

## Assignment-10.1

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Batch -23

### Task Description #1 – Syntax and Logic Errors

Task: Use AI to identify and fix syntax and logic errors in a faulty

Python script.

Sample Input Code:

```
# Calculate average score of a student

def calc_average(marks):

total = 0

for m in marks:

total += m

average = total / len(marks)

return avrage # Typo here

marks = [85, 90, 78, 92]

print("Average Score is ", calc_average(marks))
```

Expected Output:

- Corrected and runnable Python code with explanations of the fixes.

```
C:\> Users > souky > Downloads > ✎ average.py > ...

1  # refactored code with a typo and a missing parenthesis
2
3  def calc_average(marks):
4      total = 0
5      for m in marks:
6          total += m
7      average = total / len(marks)
8      return average # Fixed typo : 'avrage' to 'average' and added missing parenthesis
9  marks = [85, 90, 78, 92]
10 print("Average Score is ", calc_average(marks))
```

```
PS C:\Users\souky\Downloads> PS C:\Users\souky\Downloads> python average.py
Average Score is 86.25
PS C:\Users\souky\Downloads>
```

## Task Description #2 – PEP 8 Compliance

Task: Use AI to refactor Python code to follow PEP 8 style guidelines.

Sample Input Code:

```
def area_of_rect(L,B) : return L*B  
print(area_of_rect(10,20))
```

Expected Output:

- Well-formatted PEP 8-compliant Python code.

The screenshot shows a terminal window with the following content:

```
C: > Users > souky > Downloads > rect.py > ...  
1 def area_of_rect(L,B) : return L*B  
2 print(area_of_rect(10,20))  
3 #refactored the above code and add documentation and type hints  
4 def area_of_rect(length: float, breadth: float) -> float:  
5     """  
6         Calculate the area of a rectangle given its length and breadth.  
7     """  
8     Parameters:  
9         length (float): The length of the rectangle.  
10        breadth (float): The breadth of the rectangle.  
11    Returns:  
12        float: The area of the rectangle calculated as length multiplied by breadth.  
13    Raises:  
14        ValueError: If length or breadth is negative, as dimensions cannot be negative.  
15        TypeError: If length or breadth is not a number (int or float).  
16    """  
17    if not isinstance(length, (int, float)) or not isinstance(breadth, (int, float)):  
18        raise TypeError("Length and breadth must be numbers (int or float).")  
19    if length < 0 or breadth < 0:  
20        raise ValueError("Length and breadth must be non-negative.")  
21    return length * breadth  
22  
23 print(area_of_rect(10, 20))
```

At the bottom of the terminal window, the output is shown:

```
200  
200  
PS C:\Users\souky\Downloads> []
```

## Task Description #3 – Readability Enhancement

Task: Use AI to make code more readable without changing its logic.

Sample Input Code:

```
def c(x,y):  
    return x*y/100
```

```
a=200  
b=15  
print(c(a,b))
```

Expected Output:

- Python code with descriptive variable names, inline

comments, and clear formatting.

```
> Users > souky > OneDrive > Documents > AI Lab >  read_file.py >  calculate_percentage  
1 def c(x,y):  
2     return x*y/100  
3 a=200  
4 b=15  
5 print(c(a,b))  
6 #refactored the above code with descriptive variable names, inline comments, and clear formatting  
7 def calculate_percentage(part: float, whole: float) -> float:  
8     """  
9         Calculate the percentage of a part relative to a whole.  
10      
11    Parameters:  
12        part (float): The portion or part value.  
13        whole (float): The total or whole value.  
14      
15    Returns:  
16        float: The percentage calculated as (part / whole) * 100.  
17        Raises:  
18        ValueError: If the whole is zero, as division by zero is not allowed.  
19        TypeError: If part or whole is not a number (int or float).  
20        """  
21        if not isinstance(part, (int, float)) or not isinstance(whole, (int, float)):  
22            raise TypeError("Both part and whole must be numbers (int or float).")  
23        if whole == 0:  
24            raise ValueError("Whole cannot be zero to avoid division by zero.")  
25        return (part / whole) * 100
```

```
_file.py"  
30.0  
PS C:\Users\souky\Downloads> []
```

## Task Description #4 – Refactoring for Maintainability

Task: Use AI to break repetitive or long code into reusable functions.

Sample Input Code:

```
students = ["Alice", "Bob", "Charlie"]  
print("Welcome", students[0])
```

```
print("Welcome", students[1])
print("Welcome", students[2])
```

Expected Output:

- Modular code with reusable functions.

```
C: > Users > souky > OneDrive > Documents > AI Lab > student.py > welcome_student
1  students = ["Alice", "Bob", "Charlie"]
2  print("Welcome", students[0])
3  print("Welcome", students[1])
4  print("Welcome", students[2])
5  #refactored code to reduce redundancy with reusable function
6  def welcome_student(student: str) -> None:
7      """
8          Print a welcome message for a student.
9
10     Parameters:
11         student (str): The name of the student to welcome.
12
13     Returns:
14         None
15     values:
16         student: A string representing the name of the student.
17         type error: If the input is not a string, a TypeError will be raised.
18
19     """
20     if not isinstance(student, str):
21         raise TypeError("Student name must be a string.")
22     print("Welcome", student)
```

```
ent.py"
Welcome Alice
Welcome Bob
Welcome Charlie
PS C:\Users\souky\Downloads>
```

## Task Description #5 – Performance Optimization

Task: Use AI to make the code run faster.

