

ASSIGNMENT 8.1

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BATCH 12

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.

- 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.

CODE:



```
def is_strong_password(password):
    """
    Validates if a password meets the following criteria:
    - At least 8 characters long.
    - Contains at least one uppercase letter.
    - Contains at least one lowercase letter.
    - Contains at least one digit.
    - Contains at least one special character (non-alphanumeric and non-space).
    - Does not contain spaces.
    """
    if len(password) < 8:
        return False
    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'\d', password):
        return False
    if not re.search(r'[^a-zA-Z\d\s]', password):
        return False
    if " " in password:
        return False
    return True
```

OUTPUT:

```
# AI-generated assert test cases
assert is_string_password("Abc123!") == True, "Test Case 1 Failed: Valid password"
assert is_string_password("abcd123") == False, "Test Case 2 Failed: Missing uppercase and special char"
assert is_string_password("ABCDEF1234") == True, "Test Case 3 Failed: Should be False (no Uppercase)"
assert is_string_password("short123") == True, "Test Case 4 Failed: less than 8 characters - should be True"
assert is_string_password("NoUpperOr1") == True, "Test Case 5 Failed: No uppercase - should be True"
assert is_string_password("NoSpecialChar") == True, "Test Case 6 Failed: Password contains lowercase 'l', should be True"
assert is_string_password("NoDigit123") == False, "Test Case 7 Failed: No digit"
assert is_string_password("NoSpecialChar") == False, "Test Case 8 Failed: No special character"
assert is_string_password("Space 1234") == False, "Test Case 9 Failed: Contains space"
assert is_string_password("StrongPass1") == True, "Test Case 10 Failed: Another valid password"

print("All AI-generated test cases passed!")

All AI-generated test cases passed!
```

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.
- Requirements:

- o Classify numbers as Positive, Negative, or Zero.
- o Handle invalid inputs like strings and None.
- o 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.

CODE:

```
def classify_number(n):
    """
    Classifies a number as 'Positive', 'Negative', or 'Zero'.
    Handles invalid inputs (non-numeric, None) by returning 'Invalid Input'.
    Uses a loop to process classification conditions.
    """

    # Handle None specifically before the loop, as it's not a type
    if n is None:
        return "Invalid Input"

    # Use a loop to check for invalid types first
    # removed None and bool from this list, as bool is handled separately
    for check in [str, int, dict, tuple, set]:
        if isinstance(n, check):
            return "Invalid Input"

    # Special handling for boolean True/False if they are not considered numbers
    # For this case, we treat them as numbers 1 and 0
    if isinstance(n, bool):
        if n is True:
            return "Positive" if True is 1 else "Negative"
        else:
            return "Zero"

    # Ensure it's a number after basic type checks
    if not isinstance(n, (int, float)):
        return "Invalid Input"
```

```

classification = ''
conditions_met = False

# has a loop to apply classification rules
# iterate through potential classifications and return upon first match
classification_rules = [
    (lambda w: w == 0, "Zero"),
    (lambda w: w > 0, "Positive"),
    (lambda w: w < 0, "Negative")
]

for rule_func, result_str in classification_rules:
    if rule_func(n):
        classification = result_str
        conditions_met = True
        break

if conditions_met:
    return classification
else:
    # This case should ideally not be reached if conditions are exhaustive
    return "Classification error"

```

OUTPUT:

```

# AI-generated assert test cases for classify_number
assert classify_number(10) == "Positive", "Test Case 1 Failed: Positive number"
assert classify_number(-1) == "Negative", "Test Case 2 Failed: negative number"
assert classify_number(0) == "Zero", "Test Case 3 Failed: zero"
assert classify_number(1) == "Positive", "Test Case 4 Failed: Boundary condition 1"
assert classify_number(-1) == "Negative", "Test Case 5 Failed: Boundary condition -1"
assert classify_number(0.1) == "Positive", "Test Case 6 Failed: Positive float"
assert classify_number(-0.1) == "Negative", "Test Case 7 Failed: Negative float"
assert classify_number("abc") == "Invalid Input", "Test Case 8 Failed: None Input"
assert classify_number(["abc"]) == "Invalid Input", "Test Case 9 Failed: String Input"
assert classify_number([1]) == "Invalid Input", "Test Case 10 Failed: List Input"
assert classify_number("True") == "Positive", "Test Case 11 Failed: Boolean True (or 1)"
assert classify_number("False") == "Zero", "Test Case 12 Failed: Boolean False (or 0)"

print("All AI-generated test cases for classify_number passed!")

