SCHOOL OF COMPUTER SCIENCE AND ARTIFICIAL INTELLIGENCE	**DEPARTMENT OF COMPUTER SCIENCE ENGINEERING**

Program Name: B. Tech	**Assignment Type: Lab**	**Academic Year:**2025-2026

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Course Code	24CS002PC215	**Course Title**	AI Assisted Coding
Year/Sem	II/I	**Regulation**	R24
Date and Day of Assignment	Week5 - Monday	**Time(s)**	
Duration	2 Hours	**Applicable to Batches**	

AssignmentNumber: 9.1(Present assignment number)/**24**(Total number of assignments)

Q.No.	**Question**	***Expected Time to complete***
1	**Lab 9 – Code Review and Quality: Using AI to improve code quality and readability** **Lab Objectives** • Inline comments • Docstrings • Auto-documentation tools • AI-assisted summarization	Week5 - Monday

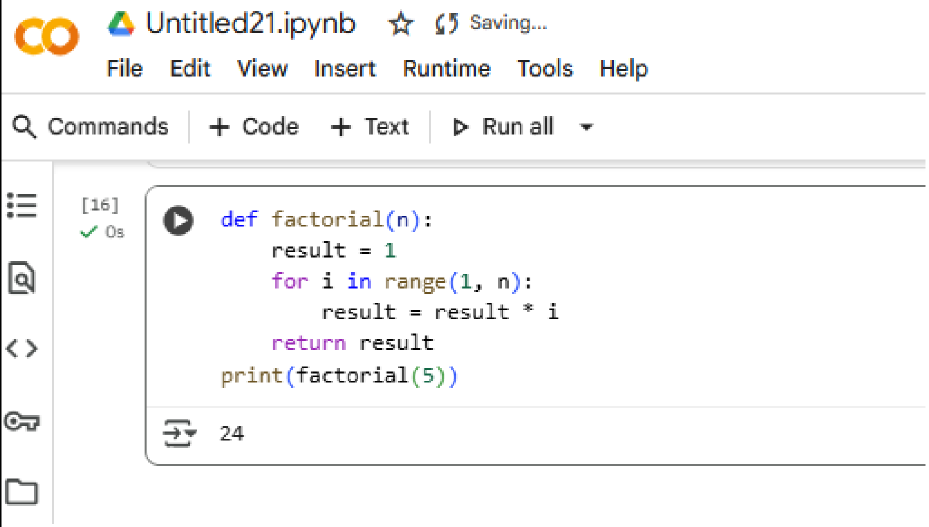
Task Description #1 (AI-Assisted Bug Detection)

Scenario: A junior developer wrote the following Python function to calculate factorials:

```
def factorial(n):
    result = 1
    for i in range(1, n):
        result = result * i
    return result
```

- Run the code and test it with factorial(5)
  (expected output = 120).
- Use AI (prompting) to review this code and identify the bug.
- Ask AI to suggest corrections and rewrite the code.
- Compare AI's corrected code with your own fix.

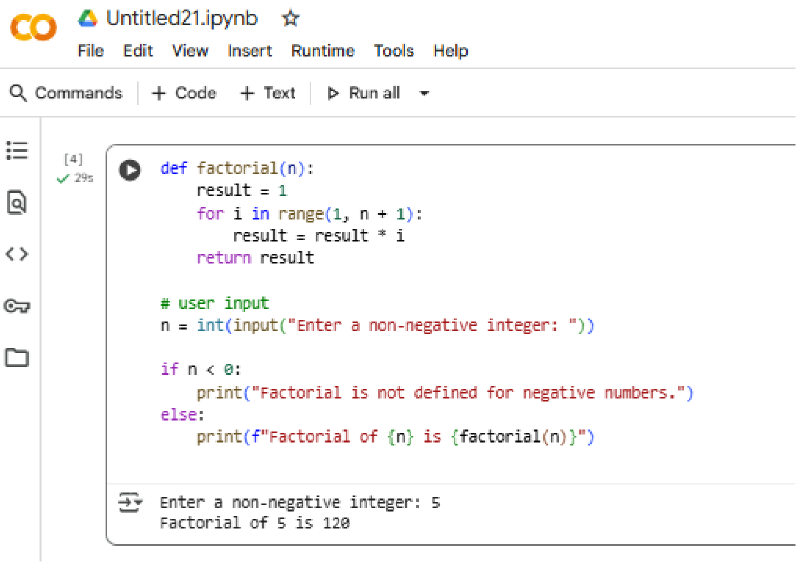
<u>Code:</u>



```
def factorial(n):
    result = 1
    for i in range(1, n):
        result = result * i
    return result
print(factorial(5))
```

```
24
```

