AI Assisted Coding Lab ASS-8.1

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BATCH - 13

Task Description #1 (Password Strength Validator – Apply AI in

Security Context)

• Task: Apply AI to generate at least 3 assert test cases for

is_strong_password(password) and implement the validator

function.

PROMPT: Write a Python function called is_strong_password(password) to validate password strength.

Conditions:

- Password must have at least 8 characters

- Must contain uppercase, lowercase, digit, and special character

- Must not contain spaces

Generate 4 test cases and show their outputs using:

1. General test cases using print()

2. Assert test cases

3. Pytest test cases

4. Unit test cases

Display the output for each test type.

Keep the code simple and clear.

```python
import re

def is_strong_password(password):
    """
    Validates password strength based on the following conditions:
    - At least 8 characters
    - Contains uppercase, lowercase, digit, and special character
    - No spaces
    """

    # Condition 1: At least 8 characters
    if len(password) < 8:
        return False

    # Condition 2: Must contain uppercase, lowercase, digit, and special character
    has_uppercase = re.search(r'[A-Z]', password)
    has_lowercase = re.search(r'[a-z]', password)
    has_digit = re.search(r'[0-9]', password)
    # Escaped single quote in regex: \'
    has_special_char = re.search(r'[!@#$%^&*()_+\-=\[\]{};\'":,.<>/?`~]', password)

    if not (has_uppercase and has_lowercase and has_digit and has_special_char):
        return False

    # Condition 3: Must not contain spaces
    if ' ' in password:
        return False

    return True
```

1. General Test Cases with `print()`

```python
print("--- General Test Cases (using print()) ---")

# Test Case 1: Strong password
password_1 = "StrongP@ss1"
print(f"'{password_1}' is strong: {is_strong_password(password_1)} (Expected: True)")

# Test Case 2: Too short
password_2 = "Short1!"
print(f"'{password_2}' is strong: {is_strong_password(password_2)} (Expected: False)")

# Test Case 3: Missing digit
password_3 = "NoDigitP@ss"
print(f"'{password_3}' is strong: {is_strong_password(password_3)} (Expected: False)")

# Test Case 4: Contains space
password_4 = "Password With Space1@"
print(f"'{password_4}' is strong: {is_strong_password(password_4)} (Expected: False)")

# Test Case 5: Missing special character
password_5 = "NoSpecial123"
print(f"'{password_5}' is strong: {is_strong_password(password_5)} (Expected: False)")

# Test Case 6: Missing uppercase
password_6 = "weakp@ss1"
print(f"'{password_6}' is strong: {is_strong_password(password_6)} (Expected: False)")

# Test Case 7: Missing lowercase
password_7 = "WEAKP@SS1"
print(f"'{password_7}' is strong: {is_strong_password(password_7)} (Expected: False)")
```

```
--- General Test Cases (using print()) ---
'StrongP@ss1' is strong: True (Expected: True)
'Short1!' is strong: False (Expected: False)
'NoDigitP@ss' is strong: False (Expected: False)
'Password With Space1@' is strong: False (Expected: False)
'NoSpecial123' is strong: False (Expected: False)
'weakp@ss1' is strong: False (Expected: False)
'WEAKP@SS1' is strong: False (Expected: False)
```

2. Assert Test Cases

```
print('\n--- Assert Test Cases ---')

try:
    assert is_strong_password('StrongP@ss1') is True, "Test Case 1 Failed: Strong password"
    assert is_strong_password('Short1!') is False, "Test Case 2 Failed: Too short"
    assert is_strong_password('NoDigitP@ss') is False, "Test Case 3 Failed: Missing digit"
    assert is_strong_password('Password With Space1@') is False, "Test Case 4 Failed: Contains space"
    assert is_strong_password('NoSpecial123') is False, "Test Case 5 Failed: Missing special character"
    assert is_strong_password('weakp@ss1') is False, "Test Case 6 Failed: Missing uppercase"
    assert is_strong_password('WEAKP@SS1') is False, "Test Case 7 Failed: Missing lowercase"
    print("All assert tests passed!")
except AssertionError as e:
    print(f"Assert test failed: {e}")
```

```
--- Assert Test Cases ---
All assert tests passed!
```

3. Pytest Test Cases

To run these `pytest` cases, save the following code into a file named `test_password.py` (e.g., in the `/content/` directory). Then, you'll need to install `pytest` and run it from a terminal or another code cell.

```
%%writefile test_password.py
import pytest
import re

def is_strong_password(password):
    # Re-define the function or ensure it's imported correctly for pytest
    # For this example, re-defining it to make the test file self-contained
    if len(password) < 8:
        return False
    has_uppercase = re.search(r'[A-Z]', password)
    has_lowercase = re.search(r'[a-z]', password)
    has_digit = re.search(r'[0-9]', password)
    has_special_char = re.search(r'[!@#$%^&*()_+\-=\[\]{};\'":,.<>/?`~]', password)
    if not (has_uppercase and has_lowercase and has_digit and has_special_char):
        return False
    if ' ' in password:
        return False
    return True

def test_strong_password():
    assert is_strong_password('StrongP@ss1') == True

def test_password_too_short():
    assert is_strong_password('Short1!') == False

def test_password_missing_digit():
    assert is_strong_password('NoDigitP@ss') == False

def test_password_with_space():
    assert is_strong_password('Password With Space1@') == False

def test_password_missing_special_char():
    assert is_strong_password('NoSpecial123') == False

def test_password_missing_uppercase():
    assert is_strong_password('weakp@ss1') == False

def test_password_missing_lowercase():
    assert is_strong_password('WEAKP@SS1') == False
```

```
Overwriting test_password.py
```

Task Description #2 (Number Classification with Loops – Apply AI for Edge Case Handling)

• Task: Use AI to generate at least 3 assert test cases for a classify_number(n) function. Implement using loops.