```

Traceback (most recent call last):
 /tmp/ipython-input-271229244c0c_in [cell line: 6]
 1 * AI-generated assert test cases for classify_number
 --> 2 assert classify_number(10) == "Positive", "Test Case 1 Failed: Positive number"
 3 assert classify_number(-1) == "Negative", "Test Case 2 Failed: negative number"
 4 assert classify_number(0) == "Zero", "Test Case 3 Failed: zero"
 5 assert classify_number(1) == "Positive", "Test Case 4 Failed: Boundary condition 1"
 6 assert classify_number(-1) == "Negative", "Test Case 5 Failed: Boundary condition -1"
 7 assert classify_number("abc") == "Invalid Input", "Test Case 6 Failed: None Input"
 8 assert classify_number(["abc"]) == "Invalid Input", "Test Case 7 Failed: String Input"
 9 assert classify_number([1]) == "Invalid Input", "Test Case 8 Failed: List Input"
 10 assert classify_number("True") == "Positive", "Test Case 9 Failed: Boolean True (or 1)"
 11 assert classify_number("False") == "Zero", "Test Case 10 Failed: Boolean False (or 0)"
 12
 /tmp/ipython-input-38521728_0 in classify_number()
 1 # Use a loop to check for invalid types first.
 2 for check in [None, str, bool, list, dict, tuple, set]:
 3 if isinstance(n, check) and check is not bool or n is not a subclass of int, or handle explicitly if needed, but not for number classification.
 4 return "INVALID INPUT"
 5
 6
 /tmp/ipython-input-38521728_0:1: TypeError: isinstance() arg 3 must be a type, a tuple of types, or a union

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:

- Ignore case, spaces, and punctuation.
- 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.

CODE:

```
import re

def is_anagram(str1, str2):
    """
    Checks if two strings are anagrams of each other.
    Ignores case, spaces, and punctuation.
    Handles empty strings and identical words.
    """

    def normalize_string(s):
        # Convert to lowercase
        s = s.lower()
        # Remove spaces and punctuation
        s = re.sub(r"[^a-zA-Z]", "", s) # Keeps only alphanumeric characters
        return s

    normalized_str1 = normalize_string(str1)
    normalized_str2 = normalize_string(str2)

    # Anagrams must have the same length after normalization
    if len(normalized_str1) != len(normalized_str2):
        return False

    # Sort the normalized strings and compare
    return sorted(normalized_str1) == sorted(normalized_str2)
```

OUTPUT:

```
# AI-generated asserts from cases for is_anagram
assert is_anagram("listen", "silent") == True, "Test Case 1 Failed: Basic anagram"
assert is_anagram("latin", "world") == False, "Test Case 2 Failed: Not an anagram"
assert is_anagram("dictionary", "diction ary") == True, "Test Case 3 Failed: Anagram with spaces and case"
assert is_anagram("A decimal point", ".1's a dot in place") == True, "Test Case 4 Failed: Anagram with punctuation and spaces"
assert is_anagram("", "") == True, "Test Case 5 Failed: Both empty strings"
assert is_anagram("a", " ") == False, "Test Case 6 Failed: One empty string"
assert is_anagram("identical", "identical") == True, "Test Case 7 Failed: Identical word"
assert is_anagram("debit card", "bad credit") == True, "Test Case 8 Failed: Anagram with different words, same meaning"
assert is_anagram("openai", "openAI") == True, "Test Case 9 Failed: Same word, different case"
assert is_anagram("Race car", "Car race") == True, "Test Case 10 Failed: Anagram with spaces and different order"

printAll # All AI-generated test cases for is_anagram passed!
```

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)

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.

