ASSIGNMENT-13.3

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Batch: 08

Lab 13: Code Refactoring Using AI Assistance Improving Legacy Code for Readability, Maintainability, and Performance

Task 1: Refactoring – Removing Code Duplication

Objective

To eliminate repeated logic by extracting reusable functions.

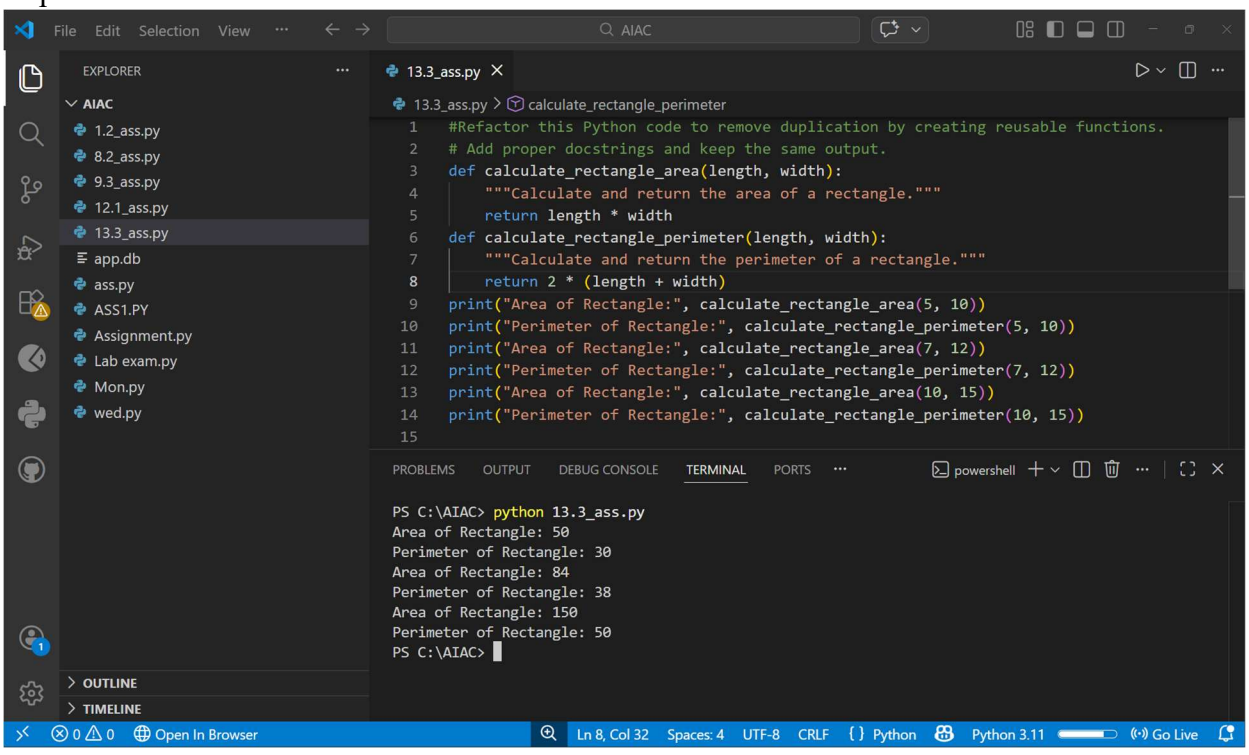
Task Description

Use AI assistance to refactor a legacy Python script that contains repeated blocks of code calculating the area and perimeter of rectangles.

Starter (Legacy) Code

```
# Legacy script with repeated logic
print("Area of Rectangle:", 5 * 10)
print("Perimeter of Rectangle:", 2 * (5 + 10))
print("Area of Rectangle:", 7 * 12)
print("Perimeter of Rectangle:", 2 * (7 + 12))
print("Area of Rectangle:", 10 * 15)
print("Perimeter of Rectangle:", 2 * (10 + 15))
```

