ASSIGNMENT – 8.3

2203A52100

M.HARI KRISHNA

B-50

TASK-01:

Scenario

You are developing a user registration system that requires reliable email input validation.

Requirements

• Must contain @ and . characters

• Must not start or end with special characters

• Should not allow multiple @ symbols

• AI should generate test cases covering valid and invalid email formats

• Implement is_valid_email(email) to pass all AI-generated test cases

Prompt:

Generate Python test cases for validating email addresses.

Email must contain @ and .

Email must not start or end with special characters

Email must contain only one @

Write a Python function is_valid_email(email) that returns True for valid emails and False for invalid ones.

Generated Code:

```
import re def

is_valid_email(email):

    # Check if email contains exactly one @

    if email.count('@') != 1:
```

```
        return False
    # Check if email contains at least one dot after the @
    if '.' not in email.split('@')[1]:
        return False


    # Check if email starts or ends with special characters
    if re.match(r'^[^a-zA-Z0-9]+|[^a-zA-Z0-9]+$', email):
        return False


    return  True
#  Test  cases
test_emails = [
    "user@example.com",  # Valid
    "invalid.email",         # Invalid - no @
    "user@@example.com",  # Invalid - two @
    "user@example",       # Invalid - no dot after @
    "@example.com",        # Invalid - starts with special character
    "user@.com",             # Invalid - ends with special character
    "user@example.",       # Invalid - ends with special character
]
for email in test_emails:
    print(f"{email}: {is_valid_email(email)}")
```

Explanation:

This code defines a function is_valid_email() that checks if an email address looks valid using simple rules. It makes sure there is exactly one @, there is at least one dot after the @, and the email does not start or end with special characters using a regular expression. Then it tests several sample emails and prints whether each one is valid or not.

TASK – 02:

Question:

Scenario

You are building an automated grading system for an online examination platform.

Requirements

• AI should generate test cases for assign_grade(score) where:

– 90–100 → A

– 80–89 → B

– 70–79 → C

– 60–69 → D

– Below 60 → F

• Include boundary values (60, 70, 80, 90)

• Include invalid inputs such as -5, 105, "eighty"

• Implement the function using a test-driven approach

Prompt:

Generate Python test cases for grading exam scores using TDD.
Grades are assigned as: 90–100 → A, 80–89 → B, 70–79 → C, 60–69 → D, below 60 → F. Include boundary values (60, 70, 80, 90) and invalid inputs like -5, 105, and "eighty". Write a Python function assign_grade(score) that returns the correct grade for valid scores and handles invalid inputs properly.

Generated Code:

```
def assign_grade(score):
    if isinstance(score, str) or not isinstance(score, (int, float)):
      return "Invalid input" if
     score < 0 or score > 100:
       return "Invalid input" if
    score >= 90:
       return "A" elif
    score >= 80:
```

```
        return "B"
    elif score >= 70:
        return "C"
    elif score >= 60:
        return "D"
    else:
        return "F" # Test cases test_scores = [95, 85, 75, 65, 55, 60,
70, 80, 90, -5, 105, "eighty"] for score in test_scores:
    print(f"{score}: {assign_grade(score)}")
```

Explanation:

This function assign_grade() gives a letter grade based on a score. It first checks if the input is a valid number between 0 and 100 — otherwise it returns "Invalid input". Then it uses if-elif conditions to return A, B, C, D, or F depending on the score range, and prints results for test values.

TASK – 03:

Question:

You are developing a text-processing utility to analyze sentences.

Requirements

• AI should generate test cases for is_sentence_palindrome(sentence)

• Ignore case, spaces, and punctuation

• Test both palindromic and non-palindromic sentences

• Example:

– "A man a plan a canal Panama" → True

Prompt:

Generate Python test cases for checking whether a sentence is a palindrome using TDD.
Ignore case, spaces, and punctuation when checking.
Include both palindromic and non-palindromic sentences (for example: "A man a plan a canal Panama" → True).

Write a Python function is_sentence_palindrome(sentence) that returns True for palindrome sentences and False otherwise, and make sure all generated tests pass.

Generated Code:

```
import re def

is_sentence_palindrome(sentence):

    cleaned_sentence = re.sub(r'[^A-Za-z0-9]', '', sentence).lower()

    return cleaned_sentence == cleaned_sentence[::-1]

# Test cases test_sentences

= [

    "A man a plan a canal Panama", # Palindrome

    "Hello World",                  # Not a palindrome

    "Madam In Eden I'm Adam",       # Palindrome

    "This is not a palindrome",     # Not a palindrome

    "No 'x' in Nixon",              # Palindrome

    "Was it a car or a cat I saw?", # Palindrome

    "Not a palindrome!",            # Not a palindrome
    "12321",                    # Palindrome
    "12345"                     # Not a palindrome
]

for sentence in test_sentences:

    print(f"{sentence}: {is_sentence_palindrome(sentence)}")
```

Explanation:

This function is_sentence_palindrome() checks if a sentence is a palindrome. It removes all spaces and special characters using re.sub, converts the text to lowercase, and stores it as cleaned_sentence. Then it compares the cleaned text with its reverse ([::-1]) — if both are the same, it returns True, otherwise False, and prints results for the test sentences.