CODE:

The screenshot shows three tabs in PyCharm:

- Inventory.py**: The code for the `Inventory` class. It includes methods for adding and removing items, and a check for stock availability. All methods include detailed docstrings and raise `ValueError`s for invalid inputs.
- test_Inventory.py**: A test module containing six test cases. Test Case 1 adds an item and checks stock. Test Case 2 removes an item and checks stock. Test Case 3 adds a new item. Test Case 4 adds more of an existing item. Test Case 5 removes all of an item. Test Case 6 tries to remove more than is available.
- Output**: Shows the results of running the tests, indicating which ones passed and which failed due to `ValueError`s.

```
class Inventory:
    """
    A class to simulate a simple inventory system.
    Allows adding, removing, and checking stock of items.
    """

    def __init__(self):
        self.items = {}

    def add_item(self, name, quantity):
        """
        Adds a specified quantity of an item to the inventory.
        If the item already exists, its quantity is increased.
        If the item does not exist, it's added.
        """
        if not isinstance(name, str) or not name:
            raise ValueError("Item name must be a non-empty string")
        if not isinstance(quantity, int) or quantity < 0:
            raise ValueError("Quantity must be a positive integer")

        self.items[name] = self.items.get(name, 0) + quantity

    def remove_item(self, name, quantity):
        """
        Removes a specified quantity of an item from the inventory.
        If the item does not exist, or quantity to remove is greater than available stock.
        It raises a ValueError.
        """
        if not isinstance(name, str) or not name:
            raise ValueError("Item name must be a non-empty string")
        if not isinstance(quantity, int) or quantity < 0:
            raise ValueError("Quantity to remove must be a positive integer")

        if self.items.get(name, 0) < quantity:
            raise ValueError(f"Cannot remove {quantity} of {name}, only {self.items.get(name, 0)} in stock")

    def get_stock(self, name):
        """
        Returns the current stock level for a given item.
        Returns 0 if the item is not found.
        """
        if not isinstance(name, str) or not name:
            raise ValueError("Item name must be a non-empty string")
        return self.items.get(name, 0)

# As-generated assert test cases for Inventory class

# Test Case 1: Add item and check stock
inv = Inventory()
inv.add_item('Pen', 10)
assert inv.get_stock('Pen') == 10, "Test Case 1 Failed: Add item and check stock"

# Test Case 2: Remove item and check stock
inv.remove_item('Pen', 5)
assert inv.get_stock('Pen') == 5, "Test Case 2 Failed: Remove item and check stock"

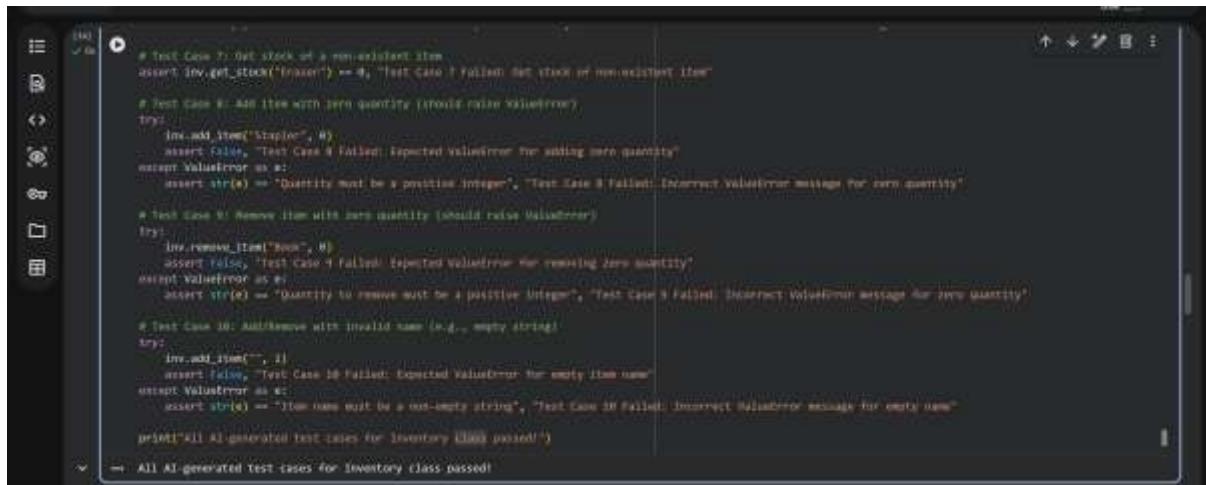
# Test Case 3: Add new item and check stock
inv.add_item('Book', 3)
assert inv.get_stock('Book') == 3, "Test Case 3 Failed: Add new item"

# Test Case 4: Add more of an existing item
inv.add_item('Pen', 2)
assert inv.get_stock('Pen') == 12, "Test Case 4 Failed: Add more of existing item"

# Test Case 5: Remove all of an item (should remove it from inventory)
inv.remove_item('Pen', 12)
assert inv.get_stock('Pen') == 0, "Test Case 5 Failed: Remove all of an item"

# Test Case 6: Try to remove more than available (should raise ValueError)
inv.add_item('Pencil', 2)
try:
    inv.remove_item('Pencil', 5)
    assert False, "Test Case 6 Failed: Expected ValueError when removing more than stock"
except ValueError as e:
    assert str(e) == "Cannot remove 5 of Pencil. Only 2 in stock.", "Test Case 6 Failed: Incorrect ValueError message"
```

