AI ASSISTED CODING LAB 13.2

Lab 13: Code Refactoring: Improving Legacy Code with AI Suggestions.

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BATCH: 01

DATE: 28-10-2025

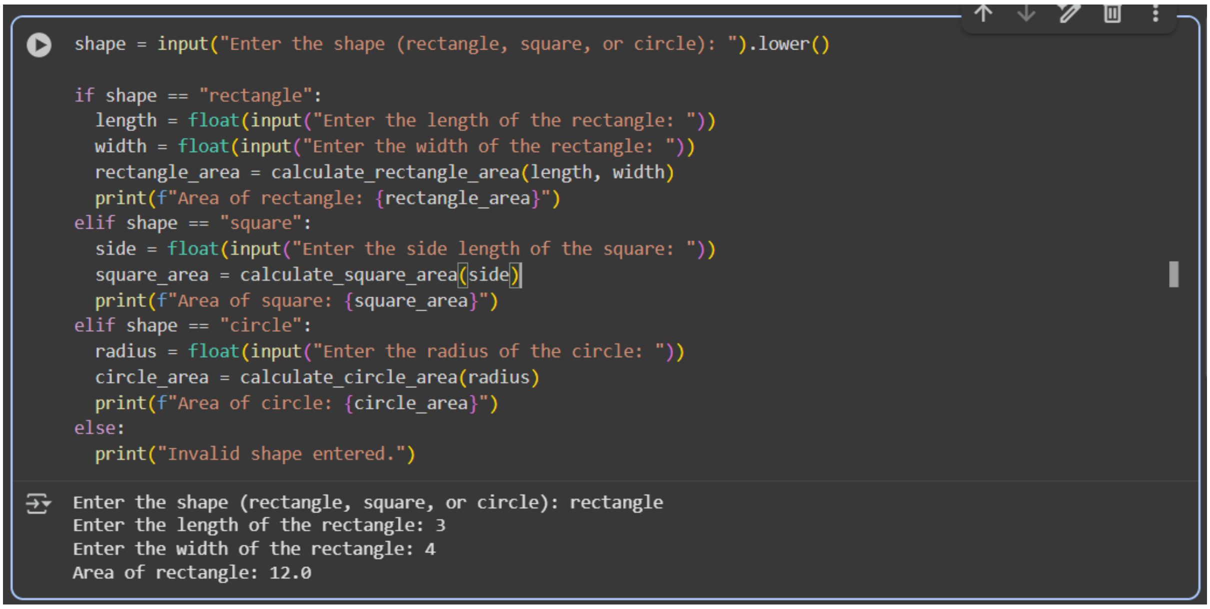
Task Description 1 – Remove Repetition
Task: Provide AI with the following redundant code and ask it to refactor.

CODE:

```
def calculate_area(shape, x, y=0):
if shape == "rectangle":
return x * y
elif shape == "square":
return x * x
elif shape == "circle":
return 3.14 * x * x
```

Used Prompt:

Refactor the given code, convert into separate functions and make it modular and cleaner. Take input from user.



```
shape = input("Enter the shape (rectangle, square, or circle): ").lower()

if shape == "rectangle":
  length = float(input("Enter the length of the rectangle: "))
  width = float(input("Enter the width of the rectangle: "))
  rectangle_area = calculate_rectangle_area(length, width)
  print(f"Area of rectangle: {rectangle_area}")
elif shape == "square":
  side = float(input("Enter the side length of the square: "))
  square_area = calculate_square_area(side)
  print(f"Area of square: {square_area}")
elif shape == "circle":
  radius = float(input("Enter the radius of the circle: "))
  circle_area = calculate_circle_area(radius)
  print(f"Area of circle: {circle_area}")
else:
  print("Invalid shape entered.")
```

```
Enter the shape (rectangle, square, or circle): rectangle
Enter the length of the rectangle: 3
Enter the width of the rectangle: 4
Area of rectangle: 12.0
```

Task Description 2 – Error Handling in Legacy Code

Task: Legacy function without proper error handling

CODE: def read_file(filename):

f = open(filename, "r")

