

AI - Assisted Coding-Assignment -8

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Batch:37

Lab 8: Test-Driven Development with AI-Generating and Working with Test Cases.

Task Description-1

Test-Driven Development for Even/Odd Number Validator

Expected Output:

A correctly implemented `is_even()` function that passes all AI-generated test cases

Prompt:

Write a Python function `is_even(n)` that returns True if the given number is even and False if it is odd.

CODE AND OUTPUT:

```
s1.py ●
s1.py > TestIsEven > test_odd_numbers
1 import unittest
2 def is_even(n):
3     return n % 2 == 0
4 # Test cases
5 class TestIsEven(unittest.TestCase):
6     def test_even_numbers(self):
7         self.assertTrue(is_even(2))
8         self.assertTrue(is_even(0))
9         self.assertTrue(is_even(-4))
10    def test_odd_numbers(self):
11        self.assertFalse(is_even(7))
12        self.assertFalse(is_even(9))
13        self.assertFalse(is_even(-1))
14 if __name__ == "__main__":
15     unittest.main()
```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS

```
PS C:\AIAC>
> & C:\Users\ajayr\AppData\Local\Programs\Python\Python313\p
..
-----
Ran 2 tests in 0.001s

OK
```

Explanation:

In this task, test cases for the `is_even(n)` function are created first using AI, following the Test-Driven Development approach. These tests describe how the function should behave for even, odd, zero, and negative numbers. After defining the tests, the function is implemented to meet all test expectations. The `unittest` framework is used to run the tests automatically, and when all tests pass, it confirms that the function works correctly and reliably.

Task Description-2

Test-Driven Development for String Case Converter

Expected Output:

Two string conversion functions that pass all AI-generated test cases with safe input handling.

Prompt:

Generate test cases for two Python functions `to_uppercase(text)` and `to_lowercase`. The functions should convert strings to upper case and lower case respectively. The test cases must handle empty strings, mixed-case input, and invalid inputs such as numbers.

CODE AND OUTPUT:

```
s1.py > ...
1  import unittest
2  def to_uppercase(text):
3      if type(text) is not str:
4          return None
5      return text.upper()
6  def to_lowercase(text):
7      if type(text) is not str:
8          return None
9      return text.lower()
10 class TestStringCaseConverter(unittest.TestCase):
11     def test_uppercase(self):
12         self.assertEqual(to_uppercase("ai coding"), "AI CODING")
13         self.assertEqual(to_uppercase(""), "")
14     def test_lowercase(self):
15         self.assertEqual(to_lowercase("TEST"), "test")
16         self.assertEqual(to_lowercase("PyThOn"), "python")
17     def test_invalid_inputs(self):
18         self.assertIsNone(to_uppercase(None))
19         self.assertIsNone(to_lowercase(123))
20 if __name__ == "__main__":
21     unittest.main()
```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS pwsh + -

PS C:\AIAC>

Ran 3 tests in 0.000s

OK

Explanation:

AI-generated test cases were written first for the string case conversion functions. The functions were then implemented to pass all tests using unittest, ensuring correct behavior and safe handling of invalid inputs, following the Test-Driven Development approach.

Task Description-3

Test-Driven Development for List Sum Calculator

Expected Output:

A robust list-sum function validated using AI-generated test cases.

Prompt:

Generate test cases for a Python function `sum_list(numbers)` that returns the sum of elements in a list. The function should handle empty lists, negative numbers, and safely ignore non-numeric values.

CODE AND OUTPUT:

```
s1.py > ...
1  def sum_list(numbers):
2      total = 0
3      for item in numbers:
4          if type(item) in (int, float):
5              total += item
6      return total
7  user_input = input("Enter list elements separated by space: ")
8  elements = []
9  for x in user_input.split():
10     try:
11         elements.append(int(x))
12     except ValueError:
13         elements.append(x)
14  print(sum_list(elements))
```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS pwsh + ▢

```
PS C:\AIAC>
• & C:\Users\ajayr\AppData\Local\Programs\Python\Python313\python.exe c:/AIAC/s1.py
Enter list elements separated by space: 1 2 3
6
• PS C:\AIAC> & C:\Users\ajayr\AppData\Local\Programs\Python\Python313\python.exe c
Enter list elements separated by space: 1 a 4
5
```

Explanation:

The program takes a list from the user, safely ignores non-numeric values, and returns the sum of valid numbers. It handles empty lists and negative numbers correctly.

Task Description-4

Test Cases for Student Result Class.

Expected Output:

A fully functional StudentResult class that passes all AI-generated test.

Prompt:

Generate test cases for a Python class StudentResult with methods `add_marks(mark)`, `calculate_average()`, and `get_result()`. Marks should be between 0 and 100.

If average ≥ 40 , result is Pass, otherwise Fail. Invalid marks should raise an error.

CODE AND OUTPUT:

```
s1.py x test_s1.py ●
test_s1.py > TestStudentResult > test_add_marks_boundary_100
1 import unittest
2 from s1 import StudentResult
3 class TestStudentResult(unittest.TestCase):
4     def setUp(self):
5         self.student = StudentResult()
6     def test_add_marks_valid(self):
7         self.student.add_marks(50)
8         self.student.add_marks(60)
9         self.assertEqual(self.student.marks, [50, 60])
10    def test_calculate_average_pass(self):
11        for mark in [60, 70, 80]:
12            self.student.add_marks(mark)
13            self.assertEqual(self.student.calculate_average(), 70)
14    def test_calculate_average_fail(self):
15        for mark in [30, 35, 40]:
16            self.student.add_marks(mark)
17            self.assertEqual(self.student.calculate_average(), 35)
18    def test_get_result_pass(self):
19        for mark in [60, 70, 80]:
20            self.student.add_marks(mark)
21            self.assertEqual(self.student.get_result(), "Pass")
22    def test_get_result_fail(self):
23        for mark in [30, 35, 40]:
24            self.student.add_marks(mark)
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```
s1.py test_s1.py ●
test_s1.py > ...
1 def is_valid_username(username):
2     if not isinstance(username, str):
3         return False
4     if len(username) < 5:
5         return False
6     if " " in username:
7         return False
8     return username.isalnum()
9 assert is_valid_username("user01") == True
10 assert is_valid_username("ai") == False
11 assert is_valid_username("user name") == False
12 assert is_valid_username("user@123") == False
13 print("All tests passed")

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS

PS C:\AIAC>
& C:\Users\ajayr\AppData\Local\Programs\Python\Python313\python.exe c
_s1.py
.....
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Ran 12 tests in 0.003s

OK
```

Explanation:

First, AI helped create test cases that clearly define what a valid and invalid username looks like. Then the function was written to satisfy those tests by checking length, spaces, and characters. If all rules are followed, it returns True; otherwise, False.