AI ASSISTED CODING

Rishaak sadhaan 2303A51125

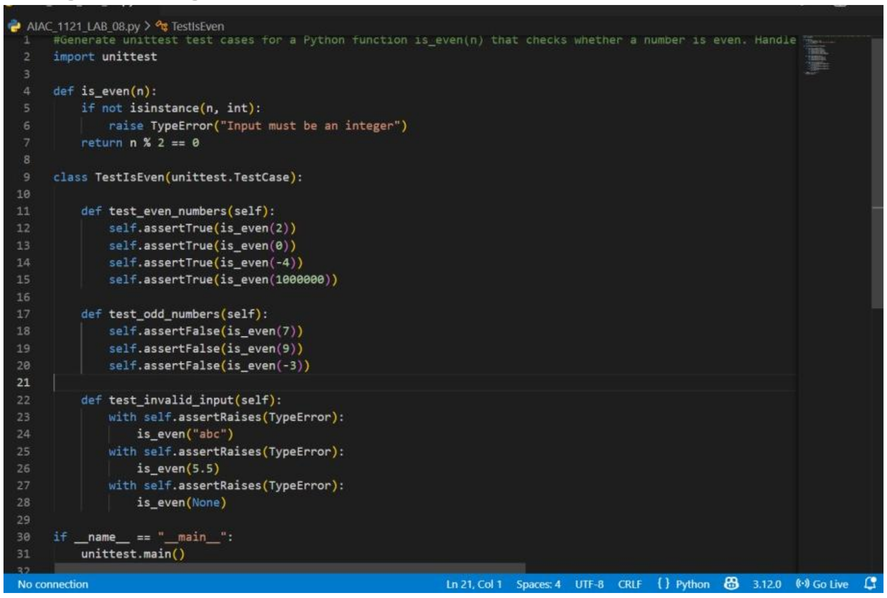
BACTH – 03 17 – 02 – 2026

ASSIGNMENT – 08

LAB – 08 : Test – Driven Development with AI – Generating and Working with Test Cases.

Task – 01 : Test – Driven Development for Odd/Even Number Validator.

Prompt : Generate unittest test cases for a Python function is_even(n) that checks whether a number is even. Handle zero, negative numbers, large integers, and invalid input. **Code :**