Manual Code:



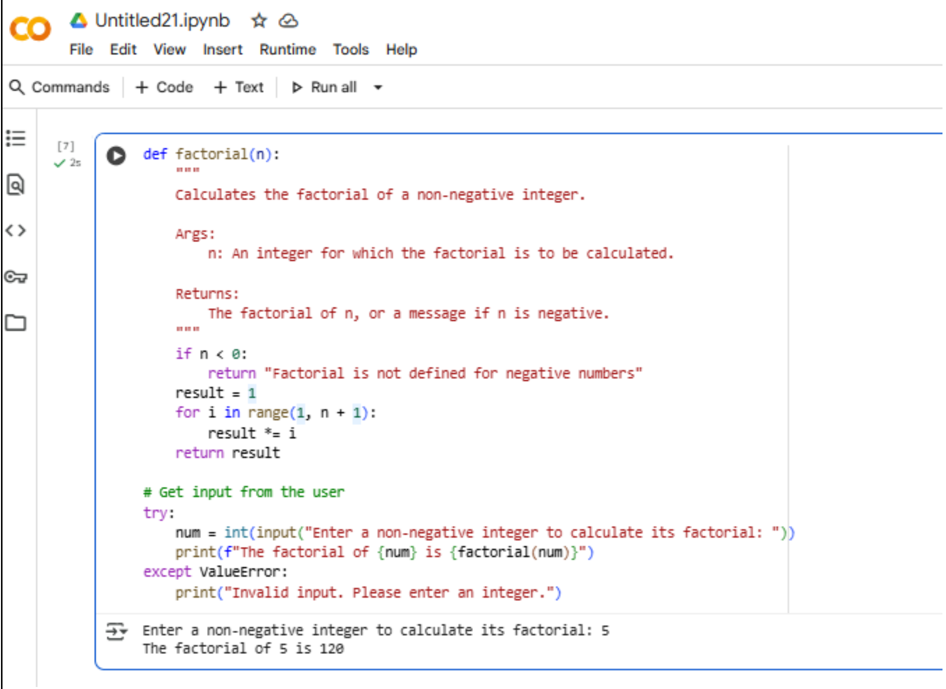
```
def factorial(n):
    result = 1
    for i in range(1, n + 1):
        result = result * i
    return result

# user input
n = int(input("Enter a non-negative integer: "))

if n < 0:
    print("Factorial is not defined for negative numbers.")
else:
    print(f"Factorial of {n} is {factorial(n)}")
```

```
Enter a non-negative integer: 5
Factorial of 5 is 120
```

Prompt:

Generate the code and identify the bug and suggest corrections.

AI-Generated Code:



```
def factorial(n):
    """
    Calculates the factorial of a non-negative integer.

    Args:
        n: An integer for which the factorial is to be calculated.

    Returns:
        The factorial of n, or a message if n is negative.
    """
    if n < 0:
        return "Factorial is not defined for negative numbers"
    result = 1
    for i in range(1, n + 1):
        result *= i
    return result

# Get input from the user
try:
    num = int(input("Enter a non-negative integer to calculate its factorial: "))
    print(f"The factorial of {num} is {factorial(num)}")
except ValueError:
    print("Invalid input. Please enter an integer.")
```

```
Enter a non-negative integer to calculate its factorial: 5
The factorial of 5 is 120
```

Comparison AI and manual code:

1. Both use for i in range(1, n+1).
2. Manual code prints an error message; AI code raises a ValueError.
3. Manual code is beginner-friendly; AI code is more descriptive with comments.

