

SR UNIVERSITY

AI ASSIST CODING

LAB-13.2:Code Refactoring: Improving Legacy Code with AI Suggestion

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TASK #1:

Prompt used:

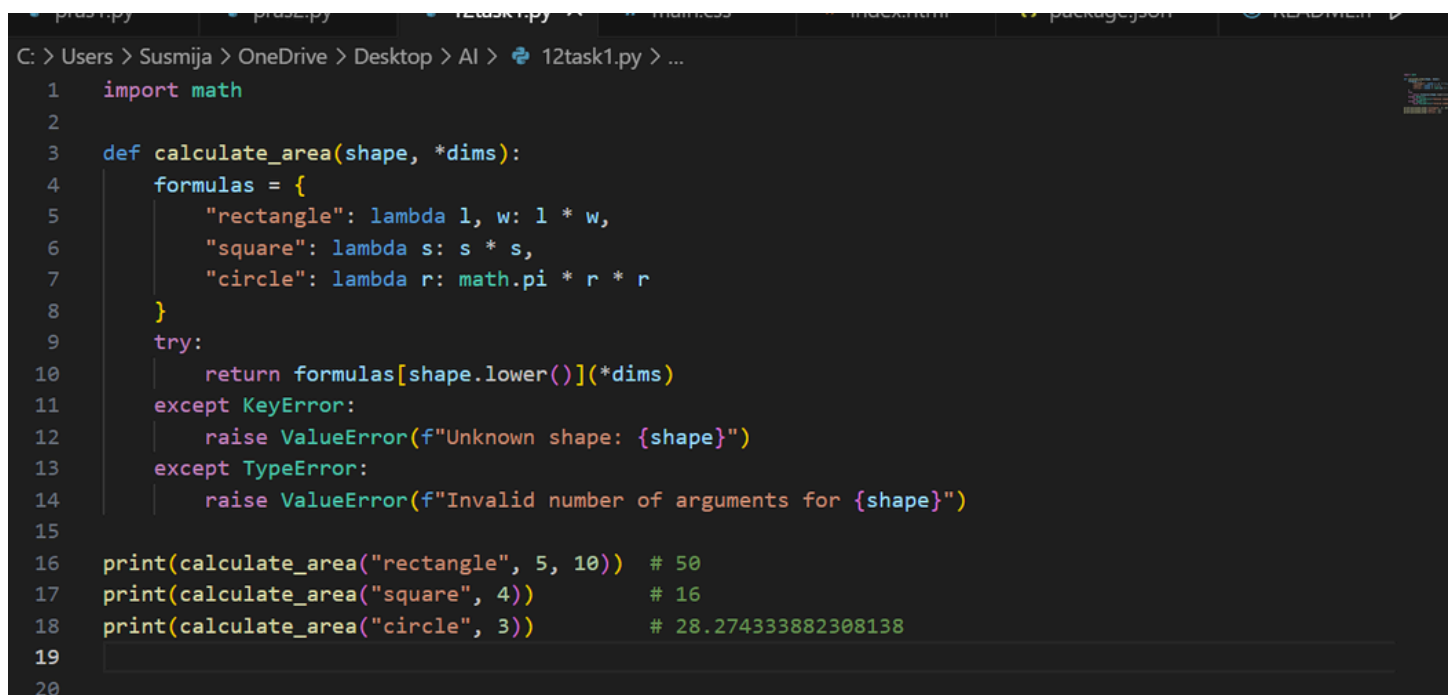
- Refactor this Python function to remove repetition using a dictionary or helper functions, keeping the same outputs. Add inline comments and a few test cases with expected results.

Before Refactoring code:

Python 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
```

After Refactoring Code Generated:



```
C: > Users > Susmija > OneDrive > Desktop > AI > 12task1.py > ...  
1  import math  
2  
3  def calculate_area(shape, *dims):  
4      formulas = {  
5          "rectangle": lambda l, w: l * w,  
6          "square": lambda s: s * s,  
7          "circle": lambda r: math.pi * r * r  
8      }  
9      try:  
10         return formulas[shape.lower()](*dims)  
11     except KeyError:  
12         raise ValueError(f"Unknown shape: {shape}")  
13     except TypeError:  
14         raise ValueError(f"Invalid number of arguments for {shape}")  
15  
16 print(calculate_area("rectangle", 5, 10)) # 50  
17 print(calculate_area("square", 4))      # 16  
18 print(calculate_area("circle", 3))      # 28.274333882308138  
19  
20
```

Observations:

- 1.Flexibility with *dimensions:**The function can take a variable number of arguments depending on the shape.
- 2.Improved Accuracy :**Uses math.pi instead of 3.14 for more precise circle calculations.
- 3.Error Handling:**If the shape is unknown, the function raises a clear error message (ValueError).

TASK #2:

Prompt used:

- Provide AI with the following redundant code and ask it to refactor with open() and try-except:


Before Refactoring code:

Python Code