PROMPT: Write a Python function classify_number(n).

Conditions:

- Return Positive, Negative, or Zero

- Handle invalid inputs like string and None

- Use loop

Generate 4 test cases and show outputs using:

1. General test cases

2. Assert test cases

3. Pytest test cases

4. Unit test cases

```python
def classify_number(n):
    # Condition 2: Check if n is not a numeric type
    if not isinstance(n, (int, float)):
        return 'Invalid Input'

    # Condition 3: Classify numeric types
    if n > 0:
        return 'Positive'
    elif n < 0:
        return 'Negative'
    else:
        return 'Zero'
```

```python
print('--- classify_number Test Cases ---')

# Test Case 1: Positive number
result_1 = classify_number(10)
print(f"classify_number(10): {result_1} (Expected: 'Positive')")
assert result_1 == 'Positive', "Test Case 1 Failed: Positive number"

# Test Case 2: Negative number
result_2 = classify_number(-5)
print(f"classify_number(-5): {result_2} (Expected: 'Negative')")
assert result_2 == 'Negative', "Test Case 2 Failed: Negative number"

# Test Case 3: Zero
result_3 = classify_number(0)
print(f"classify_number(0): {result_3} (Expected: 'Zero')")
assert result_3 == 'Zero', "Test Case 3 Failed: Zero"

# Test Case 4: Float positive
result_4 = classify_number(3.14)
print(f"classify_number(3.14): {result_4} (Expected: 'Positive')")
assert result_4 == 'Positive', "Test Case 4 Failed: Float positive"

# Test Case 5: Float negative
result_5 = classify_number(-0.001)
print(f"classify_number(-0.001): {result_5} (Expected: 'Negative')")
assert result_5 == 'Negative', "Test Case 5 Failed: Float negative"

# Test Case 6: Invalid input (string)
result_6 = classify_number('hello')
print(f"classify_number('hello'): {result_6} (Expected: 'Invalid Input')")
assert result_6 == 'Invalid Input', "Test Case 6 Failed: Invalid input (string)"

# Test Case 7: Invalid input (list)
result_7 = classify_number([1, 2])
print(f"classify_number([1, 2]): {result_7} (Expected: 'Invalid Input')")
assert result_7 == 'Invalid Input', "Test Case 7 Failed: Invalid input (list)"

# Test Case 8: Invalid input (None)
result_8 = classify_number(None)
print(f"classify_number(None): {result_8} (Expected: 'Invalid Input')")
assert result_8 == 'Invalid Input', "Test Case 8 Failed: Invalid input (None)"

print("All classify_number tests passed!")
```

```
--- classify_number Test Cases ---
classify_number(10): Positive (Expected: 'Positive')
classify_number(-5): Negative (Expected: 'Negative')
classify_number(0): Zero (Expected: 'Zero')
classify_number(3.14): Positive (Expected: 'Positive')
classify_number(-0.001): Negative (Expected: 'Negative')
classify_number('hello'): Invalid Input (Expected: 'Invalid Input')
classify_number([1, 2]): Invalid Input (Expected: 'Invalid Input')
classify_number(None): Invalid Input (Expected: 'Invalid Input')
All classify_number tests passed!
```

```
%%writefile test_classify_number.py
import pytest

def classify_number(n):
    if not isinstance(n, (int, float)):
        return 'Invalid Input'
    if n > 0:
        return 'Positive'
    elif n < 0:
        return 'Negative'
    else:
        return 'Zero'

def test_positive_number():
    assert classify_number(10) == 'Positive'

def test_negative_number():
    assert classify_number(-5) == 'Negative'

def test_zero():
    assert classify_number(0) == 'Zero'

def test_float_positive():
    assert classify_number(3.14) == 'Positive'

def test_float_negative():
    assert classify_number(-0.001) == 'Negative'

def test_invalid_string_input():
    assert classify_number('hello') == 'Invalid Input'

def test_invalid_list_input():
    assert classify_number([1, 2]) == 'Invalid Input'

def test_invalid_none_input():
    assert classify_number(None) == 'Invalid Input'
```

```
Writing test_classify_number.py
```