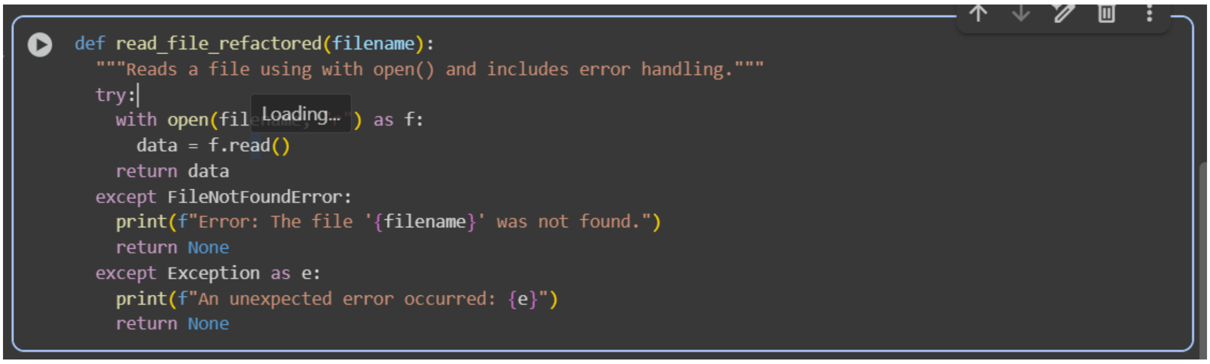
data = f.read()

f.close()

return data

Used Prompt:

refactor the code with with open() and try-except.



```
def read_file_refactored(filename):
  """Reads a file using with open() and includes error handling."""
  try:
    with open(filename, "r") as f:
      data = f.read()
    return data
  except FileNotFoundError:
    print(f"Error: The file '{filename}' was not found.")
    return None
  except Exception as e:
    print(f"An unexpected error occurred: {e}")
    return None
```

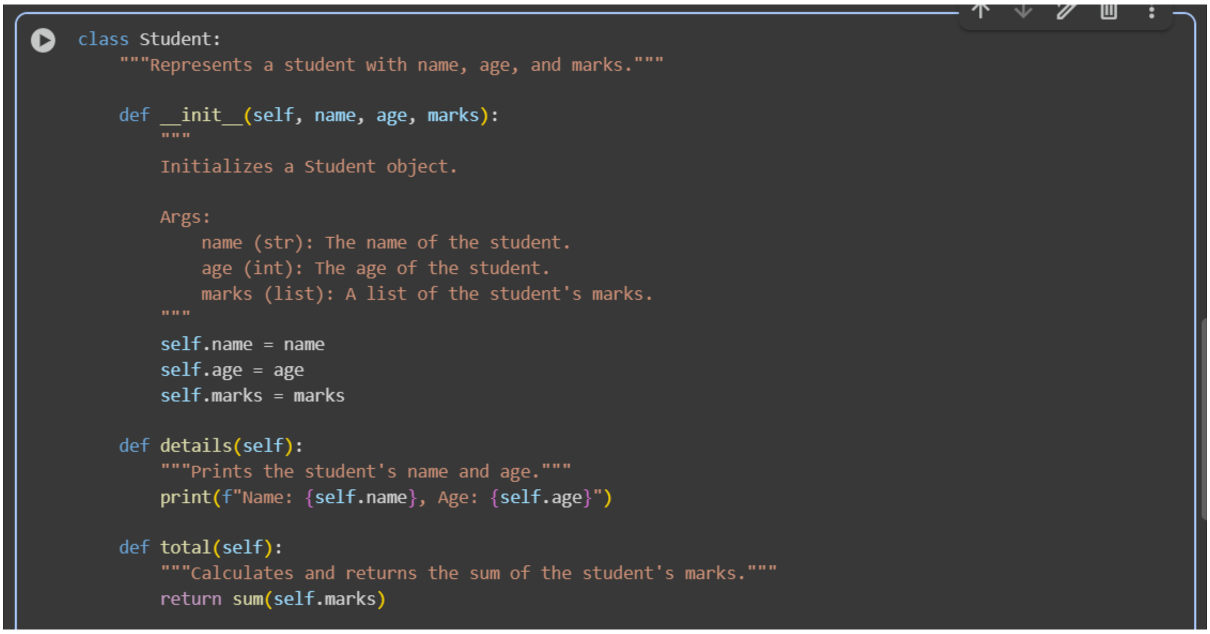
Task Description 3 – Complex Refactoring
Task: Provide this legacy class to AI for readability and modularity improvements:

CODE:

```
class Student:
def __init__(self, n, a, m1, m2, m3):
self.n = n
self.a = a
self.m1 = m1
self.m2 = m2
self.m3 = m3
def details(self):
print("Name:", self.n, "Age:", self.a)
def total(self):
return self.m1+self.m2+self.m3
```

