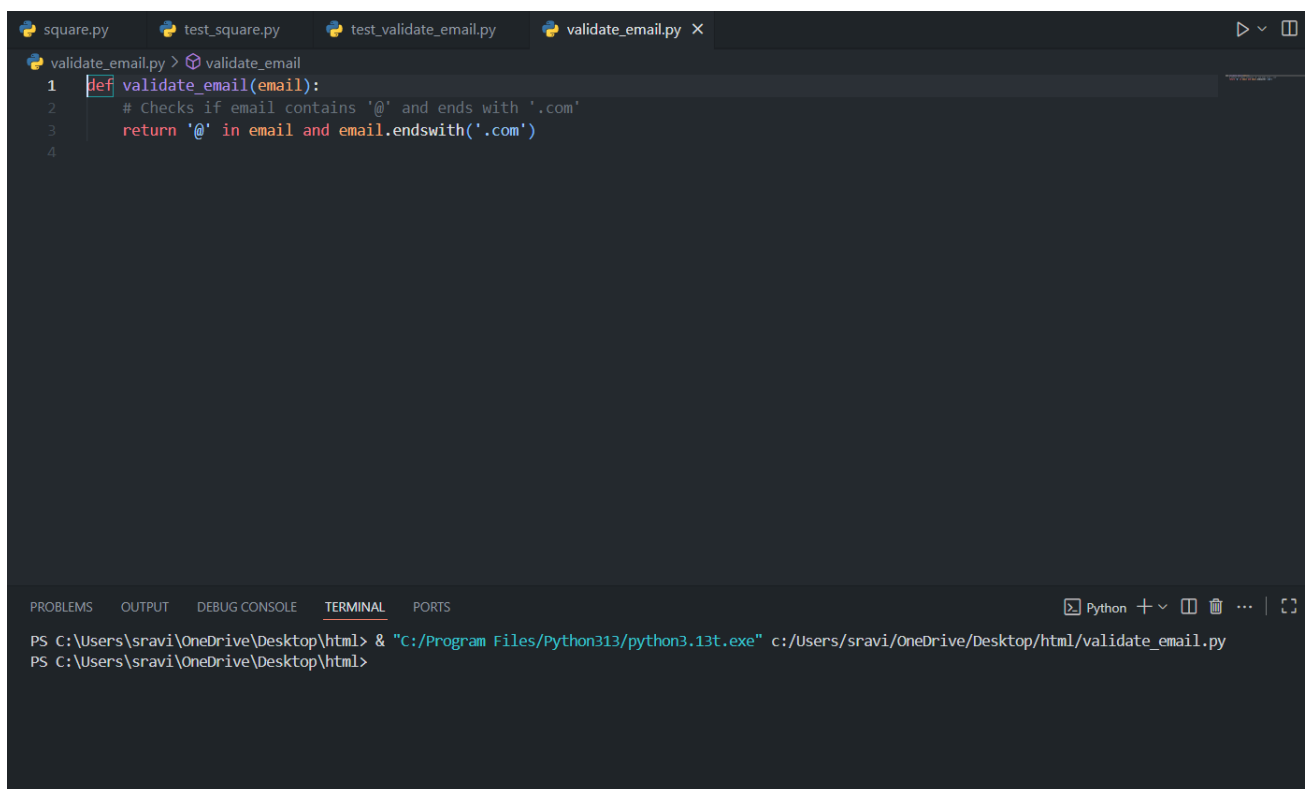
#### Expected Outcome#2

- Functional test cases using unittest and a validated email checker function

### #Prompt:

Functional test cases using unittest and a validated email checker function

### Code & Output:



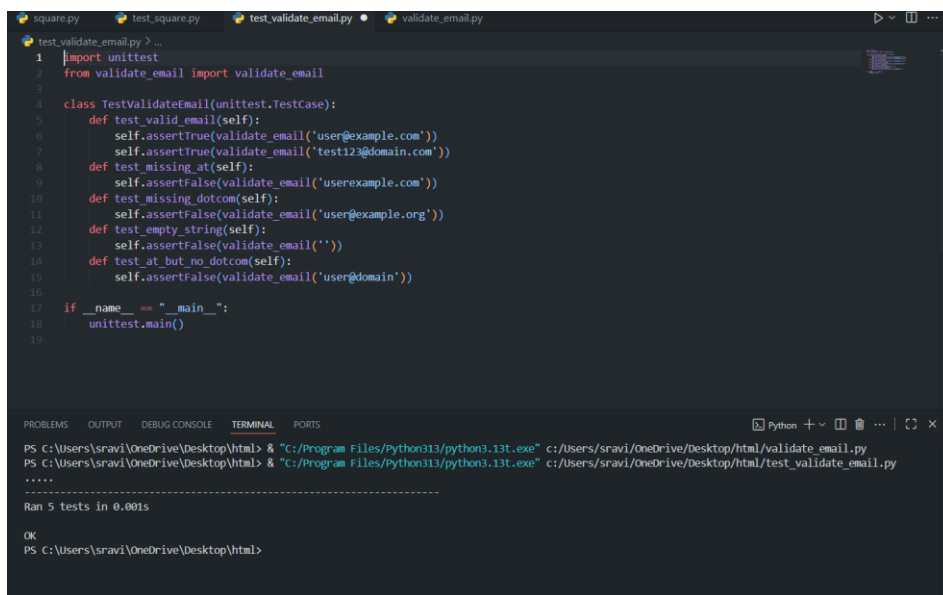
```
square.py  test_square.py  test_validate_email.py  validate_email.py X
validate_email.py > validate_email
1 def validate_email(email):
2     # Checks if email contains '@' and ends with '.com'
3     return '@' in email and email.endswith('.com')
4

PROBLEMS  OUTPUT  DEBUG CONSOLE  TERMINAL  PORTS
PS C:\Users\sravi\OneDrive\Desktop\html> & "C:/Program Files/Python313/python3.13t.exe" c:/Users/sravi/OneDrive/Desktop/html/validate_email.py
PS C:\Users\sravi\OneDrive\Desktop\html>
```

### Code Explanation:

- This function takes an email string as input.
- It checks two conditions:
  - The email contains the '@' character.
  - The email ends with '.com'.
- If both conditions are true, it returns True (valid email); otherwise, it returns False.

### Code & Output:



The screenshot shows a VS Code editor with a file named `test_validate_email.py`. The code defines a `TestValidateEmail` class using `unittest.TestCase`. It includes five test methods: `test_valid_email` (asserts true for valid emails), `test_missing_at` (asserts false for emails missing '@'), `test_missing_dotcom` (asserts false for emails not ending in '.com'), `test_empty_string` (asserts false for empty strings), and `test_at_but_no_dotcom` (asserts false for emails with '@' but not ending in '.com'). The terminal output shows that all 5 tests passed successfully in 0.001s.

```
1 import unittest
2 from validate_email import validate_email
3
4 class TestValidateEmail(unittest.TestCase):