AIAC_1121_LAB_08.py > TestIsEven

```python
#Generate unittest test cases for a Python function is_even(n) that checks whether a number is even. Handle
import unittest

def is_even(n):
    if not isinstance(n, int):
        raise TypeError("Input must be an integer")
    return n % 2 == 0

class TestIsEven(unittest.TestCase):

    def test_even_numbers(self):
        self.assertTrue(is_even(2))
        self.assertTrue(is_even(0))
        self.assertTrue(is_even(-4))
        self.assertTrue(is_even(1000000))

    def test_odd_numbers(self):
        self.assertFalse(is_even(7))
        self.assertFalse(is_even(9))
        self.assertFalse(is_even(-3))

    def test_invalid_input(self):
        with self.assertRaises(TypeError):
            is_even("abc")
        with self.assertRaises(TypeError):
            is_even(5.5)
        with self.assertRaises(TypeError):
            is_even(None)

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

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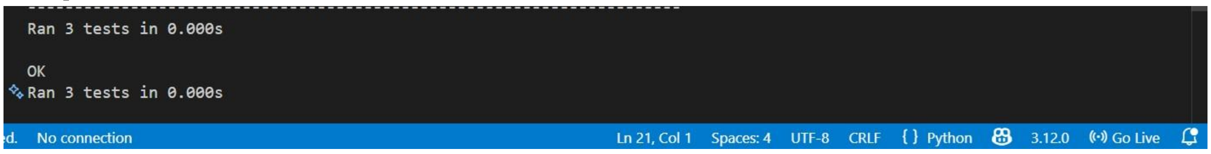
Output :



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OK
Ran 3 tests in 0.000s
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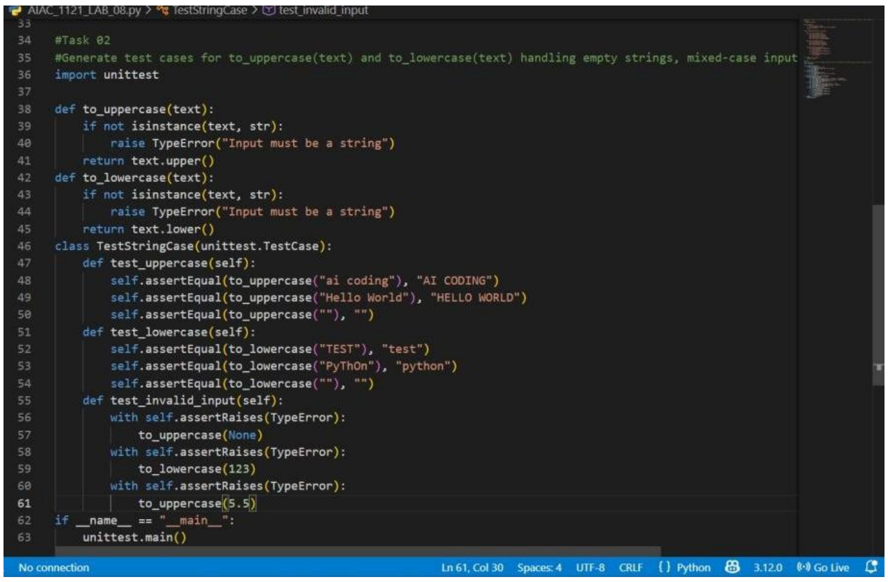
Explanation :

The function first validates that the input is an integer. It then checks divisibility by 2 using modulus operator. It handles zero, negative, and large integers correctly.

Task – 02 : Test – Driven Development for String Case Converter.
Prompt : Generate test cases for to_uppercase(text) and to_lowercase(text) handling empty strings, mixed-case input, and invalid inputs. **Code :**

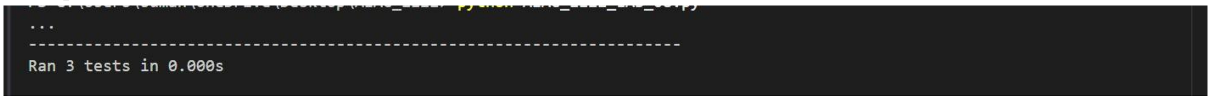


AIAC_1121_LAB_08.py > TestStringCase > test_invalid_input

```python
#Task 02
#Generate test cases for to_uppercase(text) and to_lowercase(text) handling empty strings, mixed-case input
import unittest

def to_uppercase(text):
    if not isinstance(text, str):
        raise TypeError("Input must be a string")
    return text.upper()
def to_lowercase(text):
    if not isinstance(text, str):
        raise TypeError("Input must be a string")
    return text.lower()
class TestStringCase(unittest.TestCase):
    def test_uppercase(self):
        self.assertEqual(to_uppercase("ai coding"), "AI CODING")
        self.assertEqual(to_uppercase("Hello World"), "HELLO WORLD")
        self.assertEqual(to_uppercase(""), "")
    def test_lowercase(self):
        self.assertEqual(to_lowercase("TEST"), "test")
        self.assertEqual(to_lowercase("PyThOn"), "python")
        self.assertEqual(to_lowercase(""), "")
    def test_invalid_input(self):
        with self.assertRaises(TypeError):
            to_uppercase(None)
        with self.assertRaises(TypeError):
            to_lowercase(123)
        with self.assertRaises(TypeError):
            to_uppercase(5.5)
if __name__ == "__main__":
    unittest.main()
```

Output:



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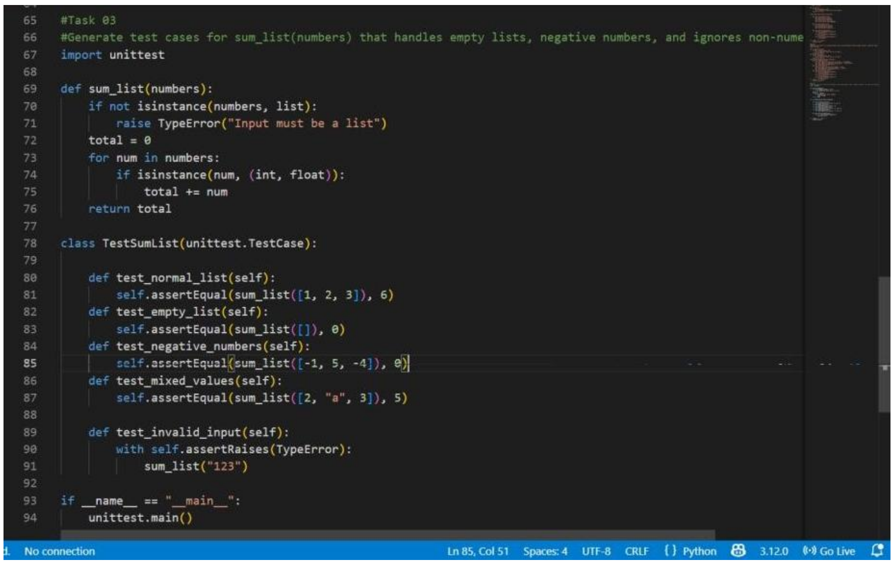
Ran 3 tests in 0.000s
```