Task Description #2 (Improving Readability & Documentation)

Scenario: The following code works but is poorly written:

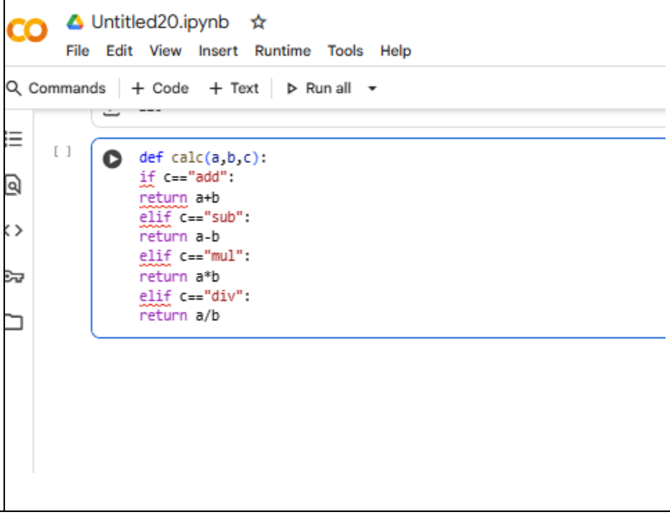
```
def calc(a,b,c):
    if c=="add":
        return a+b
    elif c=="sub":
        return a-b
    elif c=="mul":
        return a*b
    elif c=="div":
        return a/b
```

- Use AI to review this code for readability, naming, and documentation issues.
- Prompt AI to rewrite the code with:
    - Clear function & variable names.
    - Proper docstrings.
    - Exception handling for division by zero.
- Compare the before-and-after versions to evaluate AI's contribution.

Prompt:

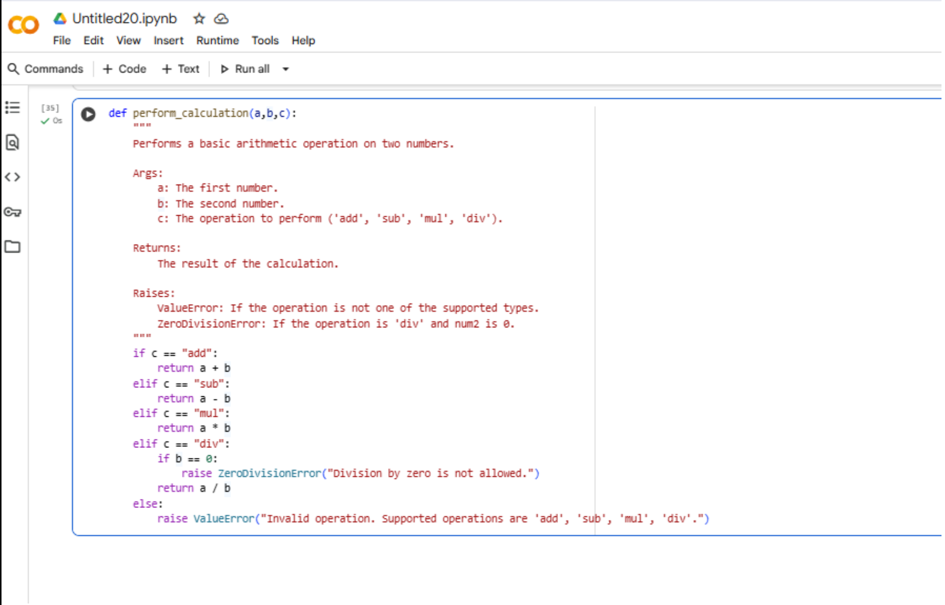
Rewrite the code with clear function and variable names and use proper docstrings and exception handling for division by zero.