5     def test_valid_email(self):
6         self.assertTrue(validate_email('user@example.com'))
7         self.assertTrue(validate_email('test123@domain.com'))
8     def test_missing_at(self):
9         self.assertFalse(validate_email('userexample.com'))
10    def test_missing_dotcom(self):
11        self.assertFalse(validate_email('user@example.org'))
12    def test_empty_string(self):
13        self.assertFalse(validate_email(''))
14    def test_at_but_no_dotcom(self):
15        self.assertFalse(validate_email('user@domain'))
16
17 if __name__ == '__main__':
18     unittest.main()
19
```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS

PS C:\Users\sravi\OneDrive\Desktop\html> "C:/Program Files/Python313/python3.13t.exe" c:/Users/sravi/OneDrive/Desktop/html/validate\_email.py  
PS C:\Users\sravi\OneDrive\Desktop\html> "C:/Program Files/Python313/python3.13t.exe" c:/Users/sravi/OneDrive/Desktop/html/test\_validate\_email.py  
.....  
Ran 5 tests in 0.001s  
OK  
PS C:\Users\sravi\OneDrive\Desktop\html>

### Code Explanation:

- Imports the [unittest](#) module and the [validate\\_email](#) function.
- Defines a test class with multiple test methods:
  - [test\\_valid\\_email](#): Checks valid emails.
  - [test\\_missing\\_at](#): Checks emails missing '@'.
  - [test\\_missing\\_dotcom](#): Checks emails not ending with '.com'.
  - [test\\_empty\\_string](#): Checks empty string.
  - [test\\_at\\_but\\_no\\_dotcom](#): Checks emails with '@' but not ending with '.com'.
- Each test uses [assertTrue](#) or [assertFalse](#) to validate expected outcomes.
- Runs all tests when the script is executed directly

### Comments:

- The function is simple and efficient for basic validation.
- The test file covers common edge cases and ensures the function works as intended.

