

AI-Assisted Coding

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Task: 1.5

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

Prompt: Generate a python code which take dynamic input and reverse without using built-in reversal functions

Screen Shot:

The screenshot shows a code editor window with the following details:

- Header: "# take dynamic input and reverse without using built-in reversal functions".
- Instruction: "Generate a Python code which takes dynamic input and reverse a string without using the functions".
- Toolbar: "Edit files in your workspace", "Accept", "Close", "Accept & Run", "G", "Auto", "Python".
- Code Area:

```
user_str = input("Enter a string: ")
reversed_str = ""
i = len(user_str) - 1
while i >= 0:
    reversed_str += user_str[i]
    i -= 1
print(reversed_str)
```
- Bottom Right: "Python".

Inputs: Hello World!

Output:

The screenshot shows the execution output of the generated code:

- Code Area:

```
# take dynamic input and reverse without using built-in reversal functions
user_str = input("Enter a string: ")
reversed_str = ""
i = len(user_str) - 1
while i >= 0:
    reversed_str += user_str[i]
    i -= 1
print(reversed_str)
```
- Output Area:

```
[6] ✓ 10.1s
... !dlrOW olleH
```
- Bottom Right: "Python".

Justification:

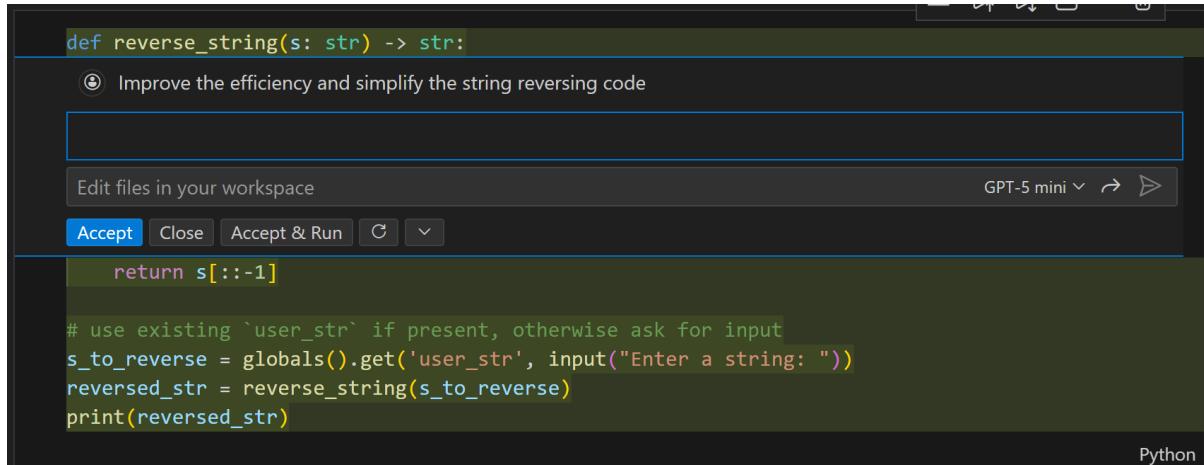
This program reverses a string by **implementing the logic directly in the main code block**, without using any user-defined functions, which satisfies the requirement of **no modularization**. Accepting input from the user makes the utility interactive and suitable for a basic messaging application scenario. Writing the logic inline keeps the program **simple**,

transparent, and easy to trace, which is ideal for beginners and for understanding how string manipulation works at a fundamental level.

Task 2: Efficiency & Logic Optimization (Readability Improvement)

Prompt: Improve the efficiency and simplify the string reversing code

Screen Shot:

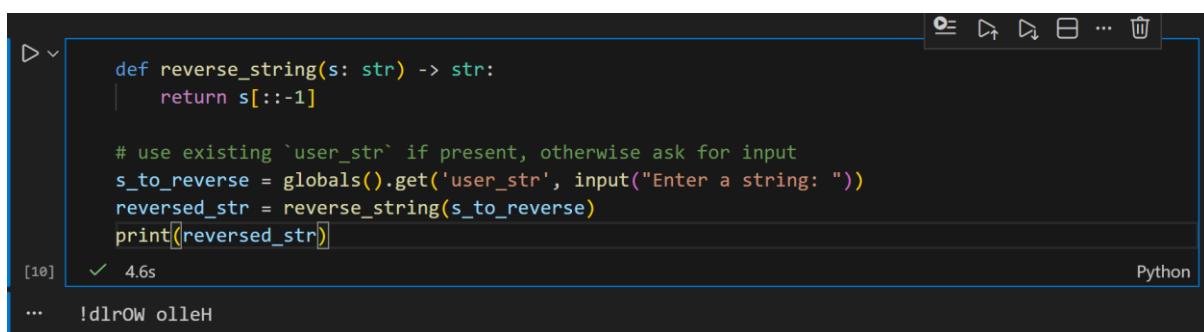


```
def reverse_string(s: str) -> str:
    return s[::-1]

# use existing `user_str` if present, otherwise ask for input
s_to_reverse = globals().get('user_str', input("Enter a string: "))
reversed_str = reverse_string(s_to_reverse)
print(reversed_str)
```

