

**AI Assisted Coding Lab ASS-8.1**

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**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.**

```
1. General Test Cases with print()  
  
print('--- General Test Cases (using print()) ---')  
  
# Test Case 1: Strong password  
password_1 = 'Strong@551'  
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 = 'NoDigit123'  
print(f"(password_3) is strong: {is_strong_password(password_3)} (Expected: False)")  
  
# Test Case 4: Contains space  
password_4 = 'Password with Space123'  
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 = 'weakpass1'  
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()) ---  
'Strong@551' is strong: True (Expected: True)  
'Short1' is strong: False (Expected: False)  
'NoDigit123' is strong: False (Expected: False)  
'Password With Space123' is strong: False (Expected: False)  
'NoSpecial123' is strong: False (Expected: False)  
'weakpass1' 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@SSI') 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'[@#$%^&*()_+`-\\{}]{1};,:.,>/?=-]', 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@SSI') == 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 function that takes a list of integers and returns the sum of all even numbers.

**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

```
def classify_number(n):
    # Condition 1: Check if n is not a numeric type
    if not isinstance(n, (int, float)):
        return 'Invalid Input'

    # Condition 2: Classify numeric types
    if n > 0:
        return 'Positive'
    elif n < 0:
        return 'Negative'
    else:
        return 'Zero'

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!
```

```

❷ %%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 =====

```

```

[33] 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--- Unitest Test Cases Output ---')
!python -m unittest test_classify_number_unittest.py

...
--- Unitest 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

```

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

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('Dobit 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('Dobit 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: inicfg>=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 =====

● xxwritetestfile 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**

```

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)

```

```

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', 8) # 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 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 ...

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.
Error: Item 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!

❶ KXwriteFile 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_items_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

...
----- 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

```
1 from datetime import datetime
2
3 def validate_and_format_date(date_str):
4     """
5         Validates and formats a date string from MM/DD/YYYY to YYYY-MM-DD.
6         Returns the formatted date string or None if the input is invalid.
7     """
8     try:
9         # Attempt to parse the date string in MM/DD/YYYY format.
10        # If parsing is successful, format it to YYYY-MM-DD.
11        formatted_date = datetime.strptime(date_str, "%m/%d/%Y").strftime("%Y-%m-%d")
12        return formatted_date
13    except ValueError:
14        # If parsing fails, the date string is not in the expected format or is invalid.
15        return None
16
17 # Install pytest if you haven't already
18 #pip install pytest
19
20 # Run pytest
21 print("```... 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: pygments<3.0,>=2.12.0 in /usr/local/lib/python3.12/dist-packages (from pytest) (2.2.0)
Requirement already satisfied: packaging>=20.0 in /usr/local/lib/python3.12/dist-packages (from pytest) (26.0)
Requirement already satisfied: pluggy<7.1.5 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
-----
platform linux -- Python 3.12.12, pytest-8.4.2, pluggy-1.6.0
rootdir: /content
plugins: mypy-4.12.1, langsmith-0.6.9, typeguard-4.4.4
collected 3 items
test_date_formatter.py ..... [100%]
----- 9 passed in 0.023 -----
print("```... Unittest Test Cases Output ...``")  
python -m unittest test_date_formatter.unittest.py
...
Unittest Test Cases Output
-----
Run 3 tests in 0.000s
OK
```

```

1) ✓ print('--- General Test Cases for validate_and_format_date (using print()) ---')
2)   # Test Case 1: Valid date
3)   date_1 = '12/25/2023'
4)   print(f'{date_1} formatted: {validate_and_format_date(date_1)} (Expected: "2023-12-25")')
5) 
6)   # Test Case 2: Valid date with single digit month/day
7)   date_2 = '01/01/2024'
8)   print(f'{date_2} formatted: {validate_and_format_date(date_2)} (Expected: "2024-01-01")')
9) 
10)  # Test Case 3: Invalid month
11)  date_3 = '13/01/2023'
12)  print(f'{date_3} formatted: {validate_and_format_date(date_3)} (Expected: None)')
13) 
14)  # Test Case 4: Invalid day
15)  date_4 = '29/02/2023' # February 2023 only has 28 days.
16)  print(f'{date_4} formatted: {validate_and_format_date(date_4)} (Expected: None)')
17) 
18)  # Test Case 5: Incorrect Format (DD-MM-YYYY)
19)  date_5 = '25-12-2023'
20)  print(f'{date_5} formatted: {validate_and_format_date(date_5)} (Expected: None)')
21) 
22)  # Test Case 6: Incorrect Format (YYYY/MM/DD)
23)  date_6 = '2023/12/25'
24)  print(f'{date_6} formatted: {validate_and_format_date(date_6)} (Expected: None)')
25) 
26)  # Test Case 7: Non-date string
27)  date_7 = 'not a date'
28)  print(f'{date_7} formatted: {validate_and_format_date(date_7)} (Expected: None)')
29) 
30)  # Test Case 8: Leap year valid date
31)  date_8 = '02/29/2024'
32)  print(f'{date_8} formatted: {validate_and_format_date(date_8)} (Expected: "2024-02-28")')
33) 
34)  # Test Case 9: Leap year invalid date
35)  date_9 = '02/29/2023'
36)  print(f'{date_9} formatted: {validate_and_format_date(date_9)} (Expected: None)')
37) 
38)  --- General Test Cases for validate_and_format_date (using print())
39)  ...
40)  '12/25/2023' formatted: 2023-12-25 (Expected: "2023-12-25")
41)  '01/01/2024' formatted: 2024-01-01 (Expected: "2024-01-01")
42)  '13/01/2023' formatted: None (Expected: None)
43)  '01/01/2023' formatted: None (Expected: None)
44)  '25-12-2023' formatted: None (Expected: None)
45)  '29/02/2023' formatted: None (Expected: None)
46)  'not a date' formatted: None (Expected: None)
47)  '02/29/2023' formatted: 2023-02-29 (Expected: "2023-02-29")
48)  '02/29/2024' formatted: None (Expected: None)
49) 
50)  ➔ GitHub
51)  print('--- Assert Test Cases for validate_and_format_date ---')
52) 
53)  try:
54)      assert validate_and_format_date('12/25/2023') == '2023-12-25', "Test Case 1 Failed: Valid date"
55)      assert validate_and_format_date('01/01/2024') == '2024-01-01', "Test Case 2 Failed: Valid date single digit."
56)      assert validate_and_format_date('13/01/2023') is None, "Test Case 3 Failed: Invalid month"
57)      assert validate_and_format_date('29/02/2023') is None, "Test Case 4 Failed: Invalid day"
58)      assert validate_and_format_date('25-12-2023') is None, "Test Case 5 Failed: Incorrect Format DD-MM-YYYY"
59)      assert validate_and_format_date('2023/12/25') is None, "Test Case 6 Failed: Incorrect Format YYYY/MM/DD"
60)      assert validate_and_format_date('02/29/2023') is None, "Test Case 7 Failed: Non-date string"
61)      assert validate_and_format_date('02/29/2024') == '2024-02-28', "Test Case 8 Failed: leap year valid date"
62)      assert validate_and_format_date('02/29/2023') is None, "Test Case 9 Failed: leap year invalid date"
63)  except AssertionError as e:
64)      print(f"AssertionError: {e}")
65) 
66)  --- Assert Test Cases for validate_and_format_date ---
67)  All assert tests passed!

```