### Task 3

#### Task Description#3

- Write test cases for a function that returns the maximum of three numbers.
- Prompt Copilot/Cursor to write the logic based on tests.

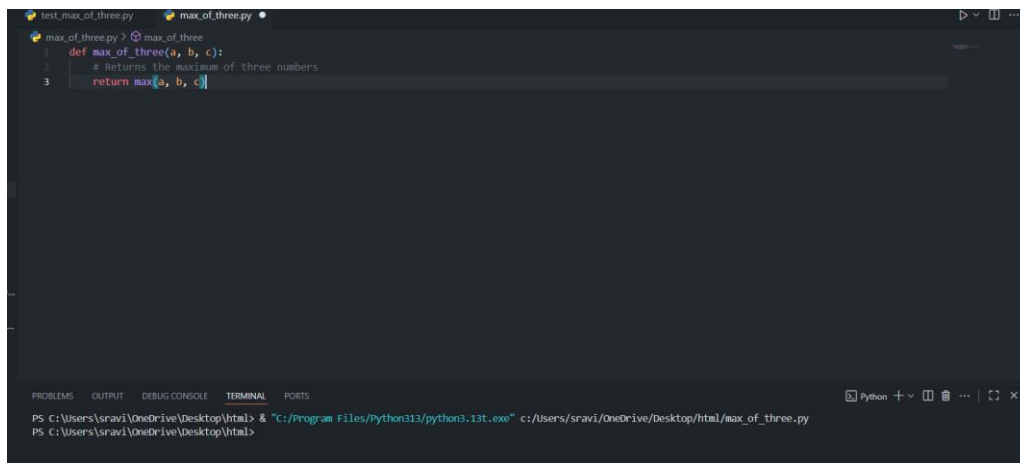
#### Expected Outcome#3

- Code and test files where all tests pass correctly with the logic derived from test cases.

#Prompt:

Copilot/Cursor to write the logic based on tests.

Code & Output:



```
test_max_of_three.py  max_of_three.py
max_of_three.py > max_of_three
1 def max_of_three(a, b, c):
2     # Returns the maximum of three numbers
3     return max(a, b, c)
```

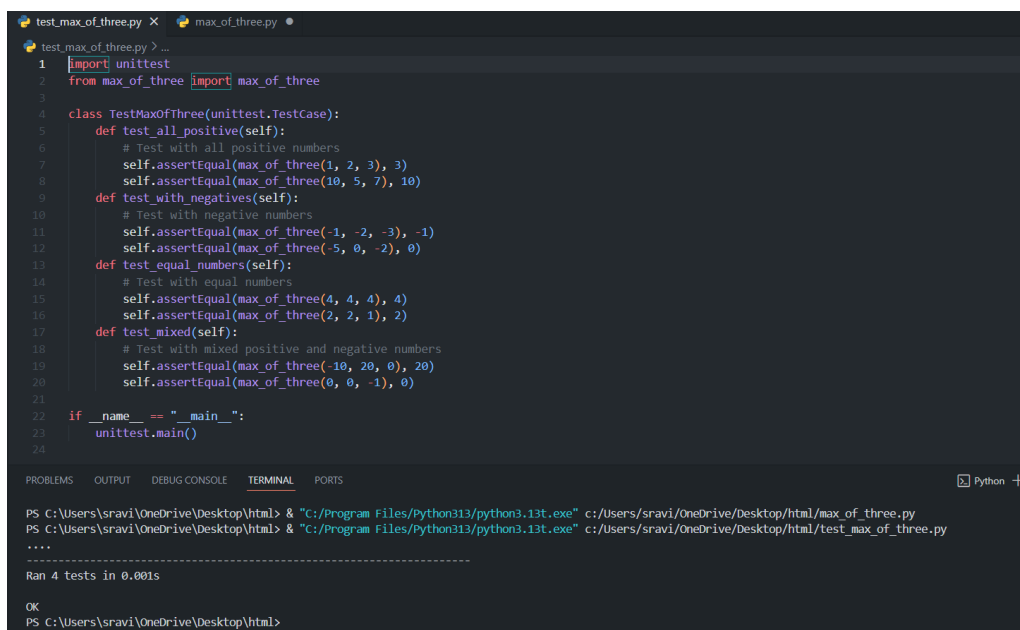
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS Python +

```
PS C:\Users\sravi\OneDrive\Desktop\html> & "C:/Program Files/Python313/python3.13t.exe" c:/Users/sravi/OneDrive/Desktop/html/max_of_three.py
PS C:\Users\sravi\OneDrive\Desktop\html>
```