Used Prompt:

in the given code make more readability and cleaner by givingnames such as(name, age,marks), add docstrings, improve print readability and use sum(self.marks) if marks are stored in a list and take input from the user



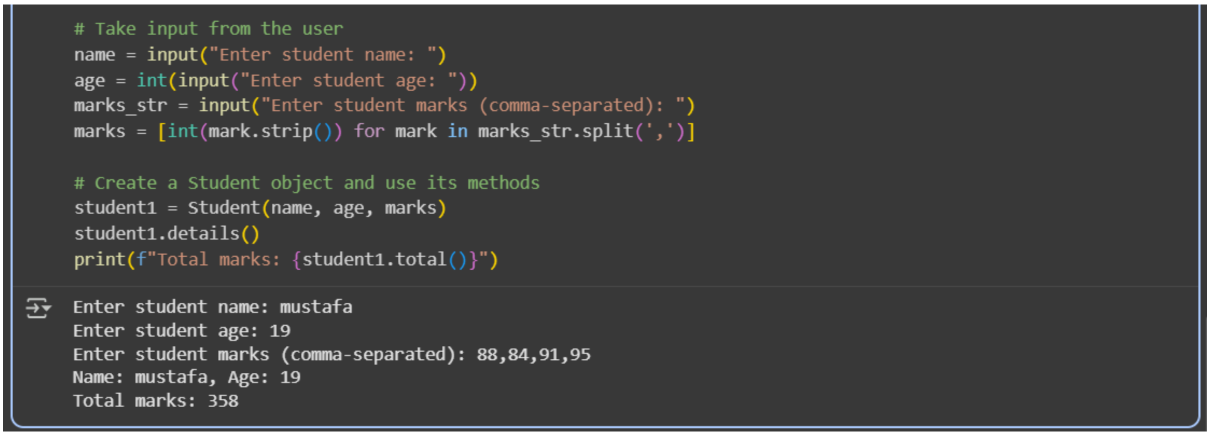
```python
class Student:
    """Represents a student with name, age, and marks."""

    def __init__(self, name, age, marks):
        """
        Initializes a Student object.

        Args:
            name (str): The name of the student.
            age (int): The age of the student.
            marks (list): A list of the student's marks.
        """
        self.name = name
        self.age = age
        self.marks = marks

    def details(self):
        """Prints the student's name and age."""
        print(f"Name: {self.name}, Age: {self.age}")

    def total(self):
        """Calculates and returns the sum of the student's marks."""
        return sum(self.marks)
```



```python
# Take input from the user
name = input("Enter student name: ")
age = int(input("Enter student age: "))
marks_str = input("Enter student marks (comma-separated): ")
marks = [int(mark.strip()) for mark in marks_str.split(',')]

# Create a Student object and use its methods
student1 = Student(name, age, marks)
student1.details()
print(f"Total marks: {student1.total()}")
```

```
Enter student name: mustafa
Enter student age: 19
Enter student marks (comma-separated): 88,84,91,95
Name: mustafa, Age: 19
Total marks: 358
```

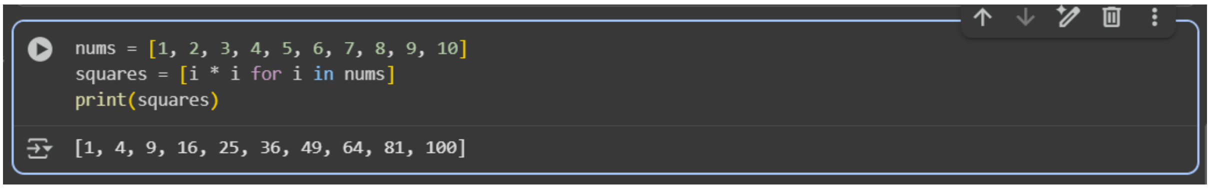
Task Description #4 – Inefficient Loop Refactoring

Task: Refactor this inefficient loop with AI help

CODE:

```
nums = [1,2,3,4,5,6,7,8,9,10]
squares = []
for i in nums:
squares.append(i * i)
```

Used Prompt: refactor this inefficient loop.



```
nums = [1, 2, 3, 4, 5, 6, 7, 8, 9, 10]
squares = [i * i for i in nums]
print(squares)
```

```
[1, 4, 9, 16, 25, 36, 49, 64, 81, 100]
```