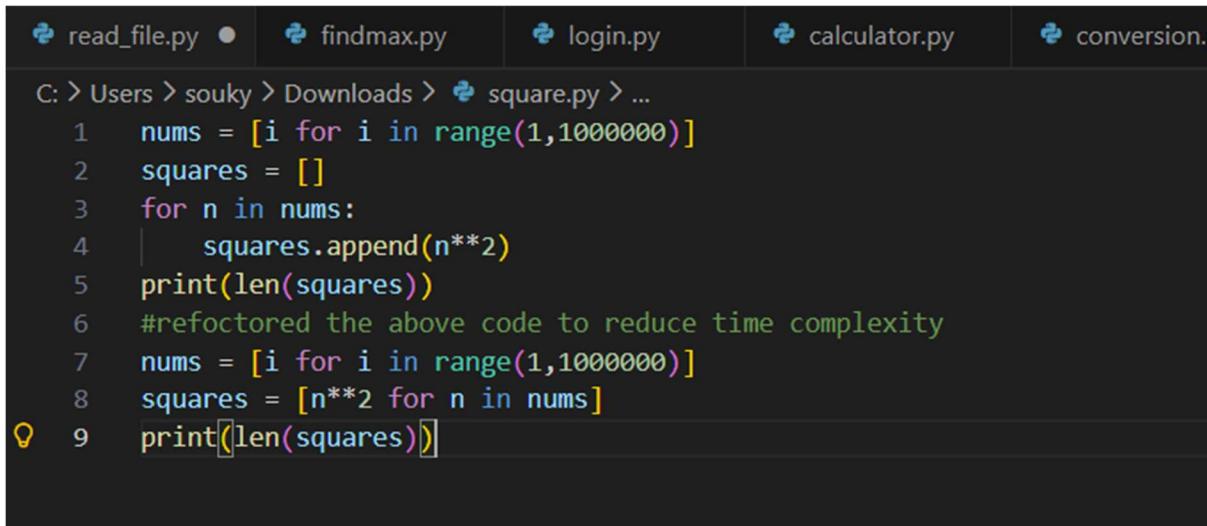
Sample Input Code:

```
# Find squares of numbers
nums = [i for i in range(1,1000000)]
```

```
squares = []
for n in nums:
    squares.append(n**2)
print(len(squares))
```

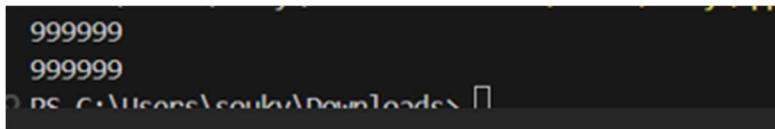
Expected Output:

- Optimized code using list comprehensions or vectorized operations.



The screenshot shows a terminal window with several tabs at the top: 'read\_file.py', 'findmax.py', 'login.py', 'calculator.py', and 'conversion.py'. The current tab is 'square.py'. The code in the terminal is as follows:

```
C: > Users > souky > Downloads > square.py > ...
1  nums = [i for i in range(1,1000000)]
2  squares = []
3  for n in nums:
4      squares.append(n**2)
5  print(len(squares))
6 #refactored the above code to reduce time complexity
7  nums = [i for i in range(1,1000000)]
8  squares = [n**2 for n in nums]
9  print(len(squares))
```



The terminal window shows the output of the code:

```
999999
999999
```

```
G_mc.py • mindmax.py • login.py • calculator.py • convertor.py
C: > Users > souky > Downloads > ✎ square.py > ...
1 import time
2 time1 = time.time()
3 nums = [i for i in range(1,1000000)]
4 squares = []
5 for n in nums:
6     squares.append(n**2)
7 #print(len(squares))
8 time2 = time.time()
9 print("Time taken:", time2 - time1)
10 # refactor the above code to reduce time complexity
11 time3 = time.time()
12 nums = [i for i in range(1,1000000)]
13 squares = [n**2 for n in nums]
14 #print(len(squares))
15 time4=time.time()
16 print("Time taken:", time4 - time3)
17 time5 = time.time()
18 #print(len([n**2 for n in range(1,1000000)]))
19 time6 = time.time()
20 print("Time taken:", time6 - time5)
```

```
Time taken: 0.36050939559936523
```

```
Time taken: 0.3215620517730713
```

```
Time taken: 9.5367431640625e-07
```

```
PS C:\Users\souky\Downloads>
```