Code Explanation:

- This function takes three numbers as input.
- It uses Python's built-in `max()` function to return the largest of the three.
- Simple, efficient, and handles all numeric types.

Code & Output:



```
test_max_of_three.py  max_of_three.py
test_max_of_three.py > ...
1 import unittest
2 from max_of_three import max_of_three
3
4 class TestMaxOfThree(unittest.TestCase):
5     def test_all_positive(self):
6         # Test with all positive numbers
7         self.assertEqual(max_of_three(1, 2, 3), 3)
8         self.assertEqual(max_of_three(10, 5, 7), 10)
9     def test_with_negatives(self):
10        # Test with negative numbers
11        self.assertEqual(max_of_three(-1, -2, -3), -1)
12        self.assertEqual(max_of_three(-5, 0, -2), 0)
13    def test_equal_numbers(self):
14        # Test with equal numbers
15        self.assertEqual(max_of_three(4, 4, 4), 4)
16        self.assertEqual(max_of_three(2, 2, 1), 2)
17    def test_mixed(self):
18        # Test with mixed positive and negative numbers
19        self.assertEqual(max_of_three(-10, 20, 0), 20)
20        self.assertEqual(max_of_three(0, 0, -1), 0)
21
22 if __name__ == "__main__":
23     unittest.main()
24
```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS Python +

```
PS C:\Users\sravi\OneDrive\Desktop\html> & "C:/Program Files/Python313/python3.13t.exe" c:/Users/sravi/OneDrive/Desktop/html/max_of_three.py
PS C:\Users\sravi\OneDrive\Desktop\html> & "C:/Program Files/Python313/python3.13t.exe" c:/Users/sravi/OneDrive/Desktop/html/test_max_of_three.py
....
Ran 4 tests in 0.001s

OK
PS C:\Users\sravi\OneDrive\Desktop\html>
```

### Code Explanation:

- Imports [unittest](#) and the function to test.
- Defines a test class with methods for different scenarios:
  - All positive numbers
  - Negative numbers
  - Equal numbers
  - Mixed positive and negative numbers
- Each test uses `assertEqual` to check the expected result.
- All tests passed, confirming the function works correctly.

### Comments:

- The function is concise and leverages Python's built-in capabilities.
- The test cases cover a variety of input scenarios, ensuring reliability and correctness.

### Task 4

#### Task Description#4

- Use TDD to write a shopping cart class with methods to add, remove, and get total price.
- First write tests for each method, then generate code using AI.