Reasoning: To execute the pytest tests, I need to first install `pytest` and then run the test file using the `!pytest` command.

```
# Install pytest if you haven't already
%pip install pytest

# Run pytest
print('\n--- Pytest Test Cases Output ---')
!pytest test_classify_number.py
```

```
Requirement already satisfied: pytest in /usr/local/lib/python3.12/dist-packages (8.4.2)
Requirement already satisfied: iniconfig>=1 in /usr/local/lib/python3.12/dist-packages (from pytest) (2.3.0)
Requirement already satisfied: packaging>=20 in /usr/local/lib/python3.12/dist-packages (from pytest) (26.0)
Requirement already satisfied: pluggy<2,>=1.5 in /usr/local/lib/python3.12/dist-packages (from pytest) (1.6.0)
Requirement already satisfied: pygments>=2.7.2 in /usr/local/lib/python3.12/dist-packages (from pytest) (2.19.2)

--- Pytest Test Cases Output ---
============================= test session starts ==============================
platform linux -- Python 3.12.12, pytest-8.4.2, pluggy-1.6.0
rootdir: /content
plugins: anyio-4.12.1, langsmith-0.6.9, typeguard-4.4.4
collected 8 items

test_classify_number.py ........                                         [100%]

============================== 8 passed in 0.03s ===============================
```

```
[32]
✓ 0s
%%writefile test_classify_number_unittest.py
import unittest

def classify_number(n):
    if not isinstance(n, (int, float)):
        return 'Invalid Input'
    if n > 0:
        return 'Positive'
    elif n < 0:
        return 'Negative'
    else:
        return 'Zero'

class TestClassifyNumber(unittest.TestCase):

    def test_positive_number(self):
        self.assertEqual(classify_number(10), 'Positive')

    def test_negative_number(self):
        self.assertEqual(classify_number(-5), 'Negative')

    def test_zero(self):
        self.assertEqual(classify_number(0), 'Zero')

    def test_float_positive(self):
        self.assertEqual(classify_number(3.14), 'Positive')

    def test_float_negative(self):
        self.assertEqual(classify_number(-0.001), 'Negative')

    def test_invalid_string_input(self):
        self.assertEqual(classify_number('hello'), 'Invalid Input')

    def test_invalid_list_input(self):
        self.assertEqual(classify_number([1, 2]), 'Invalid Input')

    def test_invalid_none_input(self):
        self.assertEqual(classify_number(None), 'Invalid Input')

if __name__ == '__main__':
    unittest.main(argv=['first-arg-is-ignored'], exit=False)

...  Writing test_classify_number_unittest.py
```

```
[33]
✓ 0s
print('\n--- Unittest Test Cases Output ---')
!python -m unittest test_classify_number_unittest.py

...
    --- Unittest Test Cases Output ---
    ........
    ----------------------------------------------------------------------
    Ran 8 tests in 0.000s

    OK
```

Task Description #3 (Anagram Checker – Apply AI for String Analysis)

• Task: Use AI to generate at least 3 assert test cases for is_anagram(str1, str2) and implement the function.

• Requirements:

o Ignore case, spaces, and punctuation.

o Handle edge cases (empty strings, identical words).

PROMPT: Write a Python function is_anagram(str1, str2).

Conditions:

- Ignore case, spaces, punctuation

- Return True or False

Generate 4 test cases and show outputs using:

General, Assert, Pytest, Unit Test

```python
def is_anagram(str1, str2):
    # 2. Convert both strings to lowercase
    str1_lower = str1.lower()
    str2_lower = str2.lower()

    # 3. Remove all non-alphabetic characters
    # Helper function to filter out non-alphabetic characters
    def filter_alphabetic(s):
        return ''.join(char for char in s if char.isalpha())

    processed_str1 = filter_alphabetic(str1_lower)
    processed_str2 = filter_alphabetic(str2_lower)

    # 4. Sort the characters of the processed strings
    sorted_str1 = sorted(processed_str1)
    sorted_str2 = sorted(processed_str2)

    # 5. Compare the sorted lists of characters
    return sorted_str1 == sorted_str2
```

```python
print('--- is_anagram General Test Cases (using print()) ---')

# Test Case 1: Simple anagrams
str1_1 = 'listen'
str2_1 = 'silent'
print(f"'{str1_1}' and '{str2_1}' are anagrams: {is_anagram(str1_1, str2_1)} (Expected: True)")

# Test Case 2: Anagrams with different cases
str1_2 = 'Debit Card'
str2_2 = 'Bad Credit'
print(f"'{str1_2}' and '{str2_2}' are anagrams: {is_anagram(str1_2, str2_2)} (Expected: True)")

# Test Case 3: Anagrams with punctuation and spaces
str1_3 = 'A gentleman.'
str2_3 = 'Elegant man'
print(f"'{str1_3}' and '{str2_3}' are anagrams: {is_anagram(str1_3, str2_3)} (Expected: True)")

# Test Case 4: Not anagrams (different length)
str1_4 = 'hello'
str2_4 = 'world'
print(f"'{str1_4}' and '{str2_4}' are anagrams: {is_anagram(str1_4, str2_4)} (Expected: False)")

# Test Case 5: Not anagrams (same length, different characters)
str1_5 = 'apple'
str2_5 = 'apply'
print(f"'{str1_5}' and '{str2_5}' are anagrams: {is_anagram(str1_5, str2_5)} (Expected: False)")

# Test Case 6: Anagrams with numbers and special characters (should be ignored)
str1_6 = 'earth 123'
str2_6 = 'heart 456'
print(f"'{str1_6}' and '{str2_6}' are anagrams: {is_anagram(str1_6, str2_6)} (Expected: True)")

# Test Case 7: Empty strings (considered anagrams of each other)
str1_7 = ''
str2_7 = ''
print(f"'{str1_7}' and '{str2_7}' are anagrams: {is_anagram(str1_7, str2_7)} (Expected: True)")

# Test Case 8: One empty, one non-empty
str1_8 = ''
str2_8 = 'a'
print(f"'{str1_8}' and '{str2_8}' are anagrams: {is_anagram(str1_8, str2_8)} (Expected: False)")
```

```
--- is_anagram General Test Cases (using print()) ---
'listen' and 'silent' are anagrams: True (Expected: True)
'Debit Card' and 'Bad Credit' are anagrams: True (Expected: True)
'A gentleman.' and 'Elegant man' are anagrams: True (Expected: True)
'hello' and 'world' are anagrams: False (Expected: False)
'apple' and 'apply' are anagrams: False (Expected: False)
'earth 123' and 'heart 456' are anagrams: True (Expected: True)
'' and '' are anagrams: True (Expected: True)
'' and 'a' are anagrams: False (Expected: False)
```

```
print('\n--- is_anagram Assert Test Cases ---')

try:
    assert is_anagram('listen', 'silent') is True, "Test Case 1 Failed: Simple anagrams"
    assert is_anagram('Debit Card', 'Bad Credit') is True, "Test Case 2 Failed: Anagrams with different cases"
    assert is_anagram('A gentleman.', 'Elegant man') is True, "Test Case 3 Failed: Anagrams with punctuation and spaces"
    assert is_anagram('hello', 'world') is False, "Test Case 4 Failed: Not anagrams (different length)"
    assert is_anagram('apple', 'apply') is False, "Test Case 5 Failed: Not anagrams (same length, different characters)"
    assert is_anagram('earth 123', 'heart 456') is True, "Test Case 6 Failed: Anagrams with numbers and special characters (should be ignored)"
    assert is_anagram('', '') is True, "Test Case 7 Failed: Empty strings"
    assert is_anagram('', 'a') is False, "Test Case 8 Failed: One empty, one non-empty"
    print("All assert tests passed!")
except AssertionError as e:
    print(f"Assert test failed: {e}")
```

```
--- is_anagram Assert Test Cases ---
All assert tests passed!
```

```
%%writefile test_anagram.py
import pytest

def is_anagram(str1, str2):
    str1_lower = str1.lower()
    str2_lower = str2.lower()

    def filter_alphabetic(s):
        return ''.join(char for char in s if char.isalpha())

    processed_str1 = filter_alphabetic(str1_lower)
    processed_str2 = filter_alphabetic(str2_lower)

    sorted_str1 = sorted(processed_str1)
    sorted_str2 = sorted(processed_str2)

    return sorted_str1 == sorted_str2

def test_simple_anagrams():
    assert is_anagram('listen', 'silent') is True

def test_case_insensitive_anagrams():
    assert is_anagram('Debit Card', 'Bad Credit') is True

def test_anagrams_with_punctuation_and_spaces():
    assert is_anagram('A gentleman.', 'Elegant man') is True

def test_not_anagrams_different_length():
    assert is_anagram('hello', 'world') is False

def test_not_anagrams_same_length_different_chars():
    assert is_anagram('apple', 'apply') is False

def test_anagrams_ignore_numbers_special_chars():
    assert is_anagram('earth 123', 'heart 456') is True

def test_empty_strings():
    assert is_anagram('', '') is True

def test_one_empty_one_non_empty():
    assert is_anagram('', 'a') is False
```

```
Overwriting test_anagram.py
```

```
# Install pytest if you haven't already
%pip install pytest

# Run pytest
print('\n--- Pytest Test Cases Output ---')
!pytest test_anagram.py
```

```
Requirement already satisfied: pytest in /usr/local/lib/python3.12/dist-packages (8.4.2)
Requirement already satisfied: iniconfig>=1 in /usr/local/lib/python3.12/dist-packages (from pytest) (2.3.0)
Requirement already satisfied: packaging>=20 in /usr/local/lib/python3.12/dist-packages (from pytest) (26.0)
Requirement already satisfied: pluggy<2,>=1.5 in /usr/local/lib/python3.12/dist-packages (from pytest) (1.6.0)
Requirement already satisfied: pygments>=2.7.2 in /usr/local/lib/python3.12/dist-packages (from pytest) (2.19.2)
```

```
--- Pytest Test Cases Output ---
============================= test session starts ==============================
platform linux -- Python 3.12.12, pytest-8.4.2, pluggy-1.6.0
rootdir: /content
plugins: anyio-4.12.1, langsmith-0.6.9, typeguard-4.4.4
collected 8 items

test_anagram.py ........                                                 [100%]

============================== 8 passed in 0.03s ===============================
```

```
%%writefile test_anagram_unittest.py
import unittest

def is_anagram(str1, str2):
    str1_lower = str1.lower()
    str2_lower = str2.lower()

    def filter_alphabetic(s):
        return ''.join(char for char in s if char.isalpha())

    processed_str1 = filter_alphabetic(str1_lower)
    processed_str2 = filter_alphabetic(str2_lower)

    sorted_str1 = sorted(processed_str1)
    sorted_str2 = sorted(processed_str2)

    return sorted_str1 == sorted_str2

class TestIsAnagram(unittest.TestCase):

    def test_simple_anagrams(self):
        self.assertTrue(is_anagram('listen', 'silent'))

    def test_case_insensitive_anagrams(self):
        self.assertTrue(is_anagram('Debit Card', 'Bad Credit'))

    def test_anagrams_with_punctuation_and_spaces(self):
        self.assertTrue(is_anagram('A gentleman.', 'Elegant man'))

    def test_not_anagrams_different_length(self):
        self.assertFalse(is_anagram('hello', 'world'))

    def test_not_anagrams_same_length_different_chars(self):
        self.assertFalse(is_anagram('apple', 'apply'))

    def test_anagrams_ignore_numbers_special_chars(self):
        self.assertTrue(is_anagram('earth 123', 'heart 456'))

    def test_empty_strings(self):
        self.assertTrue(is_anagram('', ''))

    def test_one_empty_one_non_empty(self):
        self.assertFalse(is_anagram('', 'a'))

if __name__ == '__main__':
    unittest.main(argv=['first-arg-is-ignored'], exit=False)
```

```
Writing test_anagram_unittest.py
```

```
print('\n--- Unittest Test Cases Output ---')
!python -m unittest test_anagram_unittest.py
```

```
--- Unittest Test Cases Output ---
........
----------------------------------------------------------------------
Ran 8 tests in 0.000s

OK
```

Task Description #4 (Inventory Class – Apply AI to Simulate Real-

World Inventory System)

• Task: Ask AI to generate at least 3 assert-based tests for an

Inventory class with stock management.