TASK – 04:

Question:

Scenario

You are designing a basic shopping cart module for an e-commerce application.

Requirements

• AI should generate test cases for the ShoppingCart class

• Class must include the following methods:

– add_item(name, price)

– remove_item(name)

– total_cost()

• Validate correct addition, removal, and cost calculation

• Handle empty cart scenarios

Prompt:

Generate Python test cases using TDD for a ShoppingCart class.
The class must have methods add_item(name, price), remove_item(name), and total_cost().
Test correct item addition, removal, total cost calculation, and empty cart behavior.
Then implement the ShoppingCart class so all generated tests pass.

Generated Code: class

ShoppingCart:

```
    def _init_(self):
        self.items = {}


    def add_item(self, name, price):
        if name in self.items:
            self.items[name] += price
        else:
            self.items[name] = price
```

```
    def remove_item(self, name):
        if name in self.items:
            del self.items[name]

    def total_cost(self):
        return sum(self.items.values())
# Test cases cart = ShoppingCart() cart.add_item("Apple", 1.00) cart.add_item("Banana", 0.50) print(f"Total cost after adding items: {cart.total_cost()}") # Expected: 1.50 cart.remove_item("Apple") print(f"Total cost after removing Apple: {cart.total_cost()}") # Expected: 0.50 cart.remove_item("Banana") print(f"Total cost after removing Banana: {cart.total_cost()}") # Expected: 0.00 cart.add_item("Orange", 0.75) print(f"Total cost after adding Orange: {cart.total_cost()}") # Expected: 0.75
```

Explanation:

This code defines a ShoppingCart class that stores items and their prices in a dictionary. The add_item() method adds a new item or increases its total price if it already exists, remove_item() deletes an item, and total_cost() returns the sum of all item prices. The test code shows adding and removing items and printing the cart's total cost after each step.

TASK – 05:

Question:

Scenario

You are creating a utility function to convert date formats for reports.

Requirements

• AI should generate test cases for convert_date_format(date_str)

• Input format must be "YYYY-MM-DD" • Output format must be "DD-MM-YYYY"

• Example:

– "2023-10-15" → "15-10-2023"

Prompt:

Generate Python test cases using TDD for a function convert_date_format(date_str).
The input date format is "YYYY-MM-DD" and the output must be "DD-MM-YYYY" (for example, "2023-10-15" → "15-10-2023").
Include valid and invalid date strings.
Then implement the Python function so all generated tests pass.

Generated Code:

```
def convert_date_format(date_str):
    try:
        year, month, day = date_str.split('-') if len(year) == 4
        and len(month) == 2 and len(day) == 2:
            return f"{day}-{month}-{year}"
        else:
            return "Invalid date format"
    except ValueError:
        return "Invalid date format"
# Test cases test_dates
= [
    "2023-10-15", # Valid
    "2023/10/15", # Invalid - wrong separator
    "15-10-2023", # Invalid - wrong format
    "2023-1-5",    # Invalid - month and day not two digits
    "2023-12-31", # Valid
    "2023-00-10", # Invalid - month cannot be 00
    "2023-13-10", # Invalid - month cannot be 13
    "2023-10-32" # Invalid - day cannot be 32
```