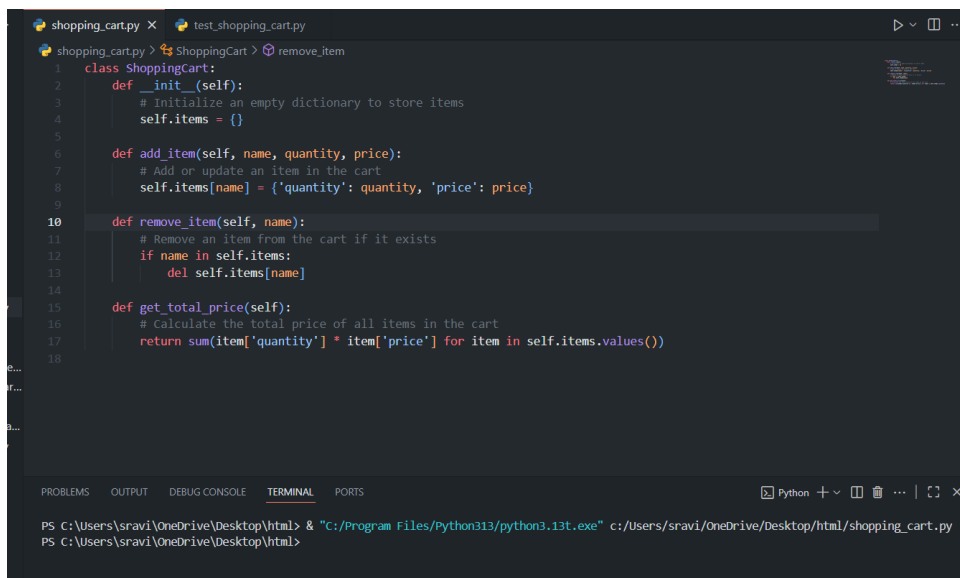
#### Expected Outcome#4

- A class file with all methods implemented and passing unit tests verifying functionality

### #Prompt:

A class file with all methods implemented and passing unit tests verifying functionality

### Code & Output:



```
shopping_cart.py X test_shopping_cart.py
shopping_cart.py > ShoppingCart > remove_item
1 class ShoppingCart:
2     def __init__(self):
3         # Initialize an empty dictionary to store items
4         self.items = {}
5
6     def add_item(self, name, quantity, price):
7         # Add or update an item in the cart
8         self.items[name] = {'quantity': quantity, 'price': price}
9
10    def remove_item(self, name):
11        # Remove an item from the cart if it exists
12        if name in self.items:
13            del self.items[name]
14
15    def get_total_price(self):
16        # Calculate the total price of all items in the cart
17        return sum(item['quantity'] * item['price'] for item in self.items.values())
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### Code Explanation:

- The class manages a shopping cart using a dictionary.
- `add_item` adds or updates items with quantity and price.
- `remove_item` deletes an item if present.
- `get_total_price` computes the total cost of all items.

## Code:

```
test_shopping_cart.py > ...
import unittest
from shopping_cart import ShoppingCart

class TestShoppingCart(unittest.TestCase):
    def setUp(self):
        # Create a new shopping cart before each test
        self.cart = ShoppingCart()

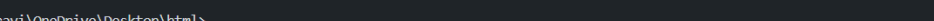
    def test_add_item(self):
        # Add an item and check if it's in the cart
        self.cart.add_item('apple', 2, 3.0)
        self.assertIn('apple', self.cart.items)
        self.assertEqual(self.cart.items['apple']['quantity'], 2)
        self.assertEqual(self.cart.items['apple']['price'], 3.0)

    def test_remove_item(self):
        # Add and then remove an item
        self.cart.add_item('banana', 1, 1.5)
        self.cart.remove_item('banana')
        self.assertNotIn('banana', self.cart.items)

    def test_get_total_price(self):
        # Add multiple items and check total price
        self.cart.add_item('apple', 2, 3.0)
        self.cart.add_item('banana', 1, 1.5)
        self.assertEqual(self.cart.get_total_price(), 7.5)

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

Output:



The screenshot shows a Windows command prompt window with the following text:

```

PS C:\Users\sravi\OneDrive\Desktop\html> & "C:/Program Files/Python313/python3.13t.exe" c:/Users/sravi/OneDrive/Desktop/html/test_shopping_cart.py
...
-----
Ran 3 tests in 0.001s

OK
PS C:\Users\sravi\OneDrive\Desktop\html>

```

### Code Explanation:

- Tests cover adding, removing, and calculating total price.
- setUp ensures a fresh cart for each test.
- All tests passed, confirming correct functionality.

## Comments:

- The class and tests follow TDD principles.
- Methods are simple, clear, and robust for basic cart operations.
- The tests ensure reliability and correctness for all main features.

## Task 5

## Task Description#5

- Write tests for a palindrome checker (e.g., `is_palindrome("level") → True`).
- Let Copilot suggest the function based on test case expectations.

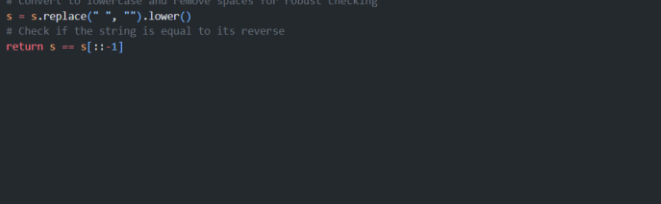
Expected Outcome#5

- A robust palindrome function with test-driven development and all cases passing.