Before Versions:



```
def calc(a,b,c):
if c=="add":
return a+b
elif c=="sub":
return a-b
elif c=="mul":
return a*b
elif c=="div":
return a/b
```

After AI versions:



```
def perform_calculation(a,b,c):
    """
    Performs a basic arithmetic operation on two numbers.

    Args:
        a: The first number.
        b: The second number.
        c: The operation to perform ('add', 'sub', 'mul', 'div').

    Returns:
        The result of the calculation.

    Raises:
        ValueError: If the operation is not one of the supported types.
        ZeroDivisionError: If the operation is 'div' and num2 is 0.
    """
    if c == "add":
        return a + b
    elif c == "sub":
        return a - b
    elif c == "mul":
        return a * b
    elif c == "div":
        if b == 0:
            raise ZeroDivisionError("Division by zero is not allowed.")
        return a / b
    else:
        raise ValueError("Invalid operation. Supported operations are 'add', 'sub', 'mul', 'div'.")
```

Comparison between Before and After Versions:

1.**Naming:**

- **Before:** Function name calc and parameters a, b, c → vague and non-descriptive.
- **After:** Function name calculate and parameters num1, num2, operation → clear, descriptive

2.Documentation:

- **Before:** No docstring or comments.
- **After:** Added detailed docstring → explains function purpose, parameters, return value.

3.**Error Handling:**

- **Before:** No error handling..
- **After:**Robust error handling.
    - Raises ValueError for unsupported operations.

Task Description #3 (Enforcing Coding Standards)

Scenario: A team project requires following PEP8 style guide. One developer submits:

def Checkprime(n):

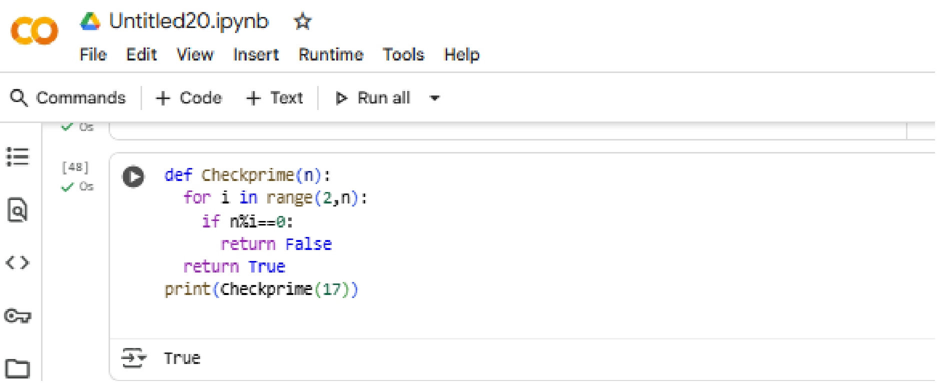
```
for i in range(2,n):
 if n%i==0:
  return False
return True
```

- Run this code and verify correctness.
- Use AI to perform a code quality review for PEP8 compliance.
- Prompt AI to return a refactored version with proper indentation, spacing, and naming conventions.
- Discuss how automated AI review can save time in large-scale projects.

Prompt:

Convert the following code to give a refactored version with proper indentation, spacing, and naming conventions.