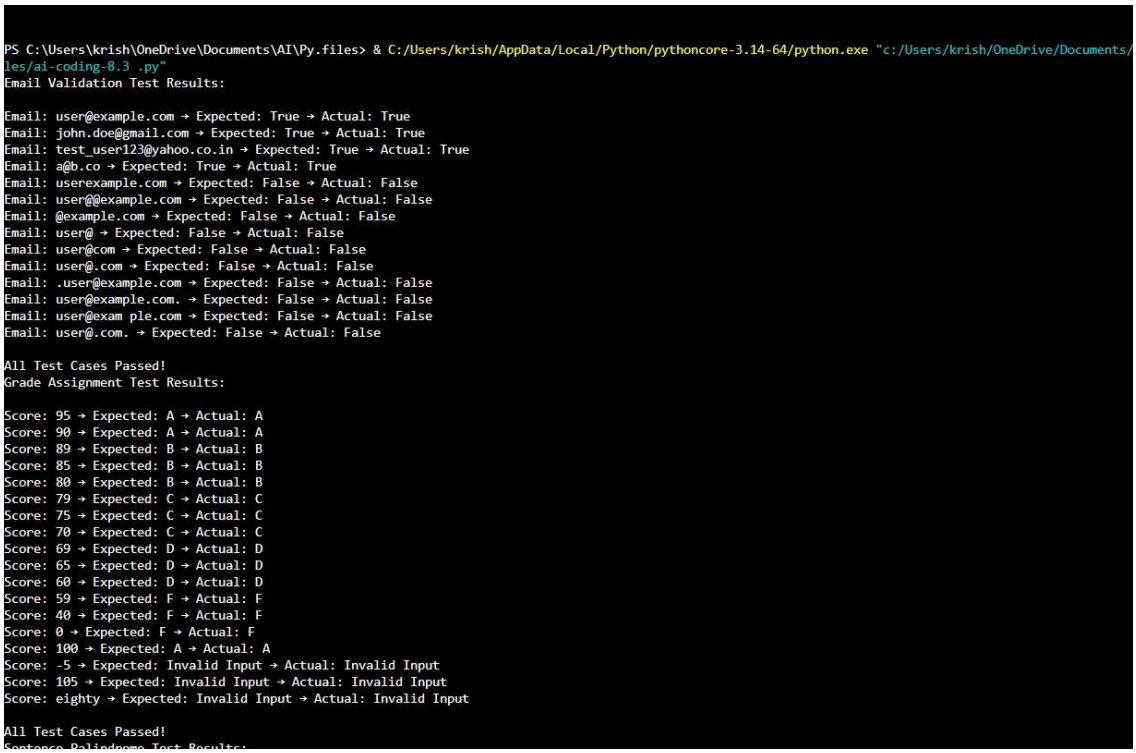
]

```
for date in test_dates:
    print(f"{date}: {convert_date_format(date)}")
```

Explanation:

This function convert_date_format() changes a date from YYYY-MM-DD to DD-MM-YYYY format. It splits the input string by -, checks that year has 4 digits and month/day have 2 digits, and then rearranges them. If the format is wrong or splitting fails, it returns "Invalid date format".

OUTPUTS:



```
All Test Cases Passed!
Sentence Palindrome Test Results:

Sentence: "A man a plan a canal Panama" → Expected: True → Actual: True
Sentence: "Madam" → Expected: True → Actual: True
Sentence: "No lemon, no melon" → Expected: True → Actual: True
Sentence: "Was it a car or a cat I saw?" → Expected: True → Actual: True
Sentence: "12321" → Expected: True → Actual: True
Sentence: "" → Expected: True → Actual: True
Sentence: "!!!" → Expected: True → Actual: True
Sentence: "Hello World" → Expected: False → Actual: False
Sentence: "OpenAI" → Expected: False → Actual: False
Sentence: "Palindrome test" → Expected: False → Actual: False
Sentence: "12345" → Expected: False → Actual: False

All Test Cases Passed!
ShoppingCart Test Results:

Test Empty Cart Total
Expected: 0 → Actual: 0

Test Add Single Item
Expected: 50000 → Actual: 50000

Test Add Multiple Items
Expected: 53000 → Actual: 53000

Test Remove Item
Expected: 52000 → Actual: 52000

Test Remove Non-existing Item
Expected: Item Not Found → Actual: Item Not Found

Test Invalid Price
Expected: Invalid Input → Actual: Invalid Input

All tests executed successfully.
Date Format Conversion Test Results:

Input: 2023-10-15 → Expected: 15-10-2023 → Actual: 15-10-2023
Input: 2023-01-01 → Expected: 01-01-2023 → Actual: 01-01-2023
Input: 1999-12-31 → Expected: 31-12-1999 → Actual: 31-12-1999
Input: 2024-02-29 → Expected: 29-02-2024 → Actual: 29-02-2024
Input: 15-10-2023 → Expected: Invalid Date Format → Actual: Invalid Date Format
Input: 2023/10/15 → Expected: Invalid Date Format → Actual: Invalid Date Format
Input: 2023-13-01 → Expected: Invalid Date Format → Actual: Invalid Date Format
Input: 2023-00-10 → Expected: Invalid Date Format → Actual: Invalid Date Format
Input: 2023-02-30 → Expected: Invalid Date Format → Actual: Invalid Date Format
Input: abcd-ef-gh → Expected: Invalid Date Format → Actual: Invalid Date Format
Input:  → Expected: Invalid Date Format → Actual: Invalid Date Format

All Test Cases Passed!
PS C:\Users\krish\OneDrive\Documents\AI\Py.files>
```