Explanation :
Both functions validate input type and use built-in string methods .upper() and .lower() for conversion.
Task – 03 : Test – Driven Development for List sum Calculator.
Prompt : Generate test cases for sum_list(numbers) that handles empty lists, negative numbers, and ignores non-numeric values.
Code :



```python
#Task 03
#Generate test cases for sum_list(numbers) that handles empty lists, negative numbers, and ignores non-nume
import unittest

def sum_list(numbers):
    if not isinstance(numbers, list):
        raise TypeError("Input must be a list")
    total = 0
    for num in numbers:
        if isinstance(num, (int, float)):
            total += num
    return total

class TestSumList(unittest.TestCase):

    def test_normal_list(self):
        self.assertEqual(sum_list([1, 2, 3]), 6)
    def test_empty_list(self):
        self.assertEqual(sum_list([]), 0)
    def test_negative_numbers(self):
        self.assertEqual(sum_list([-1, 5, -4]), 0)
    def test_mixed_values(self):
        self.assertEqual(sum_list([2, "a", 3]), 5)

    def test_invalid_input(self):
        with self.assertRaises(TypeError):
            sum_list("123")

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

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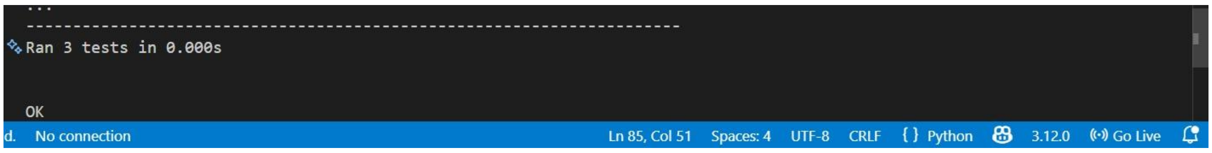
```

Output :