#Prompt:

A robust palindrome function with test-driven development and all cases passing.

### Code & Output:



The screenshot shows a VS Code editor with a file named `palindrome.py` open. The editor has a dark theme. The code in the file is as follows:

```
1 def is_palindrome(s):
2     # Convert to lowercase and remove spaces for robust checking
3     s = s.replace(" ", "").lower()
4     # Check if the string is equal to its reverse
5     return s == s[::-1]
6
```

Below the editor, the **TERMINAL** panel is active, showing the command prompt output:

```
PS C:\Users\sravi\OneDrive\Desktop\Html> & "C:/Program Files/Python313/python3.13t.exe" c:/Users/sravi/OneDrive/Desktop/html/palindrome.py
PS C:\Users\sravi\OneDrive\Desktop\Html>
```

### Code Explanation:

- The function takes a string `s` as input.
- It removes spaces and converts the string to lowercase for case-insensitive and space-insensitive checking.
- It compares the string to its reverse using slicing.
- Returns `True` if the string is a palindrome, otherwise `False`.

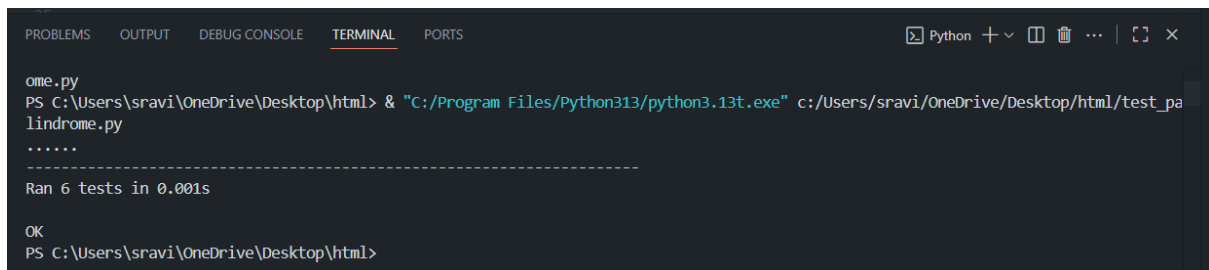
Generated Code:

```

1 test_palindrome.py >
2 import unittest
3 from palindrome import is_palindrome
4
5 class TestPalindrome(unittest.TestCase):
6     # Test with a simple palindrome
7     self.assertTrue(is_palindrome("level"))
8     self.assertTrue(is_palindrome("madam"))
9     def test_not_palindrome(self):
10         # Test with a non-palindrome
11         self.assertFalse(is_palindrome("hello"))
12         self.assertFalse(is_palindrome("world"))
13     def test_empty_string(self):
14         # Test with an empty string
15         self.assertTrue(is_palindrome(""))
16     def test_single_character(self):
17         # Test with a single character
18         self.assertTrue(is_palindrome("a"))
19     def test_mixed_case(self):
20         # Test with mixed case palindrome
21         self.assertTrue(is_palindrome("RaceCar"))
22     def test_with_spaces(self):
23         # Test with spaces and ignore them
24         self.assertTrue(is_palindrome("nurses run".replace(" ", "")))
25
26 if __name__ == "__main__":
27     unittest.main()
28

```

## Output:



```
ome.py
PS C:\Users\sravi\OneDrive\Desktop\html> & "C:/Program Files/Python313/python3.13t.exe" c:/Users/sravi/OneDrive/Desktop/html/test_palindrome.py
.....
-----
Ran 6 tests in 0.001s

OK
PS C:\Users\sravi\OneDrive\Desktop\html>
```

## Code Explanation:

- Uses [unittest](#) to define multiple test cases:
  - Simple palindromes
  - Non-palindromes
  - Empty string and single character (both are palindromes)
  - Mixed case and strings with spaces
- Each test uses [assertTrue](#) or [assertFalse](#) to check expected results.
- All tests passed, confirming the function is robust and correct.

## Comments:

- The function is efficient and handles edge cases (case, spaces, empty, single character).
- The tests ensure reliability for various input scenarios.