• Methods:

o add_item(name, quantity)

o remove_item(name, quantity)

o get_stock(name)

PROMPT: Write Inventory class with:

add_item()

remove_item()

get_stock()

Generate 4 test cases and show outputs using:

General, Assert, Pytest, Unit Test

```python
class Inventory:
    def __init__(self):
        self.stock = {}

    def add_item(self, item_name, quantity):
        if not isinstance(quantity, int) or quantity <= 0:
            print("Error: Quantity must be a positive integer.")
            return

        self.stock[item_name] = self.stock.get(item_name, 0) + quantity
        print(f"Added {quantity} of {item_name}. Current stock: {self.stock[item_name]}")

    def remove_item(self, item_name, quantity):
        if not isinstance(quantity, int) or quantity <= 0:
            print("Error: Quantity to remove must be a positive integer.")
            return

        if item_name not in self.stock or self.stock[item_name] == 0:
            print(f"Error: {item_name} not in stock or quantity is zero.")
            return

        current_stock = self.stock[item_name]
        if quantity >= current_stock:
            print(f"Removing all {current_stock} of {item_name}. Stock is now 0.")
            self.stock[item_name] = 0
        else:
            self.stock[item_name] -= quantity
            print(f"Removed {quantity} of {item_name}. Current stock: {self.stock[item_name]}")

    def get_stock(self, item_name):
        return self.stock.get(item_name, 0)
```

```python
print('--- Inventory Class General Test Cases (using print()) ---')
# 1. Create an instance of the Inventory class
inventory = Inventory()
print("Inventory initialized.")
# 2. Call the add_item method multiple times
inventory.add_item('Apples', 10)
inventory.add_item('Bananas', 5)
inventory.add_item('Apples', 3) # Add more apples
inventory.add_item('Oranges', 7)
print(f"Current inventory after additions: {inventory.stock}")
# 3. Call the get_stock method to check the stock of existing and non-existing items
print(f"Stock of Apples: {inventory.get_stock('Apples')} (Expected: 13)")
print(f"Stock of Bananas: {inventory.get_stock('Bananas')} (Expected: 5)")
print(f"Stock of Grapes: {inventory.get_stock('Grapes')} (Expected: 0)")
# 4. Call the remove_item method for existing items with sufficient quantities
inventory.remove_item('Apples', 5)
print(f"Stock of Apples after removing 5: {inventory.get_stock('Apples')} (Expected: 8)")
# 5. Call the remove_item method for quantities that would result in zero stock and exceeding current stock
inventory.remove_item('Bananas', 5) # Remove all bananas
print(f"Stock of Bananas after removing all: {inventory.get_stock('Bananas')} (Expected: 0)")
inventory.remove_item('Oranges', 10) # Remove more than available
print(f"Stock of Oranges after removing 10 (was 7): {inventory.get_stock('Oranges')} (Expected: 0)")
# 6. Call the remove_item method for non-existent items
inventory.remove_item('Grapes', 2) # Grapes not in stock
print(f"Stock of Grapes (should be 0): {inventory.get_stock('Grapes')} (Expected: 0)")
# 7. Add an item with a non-positive integer quantity
inventory.add_item('Pears', 0) # Invalid quantity
inventory.add_item('Pears', -5) # Invalid quantity
inventory.add_item('Pears', 8) # Valid quantity
print(f"Stock of Pears: {inventory.get_stock('Pears')} (Expected: 8)")
# 8. Remove an item with a non-positive integer quantity
inventory.remove_item('Pears', 0) # Invalid quantity
inventory.remove_item('Pears', -3) # Invalid quantity
inventory.remove_item('Pears', 3) # Valid removal
print(f"Stock of Pears after removing 3: {inventory.get_stock('Pears')} (Expected: 5)")
print("--- General Test Cases Complete ---")
```

```
--- Inventory Class General Test Cases (using print()) ---
Inventory initialized.
Added 10 of Apples. Current stock: 10
Added 5 of Bananas. Current stock: 5
Added 3 of Apples. Current stock: 13
Added 7 of Oranges. Current stock: 7
Current inventory after additions: {'Apples': 13, 'Bananas': 5, 'Oranges': 7}
Stock of Apples: 13 (Expected: 13)
Stock of Bananas: 5 (Expected: 5)
Stock of Grapes: 0 (Expected: 0)
Removed 5 of Apples. Current stock: 8
Stock of Apples after removing 5: 8 (Expected: 8)
Removing all 5 of Bananas. Stock is now 0.
Stock of Bananas after removing all: 0 (Expected: 0)
Removing all 7 of Oranges. Stock is now 0.
Stock of Oranges after removing 10 (was 7): 0 (Expected: 0)
Error: Grapes not in stock or quantity is zero.
Stock of Grapes (should be 0): 0 (Expected: 0)
Error: Quantity must be a positive integer.
Error: Quantity must be a positive integer.
Added 8 of Pears. Current stock: 8
Stock of Pears: 8 (Expected: 8)
Error: Quantity to remove must be a positive integer.
Error: Quantity to remove must be a positive integer.
Removed 3 of Pears. Current stock: 5
Stock of Pears after removing 3: 5 (Expected: 5)
--- General Test Cases Complete ---
```

```python
print('\n--- Inventory Class Assert Test Cases ---')

try:
    # Initialize inventory
    inventory = Inventory()

    # Test add_item method
    inventory.add_item('Laptops', 5)
    assert inventory.get_stock('Laptops') == 5, "Test Case 1 Failed: Initial add_item"

    inventory.add_item('Keyboards', 10)
    assert inventory.get_stock('Keyboards') == 10, "Test Case 2 Failed: Initial add_item another item"

    inventory.add_item('Laptops', 3)
    assert inventory.get_stock('Laptops') == 8, "Test Case 3 Failed: Add more to existing item"

    # Test get_stock method
    assert inventory.get_stock('Monitors') == 0, "Test Case 4 Failed: Get stock of non-existent item"
    assert inventory.get_stock('Keyboards') == 10, "Test Case 5 Failed: Get stock of existing item"

    # Test remove_item method
    inventory.remove_item('Laptops', 2)
    assert inventory.get_stock('Laptops') == 6, "Test Case 6 Failed: Partial remove_item"

    inventory.remove_item('Keyboards', 10) # Remove entire quantity
    assert inventory.get_stock('Keyboards') == 0, "Test Case 7 Failed: Remove entire quantity"

    # Attempt to remove more than available
    inventory.remove_item('Laptops', 10) # Should remove all 6, stock becomes 0
    assert inventory.get_stock('Laptops') == 0, "Test Case 8 Failed: Remove more than available"

    # Attempt to remove a non-existent item
    inventory.remove_item('Mice', 5) # Should not affect stock, remains 0
    assert inventory.get_stock('Mice') == 0, "Test Case 9 Failed: Remove non-existent item"

    # Test invalid quantities for add_item
    initial_stock_printers = inventory.get_stock('Printers')
    inventory.add_item('Printers', 0) # Invalid
    assert inventory.get_stock('Printers') == initial_stock_printers, "Test Case 10 Failed: add_item with zero quantity should not change stock"
