School of Computer Science and Artificial Intelligence

Lab Assignment # 8.2

Course Title : AI Assisted Coding

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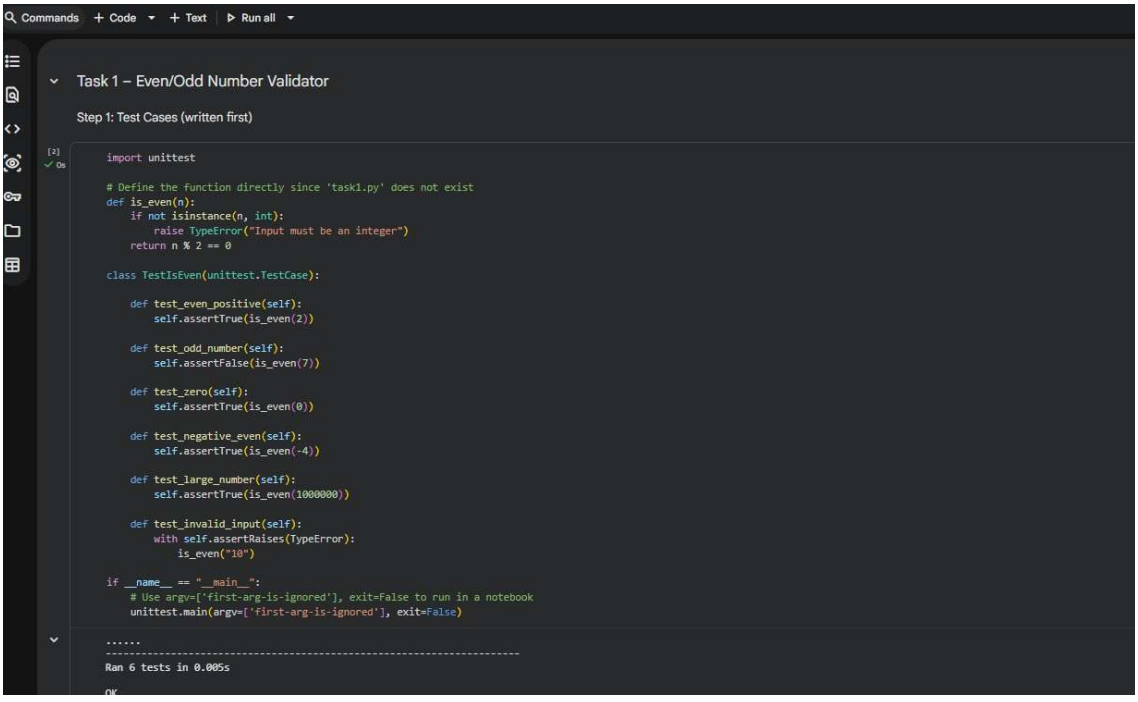
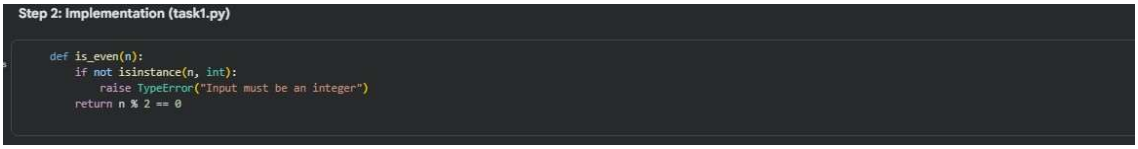
Even/Odd Number Validator

Step 1: Test Cases (written first)





Task 1 –

String Case Converter

Task 2 – String Case Converter

Step 1: Test Cases

```
import unittest

# Defining the functions directly since "task2.py" does not exist
def to_uppercase(s):
    if not isinstance(s, str):
        raise TypeError("Input must be a string")
    return s.upper()

def to_lowercase(s):
    if s is None:
        raise ValueError("Input cannot be None")
    if not isinstance(s, str):
        raise TypeError("Input must be a string")
    return s.lower()

class TestStringCase(unittest.TestCase):

    def test_uppercase_normal(self):
        self.assertEqual(to_uppercase("ai coding"), "AI CODING")

    def test_lowercase_normal(self):
        self.assertEqual(to_lowercase("TEST"), "test")

    def test_empty_string(self):
        self.assertEqual(to_uppercase(""), "")

    def test_mixed_case(self):
        self.assertEqual(to_lowercase("PyThOn"), "python")

    def test_none_input(self):
        with self.assertRaises(ValueError):
            to_lowercase(None)

    def test_invalid_type(self):
        with self.assertRaises(TypeError):
            to_uppercase(123)

if __name__ == "__main__":
    # Use argv=['first-arg-is-ignored'], exit=False for notebook compatibility
    unittest.main(argv=['first-arg-is-ignored'], exit=False)
```

```
............
----------------------------------------------------------------------
Ran 12 tests in 0.012s
```