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Ran 3 tests in 0.000s

OK
```

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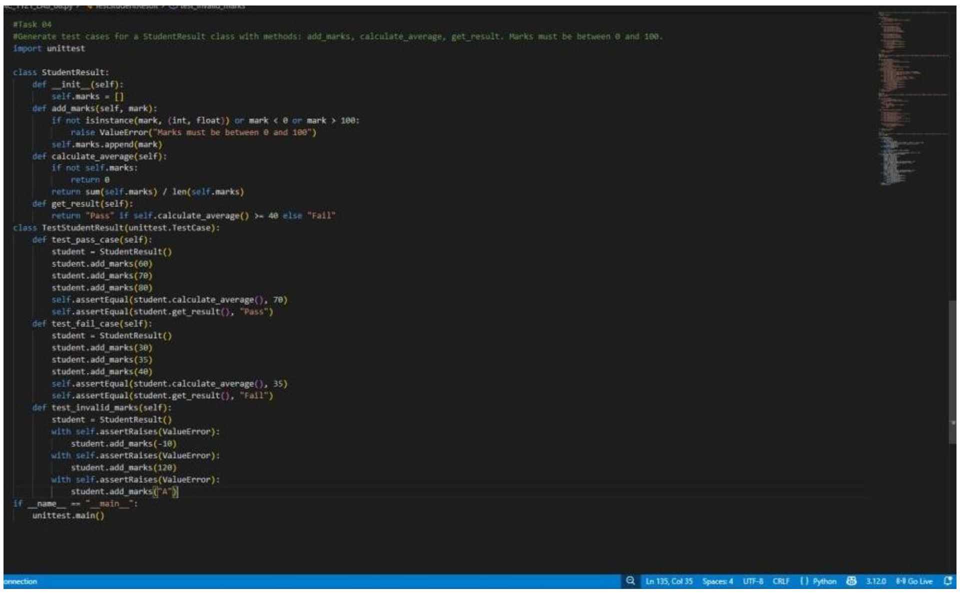
No connection          Ln 85, Col 51   Spaces: 4   UTF-8   CRLF   {} Python   3.12.0   Go Live
```

Explanation :
The function iterates through the list and adds only numeric values. It safely ignores non-numeric elements and returns 0 for empty lists.

Task – 04 : Test Cases for Student Result Class.

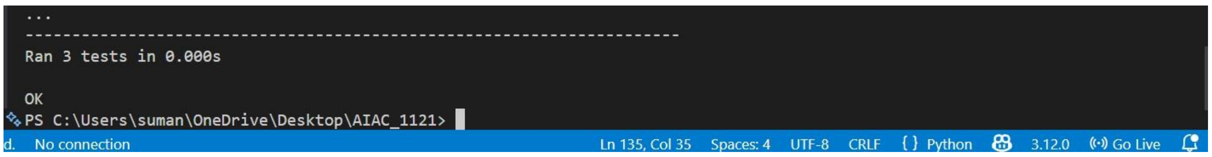
Prompt : Generate test cases for a StudentResult class with methods: add_marks, calculate_average, get_result. Marks must be between 0 and 100.

Code :



```python
#Task 04
#Generate test cases for a StudentResult class with methods: add_marks, calculate_average, get_result. Marks must be between 0 and 100.
import unittest

class StudentResult:
    def __init__(self):
        self.marks = []
    def add_marks(self, mark):
        if not isinstance(mark, (int, float)) or mark < 0 or mark > 100:
            raise ValueError("Marks must be between 0 and 100")
        self.marks.append(mark)
    def calculate_average(self):
        if not self.marks:
            return 0
        return sum(self.marks) / len(self.marks)
    def get_result(self):
        return "Pass" if self.calculate_average() >= 40 else "Fail"
class TestStudentResult(unittest.TestCase):
    def test_pass_case(self):
        student = StudentResult()
        student.add_marks(60)
        student.add_marks(70)
        student.add_marks(80)
        self.assertEqual(student.calculate_average(), 70)
        self.assertEqual(student.get_result(), "Pass")
    def test_fail_case(self):
        student = StudentResult()
        student.add_marks(30)
        student.add_marks(35)
        student.add_marks(40)
        self.assertEqual(student.calculate_average(), 35)
        self.assertEqual(student.get_result(), "Fail")
    def test_invalid_marks(self):
        student = StudentResult()
        with self.assertRaises(ValueError):
            student.add_marks(-10)
        with self.assertRaises(ValueError):
            student.add_marks(120)
        with self.assertRaises(ValueError):
            student.add_marks("A")
if __name__ == "__main__":
    unittest.main()
```

Output:



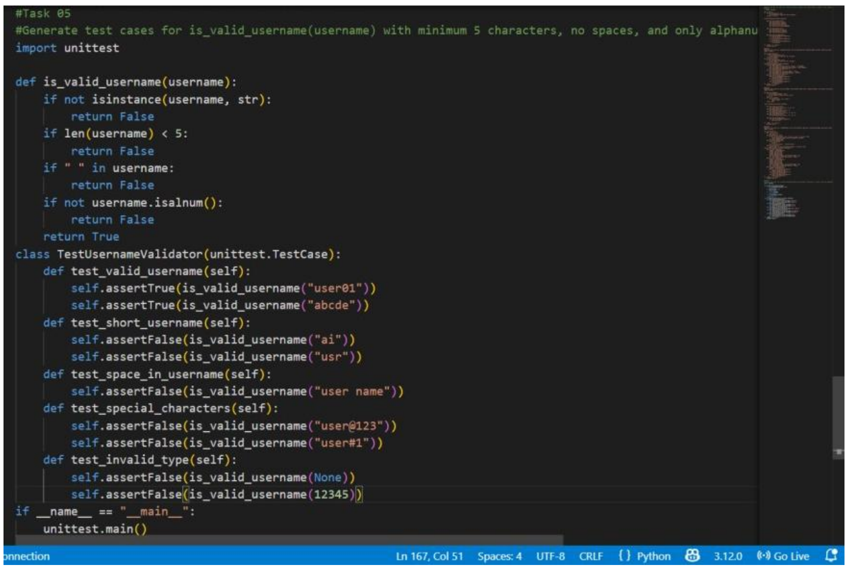
```
...
----------------------------------------------------------------------
Ran 3 tests in 0.000s

OK
PS C:\Users\suman\OneDrive\Desktop\AIAC_1121>
```

Explanation :
The class validates marks before storing them. It calculates average dynamically and determines result based on 40% threshold.

Task – 05 : Test – Driven Development for username Validator.

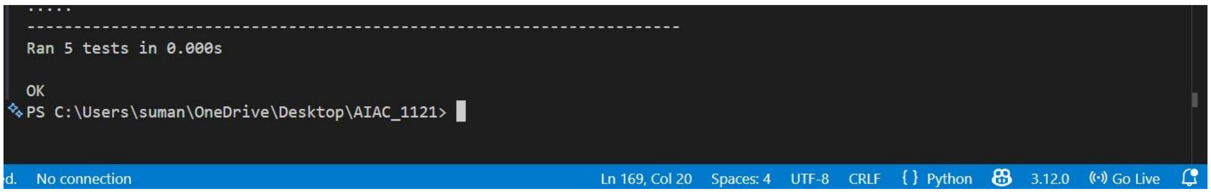
Prompt : Generate test cases for is_valid_username(username) with minimum 5 characters, no spaces, and only alphanumeric characters.

Code :



```python
#Task 05
#Generate test cases for is_valid_username(username) with minimum 5 characters, no spaces, and only alphanu
import unittest

def is_valid_username(username):
    if not isinstance(username, str):
        return False
    if len(username) < 5:
        return False
    if " " in username:
        return False
    if not username.isalnum():
        return False
    return True
class TestUsernameValidator(unittest.TestCase):
    def test_valid_username(self):
        self.assertTrue(is_valid_username("user01"))
        self.assertTrue(is_valid_username("abcde"))
    def test_short_username(self):
        self.assertFalse(is_valid_username("ai"))
        self.assertFalse(is_valid_username("usr"))
    def test_space_in_username(self):
        self.assertFalse(is_valid_username("user name"))
    def test_special_characters(self):
        self.assertFalse(is_valid_username("user@123"))
        self.assertFalse(is_valid_username("user#1"))
    def test_invalid_type(self):
        self.assertFalse(is_valid_username(None))
        self.assertFalse(is_valid_username(12345))
if __name__ == "__main__":
    unittest.main()
```

Output :



```
.....
----------------------------------------------------------------------
Ran 5 tests in 0.000s

OK
PS C:\Users\suman\OneDrive\Desktop\AIAC_1121>
```

Explanation :

The function checks length, space restriction, and alphanumeric condition using built-in string validation methods.