```
def read_file(filename):  
    f = open(filename, "r")  
    data = f.read()
```

```
    f.close()  
    return data
```

After Refactoring Code Generated:



```
Users > Susmija > OneDrive > Desktop > AI > 12task2.py > read_file  
def read_file(filename):  
    try:  
        with open(filename, "r") as f:  
            data = f.read()  
            return data  
    except FileNotFoundError:  
        print(f"Error: File '{filename}' not found.")  
        return None  
    except Exception as e:  
        print(f"An error occurred: {e}")  
        return None
```

Observations:

- Old code lacks error handling and manual file closing.
- New code uses with open() for auto file closing.
- Added try-except for handling errors safely.
- More readable, efficient, and reliable

TASK #3:

Prompt used:

- Provide this legacy class to AI for readability and modularity improvements.

Before Refactoring code:

Python 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
```

After Refactoring Code Generated:

```
> Users > Susmija > OneDrive > Desktop > AI > 12task3.py > ...
1  class Student:
2      def __init__(self, name, age, marks):
3          self.name, self.age, self.marks = name, age, marks
4
5      def details(self):
6          return f"Name: {self.name}, Age: {self.age}"
7
8      def total(self):
9          return sum(self.marks)
10
11     def average(self):
12         return sum(self.marks) / len(self.marks)
13
14     # Example usage:
15     s1 = Student("Alice", 20, [85, 90, 78])
16     print(s1.details())          # Output: Name: Alice, Age: 20
17     print("Total:", s1.total())  # Output: Total: 253
18     print("Average:", s1.average()) # Output: Average: 84.33333333333333
```

Observations:

- Variables renamed to name, age, and marks instead of cryptic n, a, m1, etc.
- Method names are descriptive: details() and total() clearly convey intent
- Class and methods have docstrings that explain purpose, parameters, and return values.
- This improves readability and maintainability of the users.

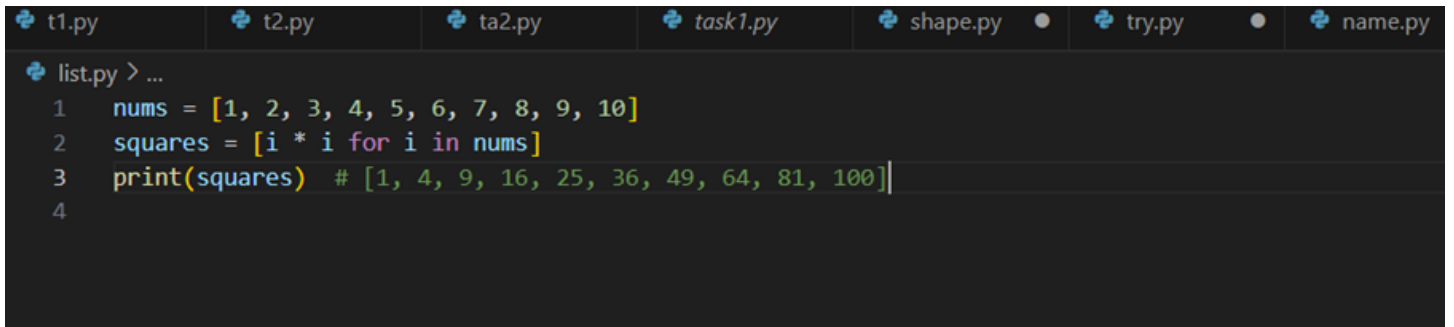
Task #4:

Prompt: Refactor this inefficient loop with AI help.

Python Code

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

After Refactoring Code Generated:

A screenshot of a code editor interface. At the top, there is a tab bar with several open files: t1.py, t2.py, ta2.py, task1.py, shape.py, try.py, and name.py. The 'list.py' file is currently selected and active. The code in the editor is as follows:

```
list.py > ...
1  nums = [1, 2, 3, 4, 5, 6, 7, 8, 9, 10]
2  squares = [i * i for i in nums]
3  print(squares)  # [1, 4, 9, 16, 25, 36, 49, 64, 81, 100]
4
```

Observation:

- The code was refactored from a loop with `.append()` to a list comprehension.
- This makes it more concise, readable, and Pythonic.
- It also improves performance since list comprehensions are optimized internally.
- The intent (generate squares of numbers) is now expressed in a single clear line.