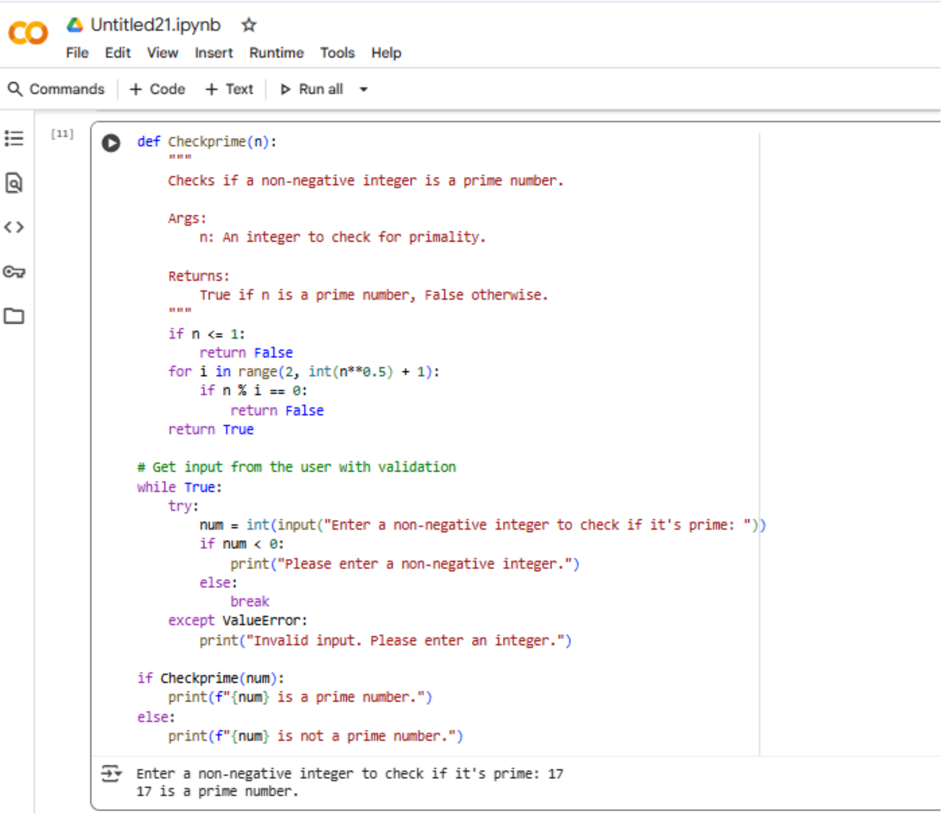
Code:



```
def Checkprime(n):
  for i in range(2,n):
    if n%i==0:
      return False
  return True
print(Checkprime(17))
```

```
True
```

Refactored version:



```
def Checkprime(n):
    """
    Checks if a non-negative integer is a prime number.

    Args:
        n: An integer to check for primality.

    Returns:
        True if n is a prime number, False otherwise.
    """
    if n <= 1:
        return False
    for i in range(2, int(n**0.5) + 1):
        if n % i == 0:
            return False
    return True

# Get input from the user with validation
while True:
    try:
        num = int(input("Enter a non-negative integer to check if it's prime: "))
        if num < 0:
            print("Please enter a non-negative integer.")
        else:
            break
    except ValueError:
        print("Invalid input. Please enter an integer.")

if Checkprime(num):
    print(f"{num} is a prime number.")
else:
    print(f"{num} is not a prime number.")
```

```
Enter a non-negative integer to check if it's prime: 17
17 is a prime number.
```

How AI Review Saves Time in Large-Scale Projects:

1.**Consistency**: Enforces uniform coding standards across teams.
2.**Reduced Manual Effort:** AI handles trivial fixes, humans focus on logic/design.
3.**Scalability**: Efficiently reviews hundreds of pull requests daily.
4.**KnowledgeSharing:** Helps junior developers learn best practices.

Task Description #4 (AI as a Code Reviewer in Real Projects)
Scenario: You are part of a GitHub project. A teammate submits this pull request:

```
def processData(d):
    return [x*2 for x in d if x%2==0]
```