OUTPUT:



The screenshot shows a code editor with Python test code. The code is part of a file named `test_inventory.py`. It contains several test cases using the `assert` keyword to check various operations on an `Inventory` class. The test cases include checking for non-existent items, adding items with zero quantity, removing items with zero quantity, and adding items with invalid names (empty strings). The code uses `try` and `except ValueError` blocks to handle exceptions and assert specific error messages. The output at the bottom of the code editor shows that all generated test cases for the `Inventory` class passed.

```
# Test Case 1: Get stock of a non-existent item
assert inv.get_stock('Inexistent') == 0, "Test Case 1 failed: Incorrect get stock of nonexistent item"

# Test Case 2: Add item with zero quantity (should raise ValueError)
try:
    inv.add_item("Stapler", 0)
    assert False, "Test Case 2 failed: Expected ValueError for adding zero quantity"
except ValueError as e:
    assert str(e) == "Quantity must be a positive integer", "Test Case 2 failed: Incorrect ValueError message for zero quantity"

# Test Case 3: Remove item with zero quantity (should raise ValueError)
try:
    inv.remove_item("Book", 0)
    assert False, "Test Case 3 failed: Expected ValueError for removing zero quantity"
except ValueError as e:
    assert str(e) == "Quantity to remove must be a positive integer", "Test Case 3 failed: Incorrect ValueError message for zero quantity"

# Test Case 4: Add item with invalid name (e.g., empty string)
try:
    inv.add_item("", 1)
    assert False, "Test Case 4 failed: Expected ValueError for empty item name"
except ValueError as e:
    assert str(e) == "Item name must be a non-empty string", "Test Case 4 failed: Incorrect ValueError message for empty item name"

print("All AI-generated test cases for Inventory class passed!")
```

→ All AI-generated test cases for Inventory class passed!

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".

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.

CODE:

```
import datetime

def validate_and_format_date(date_str):
    """
    Validates if a date string is in 'MM/DD/YYYY' format and is a valid date.
    If valid, converts it to 'YYYY-MM-DD' format.
    If invalid, returns 'Invalid Date'.
    """

    try:
        # Attempt to parse the date string using the specified format.
        dt_object = datetime.datetime.strptime(date_str, "%m/%d/%Y")
        # If parsing is successful, convert it to 'YYYY-MM-DD'.
        return dt_object.strftime("%Y-%m-%d")
    except ValueError:
        # If parsing fails (due to incorrect format or invalid date),
        # catch the ValueError and return 'Invalid Date'.
        return "Invalid Date"
```