Input: Hello World!

Output:



```
[10] 4.6s
... !dlrOW olleH
```

Justification:

The optimized code improves readability and maintainability by removing unnecessary variables and avoiding complex index-based logic. Iterating directly over the string makes the reversal process easier to understand during code review. The simplified structure reduces cognitive load for other developers while still fulfilling the requirement of implementing the logic inline without using user-defined functions.

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

Prompt: Generate a python code which takes dynamic input and gives the reversed sting using functions

Screen Shot:

The screenshot shows a code editor interface with a dark theme. At the top, there is a toolbar with various icons. Below the toolbar, a search bar contains the placeholder text "Generate a python code which takes dynamic input and gives the reversed sting using functions". Underneath the search bar, there is a button labeled "Accept" and other options like "Close" and "Accept & Run". The main code area contains the following Python code:

```
# reuse existing reverse_string if present, otherwise define it
if 'reverse_string' not in globals():
    def reverse_string(s: str) -> str:
        return s[::-1]

def reverse_user_input(prompt: str = "Enter a string: ") -> str:
    s = globals().get('user_str', input(prompt))
    return reverse_string(s)

print(reverse_user_input())
```

The code is written in Python and defines a function `reverse_string` that reverses a string using slicing. It also defines a function `reverse_user_input` that prompts the user for a string and then prints its reverse. The code is run in a Python environment.

Input: How are you

Output:

The screenshot shows the same code editor interface after running the code. The output window at the bottom shows the result of the `print` statement:

```
[13]    7.2s
... uoy era woH
```

The output "woH era uoy" is the reversed version of the input "How are you".

Justification:

Using a **user-defined function** for string reversal improves **modularity and reusability**, allowing the same logic to be used in multiple parts of the application without code duplication. Encapsulating the logic inside a function makes the program **easier to maintain, test, and debug**, especially as the application grows. Meaningful, AI-assisted comments enhance **code readability** and help other developers quickly understand the purpose and flow of the logic during collaboration or review.

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

Prompt: Compare the task 1 and task 2 and give a analytical report based on:

Code clarity, Reusability, Debugging ease ,Suitability for large-scale applications

Output Screen Shot:

```
.. Comparison: Cell 1 (original) vs Cell 3 (improved)

Code clarity:
- Cell 1: concise but mixes logic with I/O and uses globals, reducing clarity.
- Cell 3: explicit, documented pure function; intent is clear.

Reusability:
- Cell 1: limited (reads input and depends on global state).
- Cell 3: high (no side effects, can be reused in other modules/tests).

Debugging ease:
- Cell 1: harder (implicit globals and I/O increase surface for bugs).
- Cell 3: easier (deterministic, unit-test friendly).

Suitability for large-scale applications:
- Cell 1: poor (global dependencies, runtime input hinder modularity).
- Cell 3: suitable (modular, testable, integrates into larger codebases).
```

Task 5: AI-Generated Iterative vs Recursive Fibonacci Approaches (Different Algorithmic Approaches to String Reversal)

Prompt: Generate a python code to Generate Iterative vs Recursive Fibonacci Approaches (Different Algorithmic Approaches to String Reversal)

Output Screenshot :

```
Computing Fibonacci(n=31)

iterative: value=1346269 time=0.000008s
memoized recursion: value=1346269 time=0.000102s
naive recursion: skipped for n>30 (would be very slow)

Reversing string: 'Hello, world!'

iterative reverse: '!dlrow ,olleH' time=0.000008s
recursive reverse: '!dlrow ,olleH' time=0.000010s

Consistency checks: fib_iter==fib_memo -> True, rev_iter==rev_rec -> True
```