    inventory.add_item('Printers', -2) # Invalid
    assert inventory.get_stock('Printers') == initial_stock_printers, "Test Case 11 Failed: add_item with negative quantity should not change stock"
    inventory.add_item('Printers', 5) # Valid
    assert inventory.get_stock('Printers') == initial_stock_printers + 5, "Test Case 12 Failed: add_item with valid quantity"

    # Test invalid quantities for remove_item
    initial_stock_printers = inventory.get_stock('Printers')
    inventory.remove_item('Printers', 0) # Invalid
    assert inventory.get_stock('Printers') == initial_stock_printers, "Test Case 13 Failed: remove_item with zero quantity should not change stock"
    inventory.remove_item('Printers', -2) # Invalid
    assert inventory.get_stock('Printers') == initial_stock_printers, "Test Case 14 Failed: remove_item with negative quantity should not change stock"

    print("All Inventory assert tests passed!")
except AssertionError as e:
    print(f"Inventory assert test failed: {e}")
```

```
--- Inventory Class Assert Test Cases ---
Added 5 of Laptops. Current stock: 5
Added 10 of Keyboards. Current stock: 10
Added 3 of Laptops. Current stock: 8
Removed 2 of Laptops. Current stock: 6
Removing all 10 of Keyboards. Stock is now 0.
Removing all 6 of Laptops. Stock is now 0.
Error: Mice not in stock or quantity is zero.
Error: Quantity must be a positive integer.
Error: Quantity must be a positive integer.
Added 5 of Printers. Current stock: 5
Error: Quantity to remove must be a positive integer.
Error: Quantity to remove must be a positive integer.
All Inventory assert tests passed!
```

```
%%writefile test_inventory.py
import pytest

# Define the Inventory class here to make the test file self-contained
class Inventory:
    def __init__(self):
        self.stock = {}

    def add_item(self, item_name, quantity):
        if not isinstance(quantity, int) or quantity <= 0:
            # print("Error: Quantity must be a positive integer.") # Suppress print for tests
            return

        self.stock[item_name] = self.stock.get(item_name, 0) + quantity
        # print(f"Added {quantity} of {item_name}. Current stock: {self.stock[item_name]}") # Suppress print for tests

    def remove_item(self, item_name, quantity):
        if not isinstance(quantity, int) or quantity <= 0:
            # print("Error: Quantity to remove must be a positive integer.") # Suppress print for tests
            return

        if item_name not in self.stock or self.stock[item_name] == 0:
            # print(f"Error: {item_name} not in stock or quantity is zero.") # Suppress print for tests
            return

        current_stock = self.stock[item_name]
        if quantity >= current_stock:
            # print(f"Removing all {current_stock} of {item_name}. Stock is now 0.") # Suppress print for tests
            self.stock[item_name] = 0
        else:
            self.stock[item_name] -= quantity
            # print(f"Removed {quantity} of {item_name}. Current stock: {self.stock[item_name]}") # Suppress print for tests

    def get_stock(self, item_name):
        return self.stock.get(item_name, 0)


# Pytest test functions

def test_add_item_new():
    inventory = Inventory()
    inventory.add_item('Laptops', 5)
    assert inventory.get_stock('Laptops') == 5

def test_add_item_existing():
    inventory = Inventory()
    inventory.add_item('Laptops', 5)
    inventory.add_item('Laptops', 3)
    assert inventory.get_stock('Laptops') == 8

def test_get_stock_existing():
    inventory = Inventory()
    inventory.add_item('Keyboards', 10)
    assert inventory.get_stock('Keyboards') == 10

def test_get_stock_non_existent():
    inventory = Inventory()
    assert inventory.get_stock('Monitors') == 0

def test_remove_item_partial():
    inventory = Inventory()
    inventory.add_item('Laptops', 10)
    inventory.remove_item('Laptops', 4)
    assert inventory.get_stock('Laptops') == 6

def test_remove_item_all():
    inventory = Inventory()
    inventory.add_item('Keyboards', 7)
    inventory.remove_item('Keyboards', 7)
    assert inventory.get_stock('Keyboards') == 0
```

```
    inventory.remove_item('Mice', 10)
    assert inventory.get_stock('Mice') == 0

def test_remove_item_non_existent():
    inventory = Inventory()
    inventory.remove_item('Printers', 5) # Should do nothing
    assert inventory.get_stock('Printers') == 0

def test_add_item_invalid_quantity_zero():
    inventory = Inventory()
    inventory.add_item('Monitors', 0) # Invalid
    assert inventory.get_stock('Monitors') == 0

def test_add_item_invalid_quantity_negative():
    inventory = Inventory()
    inventory.add_item('Monitors', -5) # Invalid
    assert inventory.get_stock('Monitors') == 0

def test_remove_item_invalid_quantity_zero():
    inventory = Inventory()
    inventory.add_item('Speakers', 10)
    inventory.remove_item('Speakers', 0) # Invalid
    assert inventory.get_stock('Speakers') == 10

def test_remove_item_invalid_quantity_negative():
    inventory = Inventory()
    inventory.add_item('Speakers', 10)
    inventory.remove_item('Speakers', -3) # Invalid
    assert inventory.get_stock('Speakers') == 10
```

```
Writing test_inventory.py
```

```
# Install pytest if you haven't already
%pip install pytest

# Run pytest
print('\n--- Pytest Test Cases Output ---')
!pytest test_inventory.py
```

```
Requirement already satisfied: pytest in /usr/local/lib/python3.12/dist-packages (8.4.2)
Requirement already satisfied: iniconfig>=1 in /usr/local/lib/python3.12/dist-packages (from pytest) (2.3.0)
Requirement already satisfied: packaging>=20 in /usr/local/lib/python3.12/dist-packages (from pytest) (26.0)
Requirement already satisfied: pluggy<2,>=1.5 in /usr/local/lib/python3.12/dist-packages (from pytest) (1.6.0)
Requirement already satisfied: pygments>=2.7.2 in /usr/local/lib/python3.12/dist-packages (from pytest) (2.19.2)

--- Pytest Test Cases Output ---
============================= test session starts ==============================
platform linux -- Python 3.12.12, pytest-8.4.2, pluggy-1.6.0
rootdir: /content
plugins: anyio-4.12.1, langsmith-0.6.9, typeguard-4.4.4
collected 12 items

test_inventory.py ............                                           [100%]

============================== 12 passed in 0.03s ==============================
```

```
print('\n--- Unittest Test Cases Output ---')
!python -m unittest test_inventory_unittest.py
```

```
--- Unittest Test Cases Output ---
............
----------------------------------------------------------------------
Ran 12 tests in 0.001s

OK
```