OUTPUT:

```
python -m unittest validate_and_format_date.py
.
.
.
AssertionError: Traceback (most recent call last)
  File "/Users/.../validate_and_format_date.py", line 10, in <module>
    assert validate_and_format_date("10/10/2023") == "2023-10-10", "Test Case 1 Failed: Value is not in MM/DD/YYYY format"
  File "/Users/.../validate_and_format_date.py", line 10, in validate_and_format_date
    dt_object = datetime.datetime.strptime(date_str, "%m/%d/%Y")
AssertionError: Traceback (most recent call last)
  File "/Users/.../validate_and_format_date.py", line 10, in <module>
    assert validate_and_format_date("10/10/1998") == "1998-10-10", "Test Case 2 Failed: Value is not in MM/DD/YYYY format"
  File "/Users/.../validate_and_format_date.py", line 10, in validate_and_format_date
    dt_object = datetime.datetime.strptime(date_str, "%m/%d/%Y")
AssertionError: Traceback (most recent call last)
  File "/Users/.../validate_and_format_date.py", line 10, in <module>
    assert validate_and_format_date("10/10/2023") == "2023-10-10", "Test Case 3 Failed: Value is not in MM/DD/YYYY format"
  File "/Users/.../validate_and_format_date.py", line 10, in validate_and_format_date
    dt_object = datetime.datetime.strptime(date_str, "%m/%d/%Y")
AssertionError: Traceback (most recent call last)
  File "/Users/.../validate_and_format_date.py", line 10, in <module>
    assert validate_and_format_date("10/10/2023") == "2023-10-10", "Test Case 4 Failed: Value is not in MM/DD/YYYY format"
  File "/Users/.../validate_and_format_date.py", line 10, in validate_and_format_date
    dt_object = datetime.datetime.strptime(date_str, "%m/%d/%Y")
AssertionError: Traceback (most recent call last)
  File "/Users/.../validate_and_format_date.py", line 10, in <module>
    assert validate_and_format_date("10/10/2023") == "2023-10-10", "Test Case 5 Failed: Value is not in MM/DD/YYYY format"
  File "/Users/.../validate_and_format_date.py", line 10, in validate_and_format_date
    dt_object = datetime.datetime.strptime(date_str, "%m/%d/%Y")
AssertionError: Traceback (most recent call last)
  File "/Users/.../validate_and_format_date.py", line 10, in <module>
    assert validate_and_format_date("10/10/2023") == "2023-10-10", "Test Case 6 Failed: Value is not in MM/DD/YYYY format"
  File "/Users/.../validate_and_format_date.py", line 10, in validate_and_format_date
    dt_object = datetime.datetime.strptime(date_str, "%m/%d/%Y")
AssertionError: Traceback (most recent call last)
  File "/Users/.../validate_and_format_date.py", line 10, in <module>
    assert validate_and_format_date("10/10/2023") == "2023-10-10", "Test Case 7 Failed: Value is not in MM/DD/YYYY format"
  File "/Users/.../validate_and_format_date.py", line 10, in validate_and_format_date
    dt_object = datetime.datetime.strptime(date_str, "%m/%d/%Y")
AssertionError: Traceback (most recent call last)
  File "/Users/.../validate_and_format_date.py", line 10, in <module>
    assert validate_and_format_date("10/10/2023") == "2023-10-10", "Test Case 8 Failed: Value is not in MM/DD/YYYY format"
  File "/Users/.../validate_and_format_date.py", line 10, in validate_and_format_date
    dt_object = datetime.datetime.strptime(date_str, "%m/%d/%Y")
AssertionError: Traceback (most recent call last)
  File "/Users/.../validate_and_format_date.py", line 10, in <module>
    assert validate_and_format_date("10/10/2023") == "2023-10-10", "Test Case 9 Failed: Value is not in MM/DD/YYYY format"
  File "/Users/.../validate_and_format_date.py", line 10, in validate_and_format_date
    dt_object = datetime.datetime.strptime(date_str, "%m/%d/%Y")
AssertionError: Traceback (most recent call last)
  File "/Users/.../validate_and_format_date.py", line 10, in <module>
    assert validate_and_format_date("10/10/2023") == "2023-10-10", "Test Case 10 Failed: Value is not in MM/DD/YYYY format"
  File "/Users/.../validate_and_format_date.py", line 10, in validate_and_format_date
    dt_object = datetime.datetime.strptime(date_str, "%m/%d/%Y")
AssertionError: Traceback (most recent call last)
  File "/Users/.../validate_and_format_date.py", line 10, in <module>
    assert validate_and_format_date("10/10/2023") == "2023-10-10", "Test Case 11 Failed: Invalid format"
  File "/Users/.../validate_and_format_date.py", line 10, in validate_and_format_date
    dt_object = datetime.datetime.strptime(date_str, "%m/%d/%Y")
AssertionError: Traceback (most recent call last)
  File "/Users/.../validate_and_format_date.py", line 10, in <module>
    assert validate_and_format_date("10/10/2023") == "2023-10-10", "Test Case 12 Failed: Single digit month/day format"
  File "/Users/.../validate_and_format_date.py", line 10, in validate_and_format_date
    dt_object = datetime.datetime.strptime(date_str, "%m/%d/%Y")
AssertionError: Traceback (most recent call last)
  File "/Users/.../validate_and_format_date.py", line 10, in <module>
    assert validate_and_format_date("10/10/2023") == "2023-10-10", "Test Case 13 Failed: Single digit month/day format"

print("All AI-generated test cases for validate_and_format_date passed!")
```