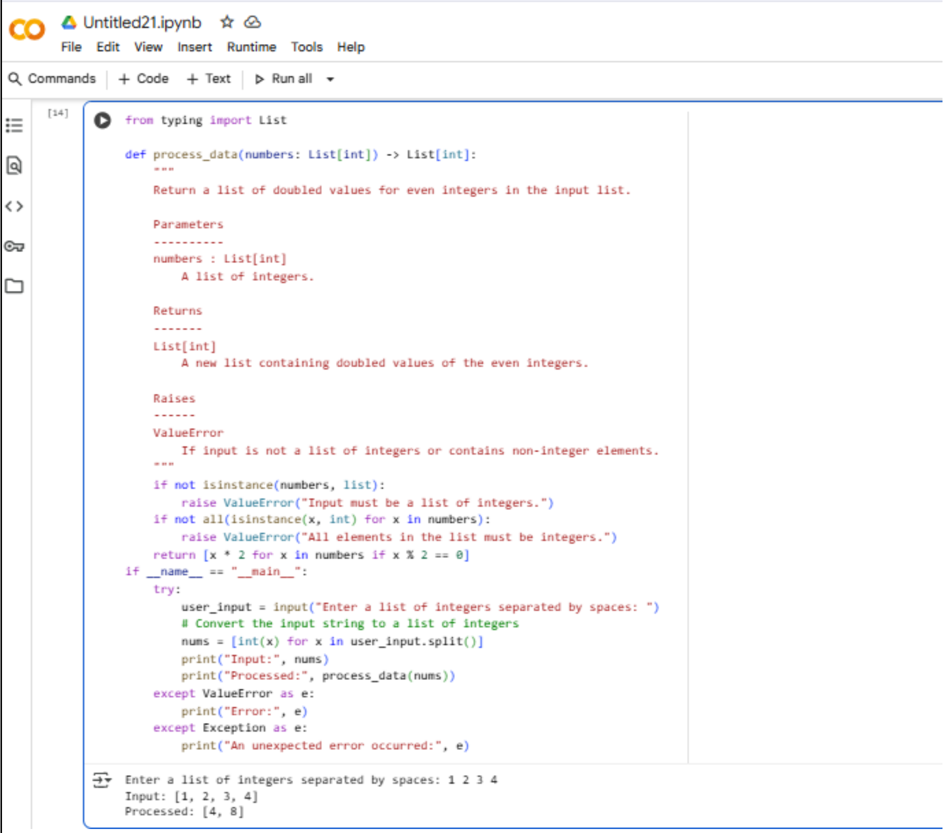
- Review this function manually for readability, reusability, and edge cases.
- Use AI to generate a code review comment, focusing on:
    - Naming conventions.
    - Input validation (e.g., what if d is not a list?).
    - Adding type hints.
- Modify the function based on AI's suggestions.

- Write a short reflection: *Would you trust AI as a standalone reviewer, or only as a support tool? Why?*

Prompt:

Review the following Python function for readability, naming conventions, reusability.

AI Modified Function:



```python
from typing import List

def process_data(numbers: List[int]) -> List[int]:
    """
    Return a list of doubled values for even integers in the input list.

    Parameters
    ----------
    numbers : List[int]
        A list of integers.

    Returns
    -------
    List[int]
        A new list containing doubled values of the even integers.

    Raises
    ------
    ValueError
        If input is not a list of integers or contains non-integer elements.
    """
    if not isinstance(numbers, list):
        raise ValueError("Input must be a list of integers.")
    if not all(isinstance(x, int) for x in numbers):
        raise ValueError("All elements in the list must be integers.")
    return [x * 2 for x in numbers if x % 2 == 0]
if __name__ == "__main__":
    try:
        user_input = input("Enter a list of integers separated by spaces: ")
        # Convert the input string to a list of integers
        nums = [int(x) for x in user_input.split()]
        print("Input:", nums)
        print("Processed:", process_data(nums))
    except ValueError as e:
        print("Error:", e)
    except Exception as e:
        print("An unexpected error occurred:", e)
```

```
Enter a list of integers separated by spaces: 1 2 3 4
Input: [1, 2, 3, 4]
Processed: [4, 8]
```

Code Review:

1.Naming Conventions: The function name processData should be renamed to process_data.

2.InputValidation: The function should check that the input is a list of integers, and show a clear error if it is not.

3.Type hints: Add type hints so it's clear what the function takes and returns.

Short reflection:

I would use AI mainly as a **support tool**, not as a standalone reviewer. AI is very helpful for catching common issues like naming, formatting, missing type hints, and simple bugs, which saves a lot of time in large projects.