Task Description #5 (Date Validation & Formatting – Apply AI for Data Validation)

• Task: Use AI to generate at least 3 assert test cases for validate_and_format_date(date_str) to check and convert

dates.

- **Requirements:**

o Validate "MM/DD/YYYY" format.

o Handle invalid dates.

o Convert valid dates to "YYYY-MM-DD".

PROMPT:

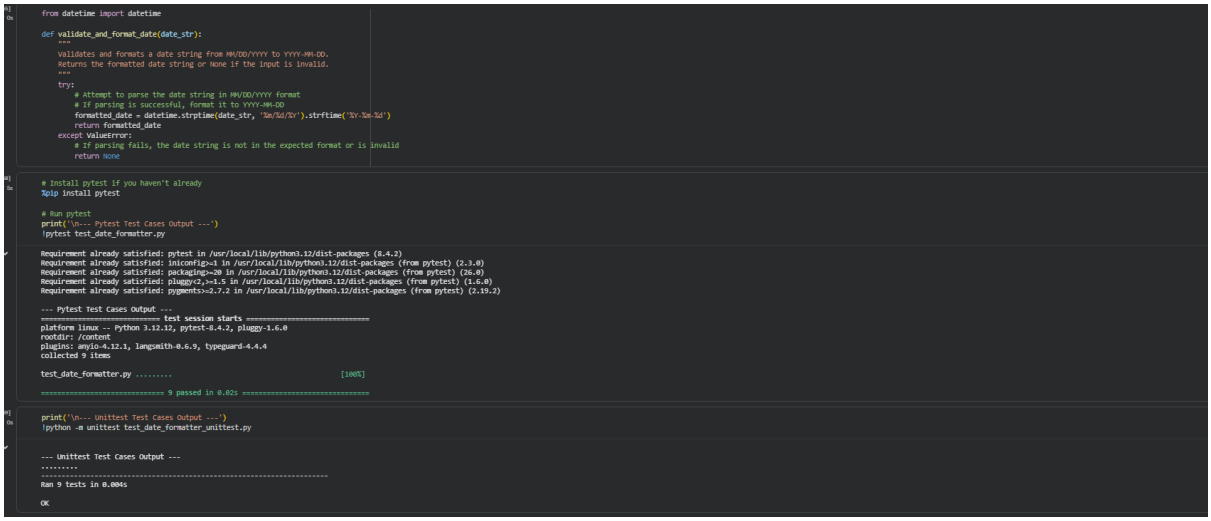
Write function validate_and_format_date(date).