Step 2: Implementation (task2.py)

```
def to_uppercase(text):
    if text is None:
        raise ValueError("Input cannot be None")
    if not isinstance(text, str):
        raise TypeError("Input must be a string")
    return text.upper()

def to_lowercase(text):
    if text is None:
        raise ValueError("Input cannot be None")
    if not isinstance(text, str):
        raise TypeError("Input must be a string")
    return text.lower()
```

Task 2 –

Step 1: Test Cases

Task 3 –

Step 1: Test Cases

List Sum Calculator

Task 3 – List Sum Calculator

Step 1: Test Cases

```
import unittest

# Defining the function directly since 'task3.py' does not exist
def sum_list(items):
    if not isinstance(items, list):
        raise TypeError("Input must be a list")
    total = 0
    for item in items:
        if isinstance(item, (int, float)):
            total += item
    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_with_non_numeric(self):
        self.assertEqual(sum_list([2, "a", 3]), 5)

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

if __name__ == "__main__":
    # Use argv=['first-arg-is-ignored'], exit=False for notebook compatibility
    unittest.main(argv=['first-arg-is-ignored'], exit=False)
```

```
.................
----------------------------------------------------------------------
Ran 17 tests in 0.018s

OK
```

Step 2: Implementation (task3.py)

```
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
```

Task 4 –

Step 1: Test Cases

Student Result Class

Task 4 – StudentResult Class

Step 1: Test Cases

```
import unittest

# Defining the class directly since 'task4.py' does not exist
class StudentResult:
    def __init__(self):
        self.marks = []

    def add_marks(self, mark):
        if mark < 0 or mark > 100:
            raise ValueError("Mark 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):
        avg = self.calculate_average()
        return "Pass" if avg >= 40 else "Fail"

class TestStudentResult(unittest.TestCase):

    def test_pass_result(self):
        s = StudentResult()
        s.add_marks(60)
        s.add_marks(70)
        s.add_marks(80)
        self.assertEqual(s.calculate_average(), 70)
        self.assertEqual(s.get_result(), "Pass")

    def test_fail_result(self):
        s = StudentResult()
        s.add_marks(30)
        s.add_marks(35)
        s.add_marks(40)
        self.assertEqual(s.get_result(), "Fail")

    def test_invalid_mark(self):
        s = StudentResult()
        with self.assertRaises(ValueError):
            s.add_marks(-10)

    def test_empty_marks(self):
        s = StudentResult()
        self.assertEqual(s.calculate_average(), 0)

if __name__ == "__main__":
    # Use argv=['first-arg-is-ignored'], exit=False for notebook compatibility
    unittest.main(argv=['first-arg-is-ignored'], exit=False)
```

```
.....
----------------------------------------------------------------------
Ran 21 tests in 0.020s
```

Step 2: Implementation (task4.py)

```
class StudentResult:
    def __init__(self):
        self.marks = []

    def add_marks(self, mark):
        if 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):
        avg = self.calculate_average()
        return "Pass" if avg >= 40 else "Fail"
```

Task 5 –

Step 1: Test Cases

Username Validator

Task 5 – Username Validator

Step 1: Test Cases

```
import unittest

# Defining the function directly since 'task5.py' does not exist
def is_valid_username(username):
    if not isinstance(username, str):
        return False
    if len(username) < 3:
        return False
    if not username.isalnum():
        return False
    return True

class TestUsername(unittest.TestCase):

    def test_valid_username(self):
        self.assertTrue(is_valid_username("user01"))

    def test_short_username(self):
        self.assertFalse(is_valid_username("ai"))

    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"))

    def test_non_string(self):
        self.assertFalse(is_valid_username(12345))

if __name__ == "__main__":
    # Use argv=['first-arg-is-ignored'], exit=False for notebook compatibility
    unittest.main(argv=['first-arg-is-ignored'], exit=False)
```

```
.........................
----------------------------------------------------------------------
Ran 26 tests in 0.027s

OK
```

Step 2: Implementation (task5.py)

```
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
```

Lab Outcomes Covered

- **Test cases written first (TDD style)**
- **Input validation & error handling**
- **Edge cases: empty, None, negative, large values**

Task 6 –

Step 1: Test Cases

- **unittest usage**
- **Clean and reliable implementations**