

AAC ASSIGNMENT 8.3

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BATCH-45

Task 1: Email Validation using TDD

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

Expected Output

- Python function for email validation
- All AI-generated test cases pass successfully
- Invalid email formats are correctly rejected
- Valid email formats return True

Prompt:

You are a senior Python developer following Test-Driven Development (TDD).

Task:

Implement email validation using TDD.

Requirements:

1. Email must contain exactly one '@' symbol.
2. Email must contain at least one '.' after the '@'.
3. Email must not start or end with special characters like '.', '@', '-', '_'.
4. Email must not contain multiple '@' symbols.
5. Email should have characters before and after '@'.
6. Domain part must contain at least one '.'.

7. No spaces allowed in the email.

Instructions:

1. First, generate comprehensive test cases (both valid and invalid emails).
2. Cover edge cases.
3. Then implement the function:

```
def is_valid_email(email: str) -> bool
```

4. Follow TDD approach:

- Write test cases first
- Then implement the function
- Ensure all tests pass

5. Print results of all test cases clearly showing:

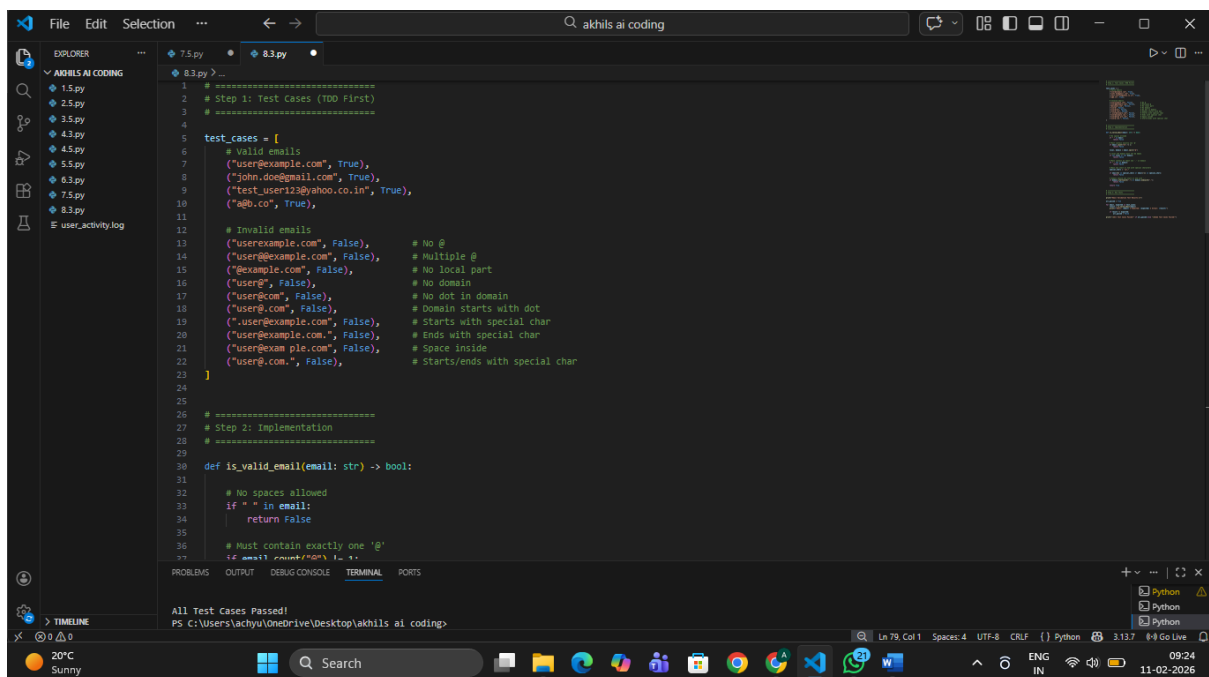
Email: <email> → Expected: <True/False> → Actual: <True/False>

6. Use only Python standard library (no external libraries).

Output format:

- Test cases list
- Function implementation
- Test execution results

Output:



```
1 # =====
2 # Step 1: Test Cases (TDD First)
3 # =====
4
5 test_cases = [
6     # Valid emails
7     ("user@example.com", True),
8     ("john.doe@gmail.com", True),
9     ("test_user123@yahoo.co.in", True),
10    ("a@b.co", True),
11
12    # Invalid emails
13    ("userexample.com", False), # No @
14    ("user@example.com", False), # Multiple @
15    ("@example.com", False), # No local part
16    ("user@", False), # No domain
17    ("user@com", False), # No dot in domain
18    ("user@.com", False), # Domain starts with dot
19    ("user@example.com.", False), # Starts with special char
20    ("user@example.com", False), # Ends with special char
21    ("user@exam ple.com", False), # Space inside
22    ("user@.com.", False), # Starts/ends with special char
23
24 ]
25
26 # =====
27 # Step 2: Implementation
28 # =====
29
30 def is_valid_email(email: str) -> bool:
31
32     # No spaces allowed
33     if " " in email:
34         return False
35
36     # Must contain exactly one '@'
37     if email.count("@") != 1:
38         return False
39
40     # Must contain a dot in the domain
41     if "." not in email.split("@")[1]:
42         return False
43
44     # Domain must not start with a dot
45     if email.split("@")[1].startswith("."):
46         return False
47
48     # Domain must not end with a special character
49     if email.split("@")[1].endswith("."):
50         return False
51
52     # Local part must not start with a special character
53     if email.split("@")[0].startswith("."):
54         return False
55
56     # Local part must not end with a special character
57     if email.split("@")[0].endswith("."):
58         return False
59
60     # Local part must not contain spaces
61     if " " in email.split("@")[0]:
62         return False
63
64     # Local part must not contain special characters
65     if not email.split("@")[0].isalnum():
66         return False
67
68     # Domain must not contain special characters
69     if not email.split("@")[1].isalnum():
70         return False
71
72     return True
73
74 # =====
75 # Step 3: Execution
76 # =====
77
78 # Run test cases
79 for email, expected in test_cases:
80     actual = is_valid_email(email)
81     print(f"Email: {email} → Expected: {expected} → Actual: {actual}")
82
83 # Print results
84 print("All Test Cases Passed!")
```

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Task 2: Grade Assignment using Loops

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

Expected Output

- Grade assignment function implemented in Python
- Boundary values handled correctly
- Invalid inputs handled gracefully
- All AI-generated test cases pass

Prompt:

You are a senior Python developer following Test-Driven Development (TDD).

Task:

Build a grade assignment system.

Function to implement:

```
def assign_grade(score)
```

Grading Rules:

90–100 → A

80–89 → B

70–79 → C

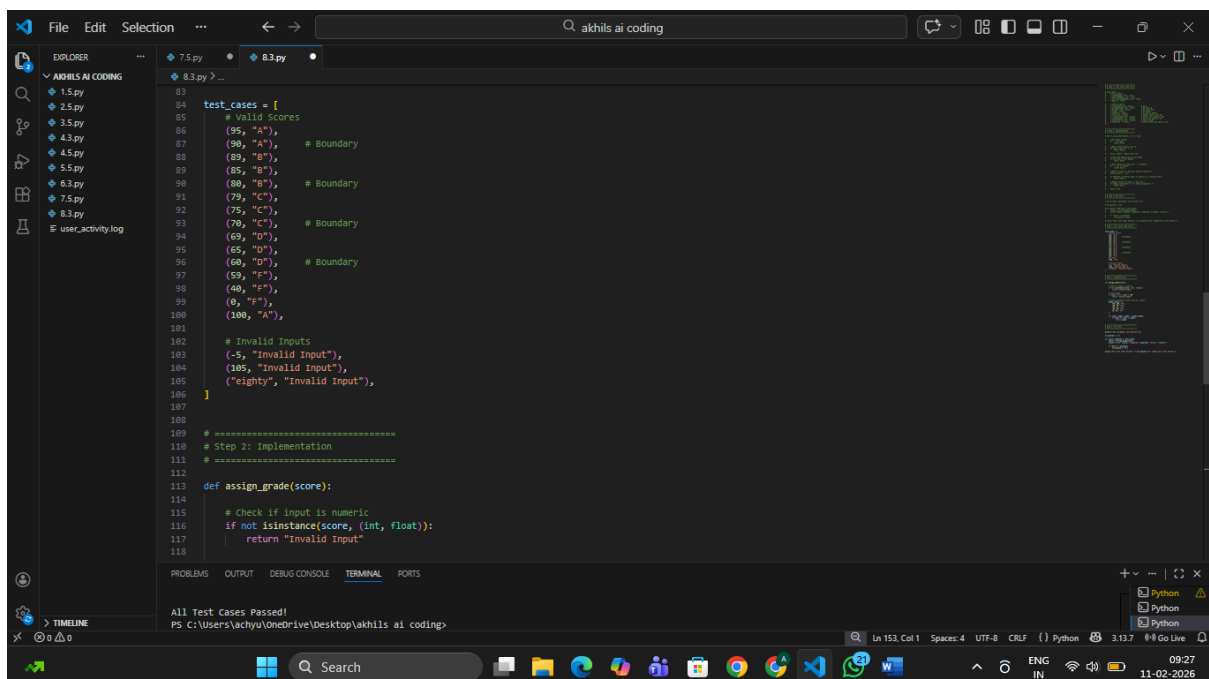
60–69 → D

Below 60 → F

Requirements:

1. Generate comprehensive test cases first.
2. Include boundary values: 60, 70, 80, 90.
3. Include edge values: 59, 69, 79, 89, 100.
4. Include invalid inputs:
 - Negative numbers (-5)
 - Numbers greater than 100 (105)
 - Non-numeric input ("eighty")
5. Handle invalid inputs gracefully (return "Invalid Input").
6. Implement the function using loops where appropriate.
7. Print test results clearly in the format:
Score: <score> → Expected: <grade> → Actual: <grade>
8. Ensure all test cases pass.
9. Use only Python standard library.

Output:



```
83
84
85 test_cases = [
86     # valid Scores
87     (95, "A"),
88     (90, "A"), # Boundary
89     (89, "B"),
90     (85, "B"),
91     (80, "B"), # Boundary
92     (79, "C"),
93     (75, "C"),
94     (70, "C"), # Boundary
95     (69, "D"),
96     (65, "D"),
97     (60, "D"), # Boundary
98     (59, "F"),
99     (40, "F"),
100    (0, "F"),
101    (100, "A"),
102
103    # Invalid Inputs
104    (-5, "Invalid Input"),
105    (105, "Invalid Input"),
106    ("eighty", "Invalid Input"),
107
108
109    # =====
110    # Step 2: Implementation
111    # =====
112
113    def assign_grade(score):
114
115        # Check if input is numeric
116        if not isinstance(score, (int, float)):
117            return "Invalid Input"
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```

Task 3: Sentence Palindrome Checker

Scenario

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

Expected Output

- Function correctly identifies sentence palindromes
- Case and punctuation are ignored
- Returns True or False accurately
- All AI-generated test cases pass

Prompt:

You are a senior Python developer following Test-Driven Development (TDD).

Task:

Implement a function:

```
def is_sentence_palindrome(sentence: str) -> bool
```

Requirements:

1. Ignore:
 - Case (uppercase/lowercase)
 - Spaces
 - Punctuation
2. Only consider alphanumeric characters.
3. Generate comprehensive test cases first.
4. Include:
 - Simple palindromes
 - Sentence palindromes
 - Non-palindromes

- Empty string
- Only punctuation

5. Print results in format:

Sentence: "<sentence>" → Expected: <True/False> → Actual: <True/False>

6. Use only Python standard library.

7. Ensure all test cases pass.

Output:

```

156 # =====
157
158 test_cases = [
159     # Palindromes
160     ("A man a plan a canal Panama", True),
161     ("Madam", True),
162     ("No lemon, no melon", True),
163     ("Was it a car or a cat I saw?", True),
164     ("12321", True),
165     ("", True), # Empty string
166     ("!!!", True), # Only punctuation
167
168     # Non-palindromes
169     ("Hello world", False),
170     ("OpenAI", False),
171     ("Palindrome test", False),
172     ("12345", False),
173 ]
174
175 # =====
176 # Step 2: Implementation
177 # =====
178
179 def is_sentence_palindrome(sentence: str) -> bool:
180
181     # Keep only alphanumeric characters and convert to lowercase
182     cleaned = ""
183
184     for ch in sentence:
185         if ch.isalnum():
186             cleaned += ch.lower()
187
188     # Check if cleaned string is palindrome
189     return cleaned == cleaned[::-1]
190
191
192

```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS

All Test Cases Passed!
PS C:\Users\achyu\OneDrive\Desktop\akhils ai coding>

Task 4: ShoppingCart Class

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

Expected Output

- Fully implemented ShoppingCart class
- All methods pass AI-generated test cases
- Total cost is calculated accurately
- Items are added and removed correctly

Prompt:

You are a senior Python developer following Test-Driven Development (TDD).

Task:

Design a ShoppingCart class.

Class Requirements:

1. add_item(name, price)
2. remove_item(name)
3. total_cost()

Rules:

- Item name must be string.
- Price must be positive number.
- Removing a non-existing item should be handled gracefully.
- total_cost() should return 0 for empty cart.
- Support multiple items.

Instructions:

1. First generate comprehensive test cases:
 - Add single item
 - Add multiple items
 - Remove item
 - Remove non-existing item
 - Empty cart total
 - Invalid price
2. Implement the ShoppingCart class.
3. Print test results clearly.

4. Ensure all test cases pass.

5. Use only Python standard library.

Output:

The screenshot displays a Windows desktop environment. The primary focus is a code editor window titled "akshis ai coding". The editor contains Python code for a `ShoppingCart` class and its associated tests. The code is as follows:

```
class ShoppingCart:
    def __init__(self):
        self.items = {} # Dictionary: (name: price)

    def add_item(self, name, price):
        if not isinstance(name, str) or not isinstance(price, (int, float)):
            return "Invalid Input"

        if price <= 0:
            return "Invalid Input"

        self.items[name] = price
        return "Item Added!"

    def remove_item(self, name):
        if name in self.items:
            del self.items[name]
            return "Item Removed"
        return "Item Not Found"

    def total_cost(self):
        total = 0
        for price in self.items.values():
            total += price
        return total
```

=====
Step 3: Test Cases Execution
=====

```
print("ShoppingCart Test Results:\n")

cart = ShoppingCart()

# Test 1: Empty cart total
print("Test Empty Cart Total")
print(f"Expected: 0 = Actual:", cart.total_cost(), "\n")

# Test 2: Add single item
print("Test Add Single Item")
cart.add_item("Laptop", 50000)

test_result = unittest.main(argv=[''], exit=False, verbosity=2)
```

The bottom status bar of the code editor shows "All tests executed successfully." and the file path "PS C:\Users\ladyhu\OneDrive\Desktop\akshis ai coding". The Windows taskbar at the bottom includes icons for various applications like File Explorer, Microsoft Edge, and WhatsApp, along with the system clock showing 09:35 on 11-02-2026.

Task 5: Date Format Conversion

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"

Expected Output

- Date conversion function implemented in Python
- Correct format conversion for all valid inputs
- All AI-generated test cases pass successfully

Prompt:

You are a senior Python developer following Test-Driven Development (TDD).

Task:

Implement a function:

```
def convert_date_format(date_str: str) -> str
```

Requirements:

1. Input format must be exactly "YYYY-MM-DD".
2. Output format must be "DD-MM-YYYY".
3. Generate comprehensive test cases first.
4. Include:
 - Valid dates
 - Edge dates like "2023-01-01"
 - Invalid formats like:
 - "15-10-2023"
 - "2023/10/15"
 - "2023-13-01"
 - "2023-00-10"
 - "abcd-ef-gh"
5. Handle invalid inputs gracefully (return "Invalid Date Format").
6. Print results in format:
Input: <date> → Expected: <output> → Actual: <output>
7. Use only Python standard library.
8. Ensure all test cases pass.

Output:

