ASSIGNMENT-01

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BATCH: 50

Task-01:

Question:

Task 1: AI-Generated Logic Without Modularization (String Reversal Without Functions)

❖ Scenario

You are developing a basic text-processing utility for a messaging application.

❖ Task Description

Use GitHub Copilot to generate a Python program that:

➢ Reverses a given string

➢ Accepts user input

➢ Implements the logic directly in the main code

➢ Does not use any user-defined functions

Prompt:

generate a python code for reverse of string without functions

Generated Code:

```
# Reverse a string without using built-in functions
string = input("Enter a string: ")
reversed_string = ""

for i in range(len(string) - 1, -1, -1):
    reversed_string += string[i]

print("Original string:", string)
print("Reversed string:", reversed_string)
```

Output:

```
PS C:\Users\akhir\OneDrive\Documents\AI ASSISTANT> & C:/Users/akhir/AppData/Local/Python/pythoncore-3.14-64/python.exe "c:/Users/akhir/O
neDrive/Documents/AI ASSISTANT/ASS-1.py"
Enter a string: STRING
Original string: STRING
Reversed string: GNIRTS
PS C:\Users\akhir\OneDrive\Documents\AI ASSISTANT>
```

Explanation:

In this program it stores the string given by the user during runtime of code
It builds a new empty string
for loop is used to iterate from last character to first character
Each loop adds the current character to the new string reversing the order
Finally it prints the original string and reversed string

Task-02:

Question:

Task 2: Efficiency & Logic Optimization (Readability Improvement)

❖ Scenario

The code will be reviewed by other developers.

❖ Task Description

Examine the Copilot-generated code from Task 1 and improve it by:

➢ Removing unnecessary variables

➢ Simplifying loop or indexing logic

➢ Improving readability

➢ Use Copilot prompts like:

▪ “Simplify this string reversal code”

▪ “Improve readability and efficiency”

Hint:

Prompt Copilot with phrases like

“optimize this code”, “simplify logic”, or “make it more readable”

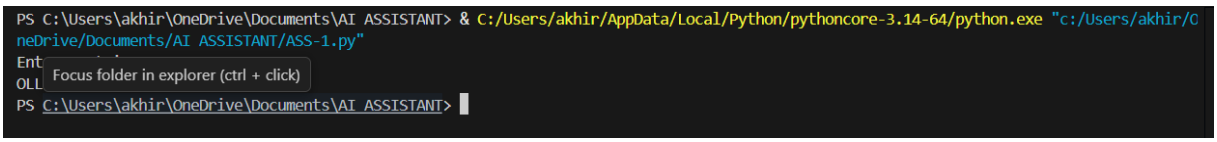
Prompt:

Optimize this code by removing unnecessary variables, simplifying the logic, and improving overall readability

Generated Code:

```
string = input("Enter a string: ")

reversed_string = string[::-1]

print(reversed_string)
```

Output:



Explanation:

First line of the code reads the string from the user during runtime and stores it in a variable
reversed_string = string[::-1] makes a new word from string but backwards.

[::-1] means take the characters from end to start.

Example: if string is "cat", reversed_string becomes "tac".

Task-03:

Question:

ask 3: Modular Design Using AI Assistance (String Reversal Using Functions)

❖ Scenario

The string reversal logic is needed in multiple parts of an application.

❖ Task Description

Use GitHub Copilot to generate a function-based Python program that:

➢ Uses a user-defined function to reverse a string

➢ Returns the reversed string

➢ Includes meaningful comments (AI-assisted)

Prompt:

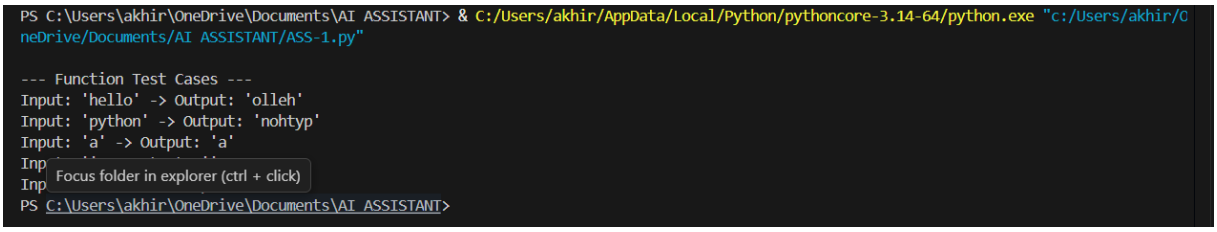
Create a Python function to reverse a string, return the result, add meaningful comments, and show sample test cases.

Generated Code:

```
def reverse_string(s):
    """
    Reverse a string using slicing.

    Args:
        s (str): The string to reverse

    Returns:
        str: The reversed string
    """
    return s[::-1]

# Test cases
print("\n--- Function Test Cases ---")
test_cases = ["hello", "python", "a", "", "12345"]
```

```
for test in test_cases:
    result = reverse_string(test)
    print(f"Input: '{test}' -> Output: '{result}'")
```

Output:



Explanation:

The function reverse_string(s) takes a word or sentence s.

return s[::-1] makes a new string with characters in reverse order.

The test loop runs several example inputs through reverse_string.

Each print shows the input and its reversed output (e.g., "hello" -> "olleh").

Task-04:

Question:

Task 4: Comparative Analysis – Procedural vs Modular Approach (With vs Without Functions)

❖ Scenario

You are asked to justify design choices during a code review.

❖ Task Description

Compare the Copilot-generated programs:

➢ Without functions (Task 1)

➢ With functions (Task 3)

Analyze them based on:

➢ Code clarity

➢ Reusability

➢ Debugging ease

➢ Suitability for large-scale applications

Prompt:

Compare procedural and function-based string reversal programs based on clarity, reusability, debugging, and scalability.

Generated Code:

```
# Comparison: Procedural vs Function-based String Reversal


print("\n--- COMPARISON ANALYSIS ---\n")


    # PROCEDURAL APPROACH
print("1. PROCEDURAL APPROACH:")
print("   Clarity: Code is straightforward but scattered")
print("   Reusability: Must rewrite logic each time")
print("   Debugging: Harder to isolate and fix issues")
print("    Scalability: Difficult to extend with new features")


string = input("Enter a string: ")
reversed_string = ""
for i in range(len(string) - 1, -1, -1):
    reversed_string += string[i]
print(f"Reversed: {reversed_string}\n")


# FUNCTION-BASED APPROACH
print("2. FUNCTION-BASED APPROACH:")
```

```
print("  Clarity: Logic encapsulated, self-documenting")
print("  Reusability: Call function anywhere, anytime")
print("  Debugging: Test and fix in one location")
print("   Scalability: Easy to add validation, logging, etc.\n")

def reverse_string(s):
    """Reverse a string using slicing."""
    return s[::-1]

string = input("Enter a string: ")
print(f"Reversed: {reverse_string(string)}\n")

   # VERDICT
print("RECOMMENDATION: Use function-based approach for production code")
print("- Better code organization")
print("- Easier unit testing")
print("- Improved maintainability")
```

Output:

```
1. PROCEDURAL APPROACH:
   Clarity: Code is straightforward but scattered
   Reusability: Must rewrite logic each time
   Debugging: Harder to isolate and fix issues
   Scalability: Difficult to extend with new features
Enter a string: hello
Reversed: olleh

2. FUNCTION-BASED APPROACH:
   Clarity: Logic encapsulated, self-documenting
   Reusability: Call function anywhere, anytime
   Debugging: Test and fix in one location
   Scalability: Easy to add validation, logging, etc.

Enter a string: world
Reversed: dlrow

RECOMMENDATION: Use function-based approach for production code
- Better code organization
- Easier unit testing
- Improved maintainability
```

Explanation:

Procedural way The reversal loop is written directly—easy to see how it works but hard to reuse elsewhere.

Function way The reversal is wrapped inside a reverse_string() function—it can be called anywhere without rewriting the code.

The verdict: Functions are better for real projects because the code is organized, easier to fix bugs, and simpler to test and update.

TASK-05:

Question:

Task 5: AI-Generated Iterative vs Recursive Fibonacci Approaches (Different

Algorithmic Approaches to String Reversal)

❖ Scenario

Your mentor wants to evaluate how AI handles alternative logic paths.

❖ Task Description

Prompt GitHub Copilot to generate:

➢ A loop-based string reversal approach

➢ A built-in / slicing-based string reversal approach

Prompt:

Write loop-based and slicing-based string reversal programs in Python.

Generated Code:

```
# BONUS: Side-by-side comparison of both methods

print("\n--- METHOD COMPARISON ---\n")

test_string = input("Enter a string for method comparison: ")

# Loop-based approach
reversed_loop = ""
for i in range(len(test_string) - 1, -1, -1):
    reversed_loop += test_string[i]

# Slicing-based approach
reversed_slice = test_string[::-1]

print(f"Original string: '{test_string}'")
print(f"Loop-based result: '{reversed_loop}'")
print(f"Slicing-based result: '{reversed_slice}'")
print(f"Both methods match: {reversed_loop == reversed_slice}")
```

Output:

```
Enter a string: Hello
Reversed: olleH

RECOMMENDATION: Use function-based approach for production code
- Better code organization
- Easier unit testing
- Improved maintainability

--- METHOD COMPARISON ---

Enter a string for method comparison: World
Original string: 'World'
Loop-based result: 'dlroW'
Slicing-based result: 'dlroW'
Both methods match: True
```

Explanation:

The code gets a string from input.

It reverses the string two ways: first using a loop then using slicing.

Both results are printed side-by-side to show what each method produces.

The last line checks if both methods give the same answer—they always do, proving both approaches work.