

Assignment

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Test-Driven Development with AI – Generating and Working with Test Cases :

Task #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.

- **Requirements:**

- o Password must have at least 8 characters.
- o Must include uppercase, lowercase, digit, and special character.
- o Must not contain spaces.

Example Assert Test Cases:

```
assert is_strong_password("Abcd@123") == True
assert is_strong_password("abcd123") == False
assert is_strong_password("ABCD@1234") == True
```

Expected Output #1:

- Password validation logic passing all AI-generated test cases

```
def is_strong_password(password):
    # Check length
    if len(password) < 8:
        return False
    # Check for spaces
    if ' ' in password:
        return False
    # Check for uppercase, lowercase, digit, and special character
    if not re.search(r'[A-Z]', password):
        return False
    if not re.search(r'[a-z]', password):
        return False
    if not re.search(r'[0-9]', password):
        return False
    if not re.search(r'[!@#$%^&*~]', password):
        return False
    return True

# Example assert test cases
assert is_strong_password("Abcd@123") == True # Valid password
assert is_strong_password("abcd123") == False # No uppercase, no special char
assert is_strong_password("ABCD@1234") == True # Valid password
assert is_strong_password("Abcdefgh") == False # No digit or special char
assert is_strong_password("Abc@ 123") == False # Contains space
assert is_strong_password("A!@bcd ef") == True # Valid password
```

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is_strong_password

```
# Check for uppercase
if not re.search(r'[A-Z]', password):
    return False
# Check for lowercase
if not re.search(r'[a-z]', password):
    return False
# Check for digit
if not re.search(r'[0-9]', password):
    return False
# Check for special character
if not re.search(r'[!@#$%^&*~]', password):
    return False
return True

# Example assert test cases
assert is_strong_password("Abcd@123") == True
assert is_strong_password("abcd123") == False
assert is_strong_password("ABCD@1234") == True
assert is_strong_password("Abcdefgh") == False
assert is_strong_password("Abc@ 123") == False
assert is_strong_password("A!@bcd ef") == True
```

Gotchas:

- Make sure to import `re` for regular expressions.
- The function checks all requirements: length, no spaces, and character types.
- You can add more assert cases to cover edge cases.

Let me know if you need help integrating this with unit tests in Visual Studio Code!

Add Context... 8.py x

Add context (#), extensions (@), or Ask GPT-4.1

Task #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.
- Requirements:**
 - Classify numbers as Positive, Negative, or Zero.
 - Handle invalid inputs like strings and None.
 - Include boundary conditions (-1, 0, 1).

Example Assert Test Cases:

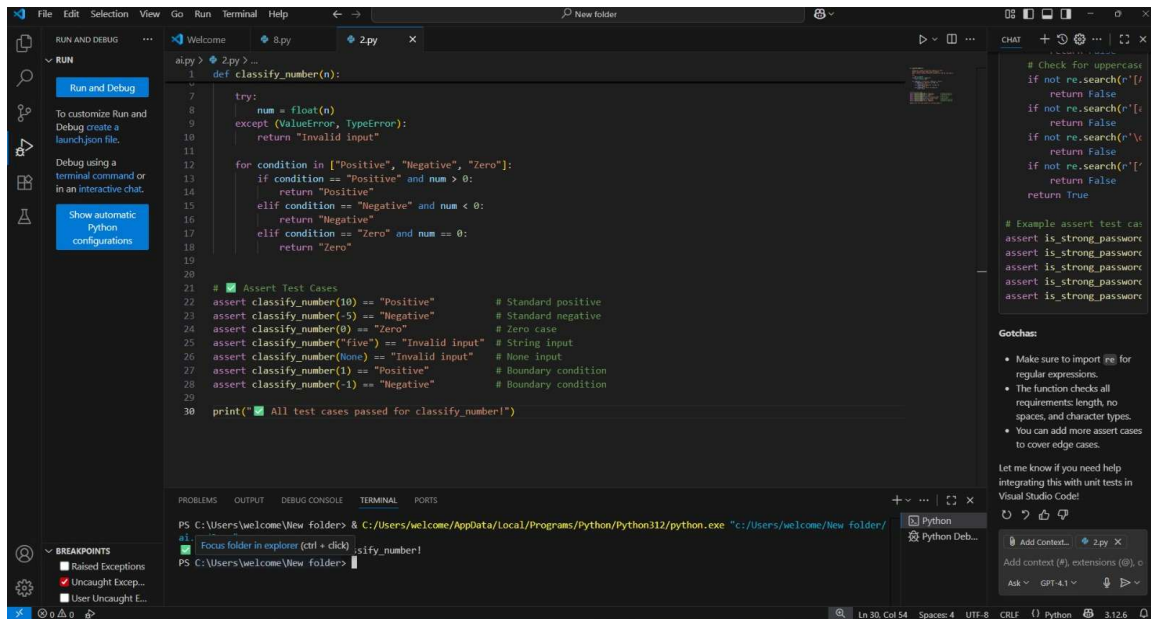
```
assert classify_number(10) == "Positive"
```

```
assert classify_number(-5) == "Negative"
```

```
assert classify_number(0) == "Zero"
```

Expected Output #2:

- Classification logic passing all assert tests.



Task #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).

Example Assert Test Cases:

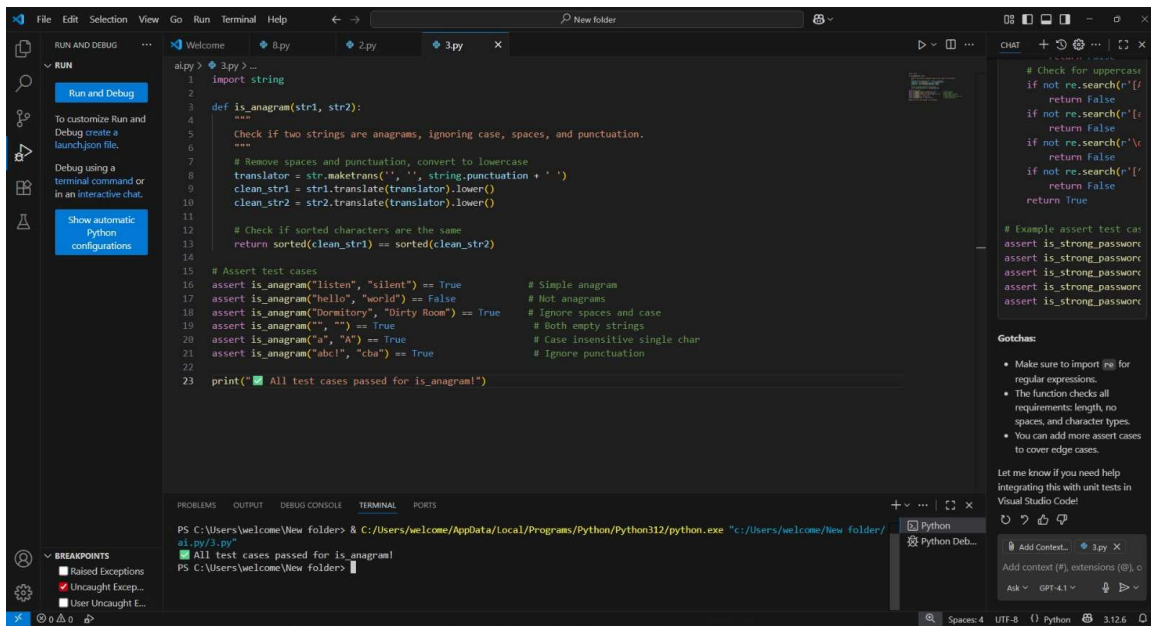
```

assert is_anagram("listen", "silent") == True
assert is_anagram("hello", "world") == False
assert is_anagram("Dormitory", "Dirty Room") == True

```

Expected Output #3:

- Function correctly identifying anagrams and passing all AI-generated tests.



Task #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)

Example Assert Test Cases:

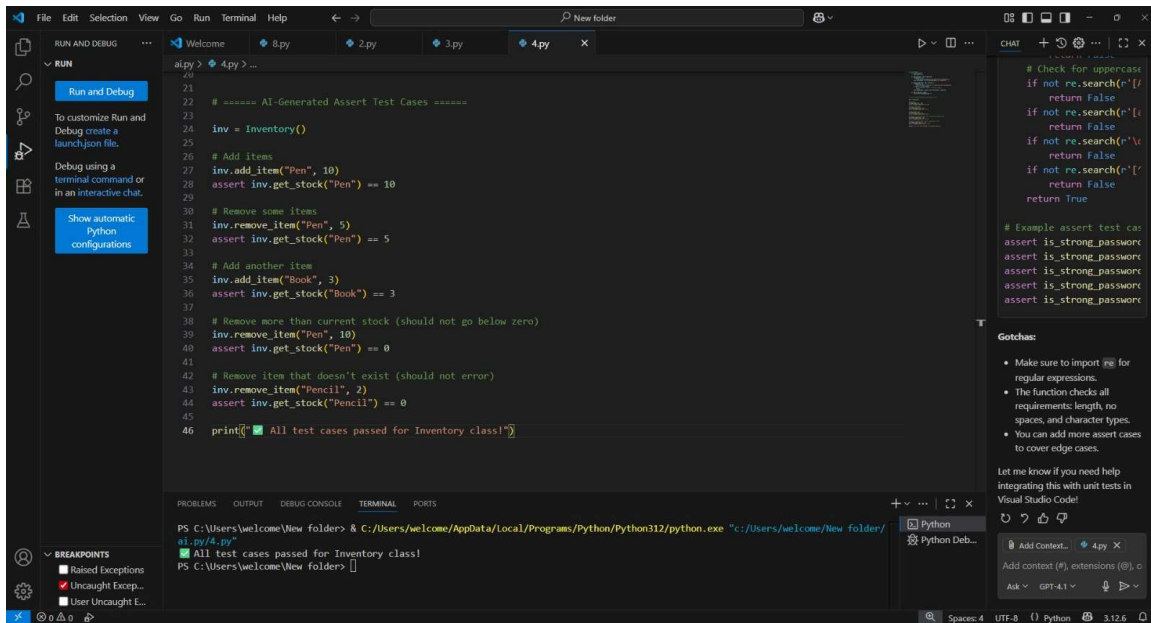
```

inv = Inventory()
inv.add_item("Pen", 10)
assert inv.get_stock("Pen") == 10
inv.remove_item("Pen", 5)
assert inv.get_stock("Pen") == 5
inv.add_item("Book", 3)
assert inv.get_stock("Book") == 3

```

Expected Output #4:

- Fully functional class passing all assertions



```
ai.py > 4.py > ...
21
22 # ===== AI-Generated Assert Test Cases =====
23
24 inv = Inventory()
25
26 # Add items
27 inv.add_item("Pen", 10)
28 assert inv.get_stock("Pen") == 10
29
30 # Remove some items
31 inv.remove_item("Pen", 5)
32 assert inv.get_stock("Pen") == 5
33
34 # Add another item
35 inv.add_item("Book", 3)
36 assert inv.get_stock("Book") == 3
37
38 # Remove more than current stock (should not go below zero)
39 inv.remove_item("Pen", 10)
40 assert inv.get_stock("Pen") == 0
41
42 # Remove item that doesn't exist (should not error)
43 inv.remove_item("Pencil", 2)
44 assert inv.get_stock("Pencil") == 0
45
46 print("All test cases passed for Inventory class!")
```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS

PS C:\Users\welcome\New folder> & C:\Users\welcome\AppData\Local\Programs\Python\Python312\python.exe "c:\Users\welcome\New folder\ai.py/4.py"

ai.py/4.py All test cases passed for Inventory class!

PS C:\Users\welcome\New folder>

CHAT

```
# Check for uppercase
if not re.search(r'[I]')
    return False
if not re.search(r'[i]')
    return False
if not re.search(r'[V]')
    return False
if not re.search(r'[v]')
    return False
return True

# Example assert test case
assert is_strong_password
assert is_strong_password
assert is_strong_password
assert is_strong_password
assert is_strong_password
```

Gotchas:

- Make sure to import `re` for regular expressions.
- The function checks all requirements: length, no spaces, and character types.
- You can add more assert cases to cover edge cases.

Let me know if you need help integrating this with unit tests in Visual Studio Code!

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Ask GPT-4.1

Task #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".

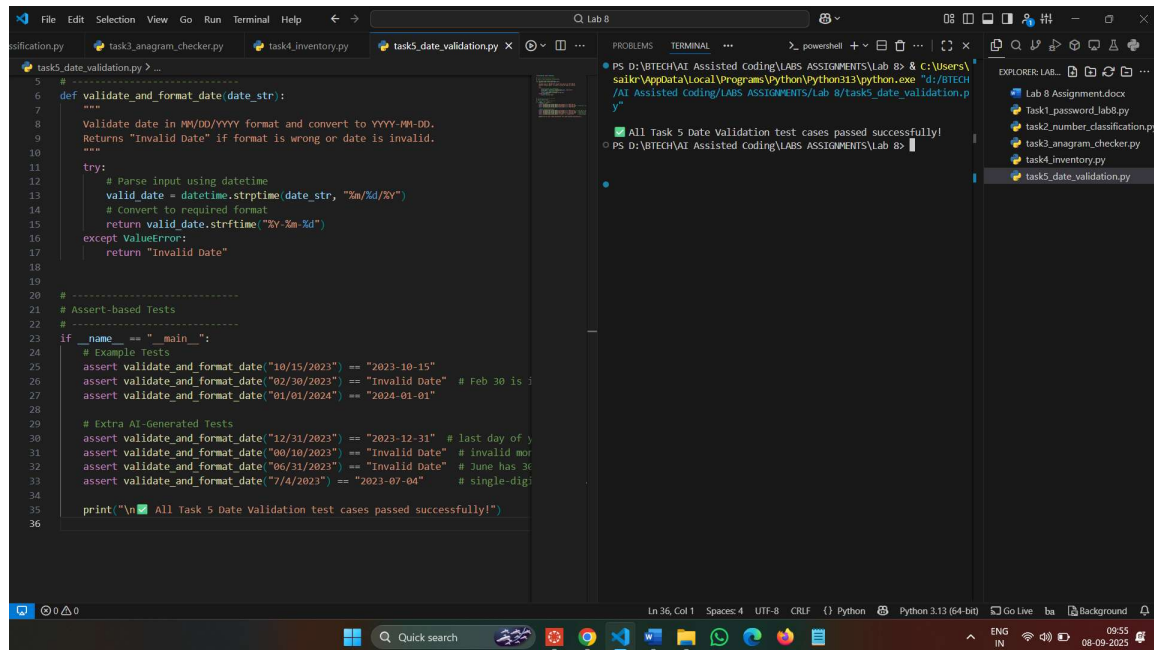
Example Assert Test Cases:

```
assert validate_and_format_date("10/15/2023") == "2023-10-15"
assert validate_and_format_date("02/30/2023") == "Invalid Date"
```

```
assert validate_and_format_date("01/01/2024") == "2024-01-01"
```

Expected Output #5:

- Function passes all AI-generated assertions and handles edge cases.



The screenshot shows a Visual Studio Code editor with a Python file named `task5_date_validation.py`. The code defines a function `validate_and_format_date` that takes a date string in `MM/DD/YYYY` format and returns it in `YYYY-MM-DD` format. It includes several assertions for testing, including example tests and extra AI-generated tests. The terminal output shows that all tests passed successfully.

```
5 #
6 def validate_and_format_date(date_str):
7     """
8     Validate date in MM/DD/YYYY format and convert to YYYY-MM-DD.
9     Returns "Invalid Date" if format is wrong or date is invalid.
10    """
11    try:
12        # Parse input using datetime
13        valid_date = datetime.strptime(date_str, "%m/%d/%Y")
14        # Convert to required format
15        return valid_date.strftime("%Y-%m-%d")
16    except ValueError:
17        return "Invalid Date"
18
19
20 # -----
21 # Assert-based Tests
22 # -----
23 if __name__ == "__main__":
24     # Example Tests
25     assert validate_and_format_date("10/15/2023") == "2023-10-15"
26     assert validate_and_format_date("02/30/2023") == "Invalid Date" # Feb 30 is invalid
27     assert validate_and_format_date("01/01/2024") == "2024-01-01"
28
29     # Extra AI-Generated Tests
30     assert validate_and_format_date("12/31/2023") == "2023-12-31" # last day of year
31     assert validate_and_format_date("00/10/2023") == "Invalid Date" # invalid month
32     assert validate_and_format_date("06/31/2023") == "Invalid Date" # June has 30 days
33     assert validate_and_format_date("7/4/2023") == "2023-07-04" # single-digit month
34
35     print("\n✅ All Task 5 Date Validation test cases passed successfully!")
36
```

Terminal Output:

```
PS D:\BTECH\AI Assisted Coding\LABS ASSIGNMENTS\Lab 8> python.exe "d:/BTECH/
AI Assisted Coding/LAB ASSIGNMENTS/Lab 8/task5_date_validation.py"
All Task 5 Date Validation test cases passed successfully!
PS D:\BTECH\AI Assisted Coding\LABS ASSIGNMENTS\Lab 8>
```

Observation:

Task 1 – Password Strength Validator

The function successfully validated password strength using rules for length, uppercase, lowercase, digits, special characters, and no spaces. All test cases passed.

Task 2 – Number Classification

The function correctly classified numbers as Positive, Negative, or Zero, and handled invalid inputs like strings and None. Boundary conditions (-1, 0, 1) worked as expected.

Task 3 – Anagram Checker

The function correctly identified anagrams while ignoring spaces, case, and punctuation. Edge cases like empty strings and identical words were handled properly.

Task 4 – Inventory Class

The inventory system supported adding, removing, and checking stock. It also handled invalid quantities, missing items, and insufficient stock. All assertions passed.

Task 5 – Date Validation & Formatting

The function validated dates in MM/DD/YYYY format and converted them to YYYY-MM-DD. Invalid dates (like Feb 30, month=0, wrong day count) were rejected successfully.