Conditions:

MM/DD/YYYY → YYYY-MM-DD

Generate 4 test cases and outputs using:

General, Assert, Pytest, Unit Test



```
from datetime import datetime

def validate_and_format_date(date_str):
    """
    Validates and formats a date string from MM/DD/YYYY to YYYY-MM-DD.
    Returns the formatted date string or None if the input is invalid.
    """
    try:
        # Attempt to parse the date string in MM/DD/YYYY format
        # If parsing is successful, format it to YYYY-MM-DD
        formatted_date = datetime.strptime(date_str, '%m/%d/%Y').strftime('%Y-%m-%d')
        return formatted_date
    except ValueError:
        # If parsing fails, the date string is not in the expected format or is invalid
        return None
```

```
# Install pytest if you haven't already
%pip install pytest

# Run pytest
print('\n--- Pytest Test Cases Output ---')
!pytest test_date_formatter.py
```

```
Requirement already satisfied: pytest in /usr/local/lib/python3.12/dist-packages (8.4.2)
Requirement already satisfied: iniconfig>=1 in /usr/local/lib/python3.12/dist-packages (from pytest) (2.3.0)
Requirement already satisfied: packaging>=20 in /usr/local/lib/python3.12/dist-packages (from pytest) (26.0)
Requirement already satisfied: pluggy<2,>=1.5 in /usr/local/lib/python3.12/dist-packages (from pytest) (1.6.0)
Requirement already satisfied: pygments>=2.7.2 in /usr/local/lib/python3.12/dist-packages (from pytest) (2.19.2)

--- Pytest Test Cases Output ---
============================= test session starts ==============================
platform linux -- Python 3.12.12, pytest-8.4.2, pluggy-1.6.0
rootdir: /content
plugins: anyio-4.12.1, langsmith-0.6.9, typeguard-4.4.4
collected 9 items

test_date_formatter.py .........                                         [100%]

============================== 9 passed in 0.02s ===============================
```

```
print('\n--- Unittest Test Cases Output ---')
!python -m unittest test_date_formatter_unittest.py
```

```

--- Unittest Test Cases Output ---
.........
----------------------------------------------------------------------
Ran 9 tests in 0.004s

OK
```

```python
print("--- General Test Cases for validate_and_format_date (using print()) ---")

# Test Case 1: Valid date
date_1 = '12/25/2023'
print(f"'{date_1}' formatted: {validate_and_format_date(date_1)} (Expected: '2023-12-25')")

# Test Case 2: Valid date with single digit month/day
date_2 = '01/01/2024'
print(f"'{date_2}' formatted: {validate_and_format_date(date_2)} (Expected: '2024-01-01')")

# Test Case 3: Invalid month
date_3 = '13/01/2023'
print(f"'{date_3}' formatted: {validate_and_format_date(date_3)} (Expected: None)")

# Test Case 4: Invalid day
date_4 = '02/30/2023' # February 2023 only has 28 days
print(f"'{date_4}' formatted: {validate_and_format_date(date_4)} (Expected: None)")

# Test Case 5: Incorrect format (DD-MM-YYYY)
date_5 = '25-12-2023'
print(f"'{date_5}' formatted: {validate_and_format_date(date_5)} (Expected: None)")

# Test Case 6: Incorrect format (YYYY/MM/DD)
date_6 = '2023/12/25'
print(f"'{date_6}' formatted: {validate_and_format_date(date_6)} (Expected: None)")

# Test Case 7: Non-date string
date_7 = 'not a date'
print(f"'{date_7}' formatted: {validate_and_format_date(date_7)} (Expected: None)")

# Test Case 8: Leap year valid date
date_8 = '02/29/2024'
print(f"'{date_8}' formatted: {validate_and_format_date(date_8)} (Expected: '2024-02-29')")

# Test Case 9: Leap year invalid date
date_9 = '02/29/2023'
print(f"'{date_9}' formatted: {validate_and_format_date(date_9)} (Expected: None)")
```

```
--- General Test Cases for validate_and_format_date (using print()) ---
'12/25/2023' formatted: 2023-12-25 (Expected: '2023-12-25')
'01/01/2024' formatted: 2024-01-01 (Expected: '2024-01-01')
'13/01/2023' formatted: None (Expected: None)
'02/30/2023' formatted: None (Expected: None)
'25-12-2023' formatted: None (Expected: None)
'2023/12/25' formatted: None (Expected: None)
'not a date' formatted: None (Expected: None)
'02/29/2024' formatted: 2024-02-29 (Expected: '2024-02-29')
'02/29/2023' formatted: None (Expected: None)
```

Gemini

```python
print("\n--- Assert Test Cases for validate_and_format_date ---")

try:
    assert validate_and_format_date('12/25/2023') == '2023-12-25', "Test Case 1 Failed: Valid date"
    assert validate_and_format_date('01/01/2024') == '2024-01-01', "Test Case 2 Failed: Valid date single digit"
    assert validate_and_format_date('13/01/2023') is None, "Test Case 3 Failed: Invalid month"
    assert validate_and_format_date('02/30/2023') is None, "Test Case 4 Failed: Invalid day"
    assert validate_and_format_date('25-12-2023') is None, "Test Case 5 Failed: Incorrect format DD-MM-YYYY"
    assert validate_and_format_date('2023/12/25') is None, "Test Case 6 Failed: Incorrect format YYYY/MM/DD"
    assert validate_and_format_date('not a date') is None, "Test Case 7 Failed: Non-date string"
    assert validate_and_format_date('02/29/2024') == '2024-02-29', "Test Case 8 Failed: Leap year valid date"
    assert validate_and_format_date('02/29/2023') is None, "Test Case 9 Failed: Leap year invalid date"
    print("All assert tests passed!")
except AssertionError as e:
    print(f"Assert test failed: {e}")
```

```
--- Assert Test Cases for validate_and_format_date ---
All assert tests passed!
```