Expected Outcome



Task 2: Refactoring – Optimizing Loops and Conditionals

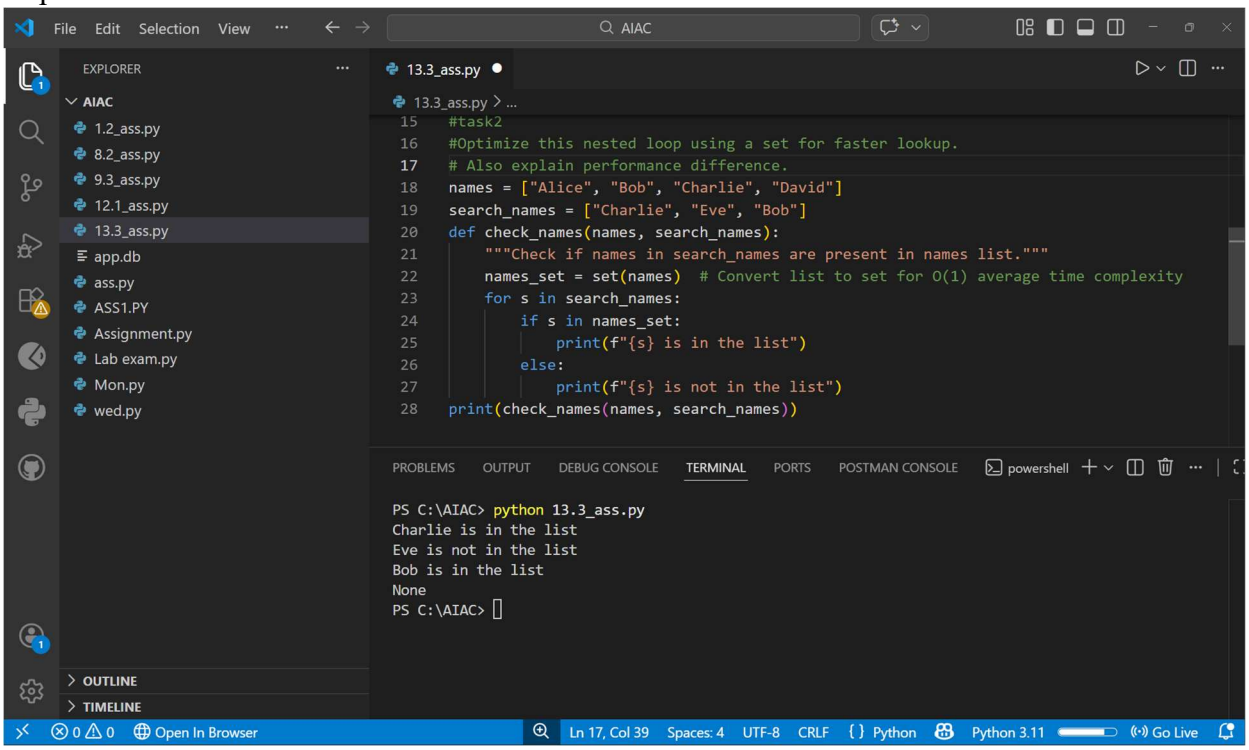
Objective

To improve performance by replacing inefficient nested loops with optimized structures.

Task Description
Use AI to analyze and refactor a script that checks the presence of elements using nested loops.
Starter (Legacy) Code

```
names = ["Alice", "Bob", "Charlie", "David"]
search_names = ["Charlie", "Eve", "Bob"]
for s in search_names:
found = False
for n in names:
if s == n:
found = True
if found:
print(f"{s} is in the list")
else:
print(f"{s} is not in the list")
```

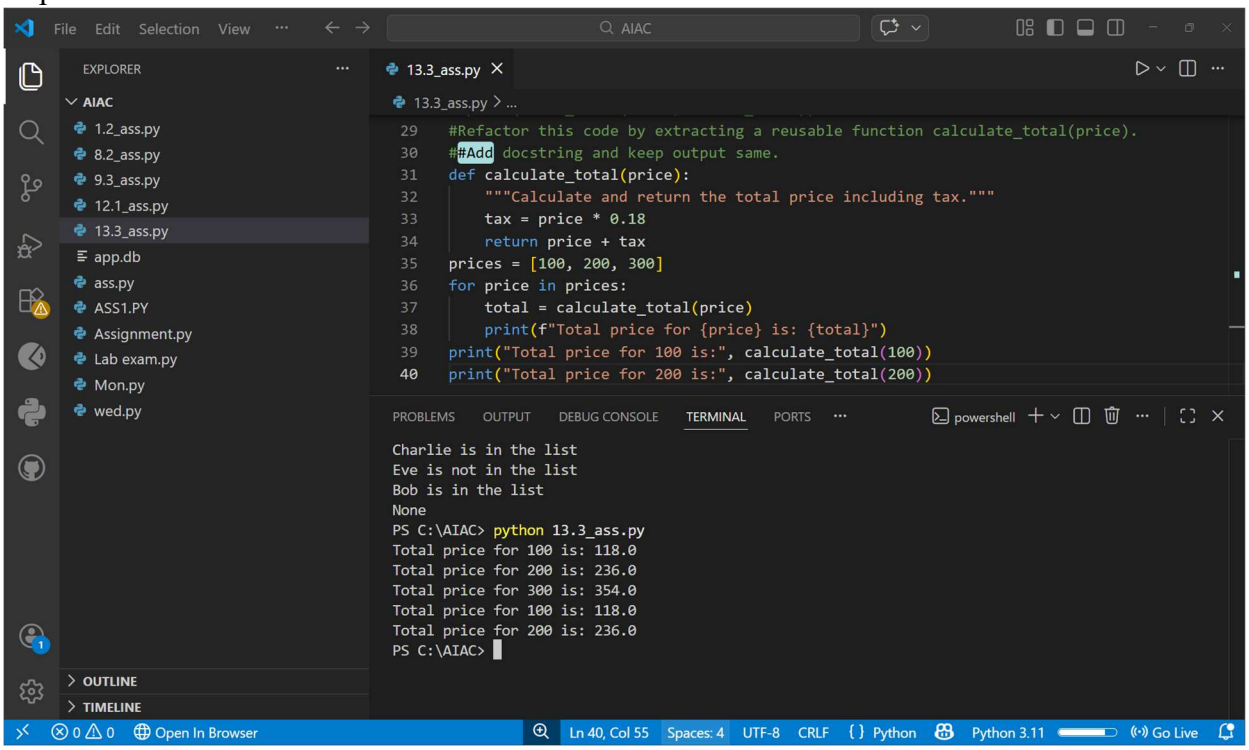
Expected Outcome



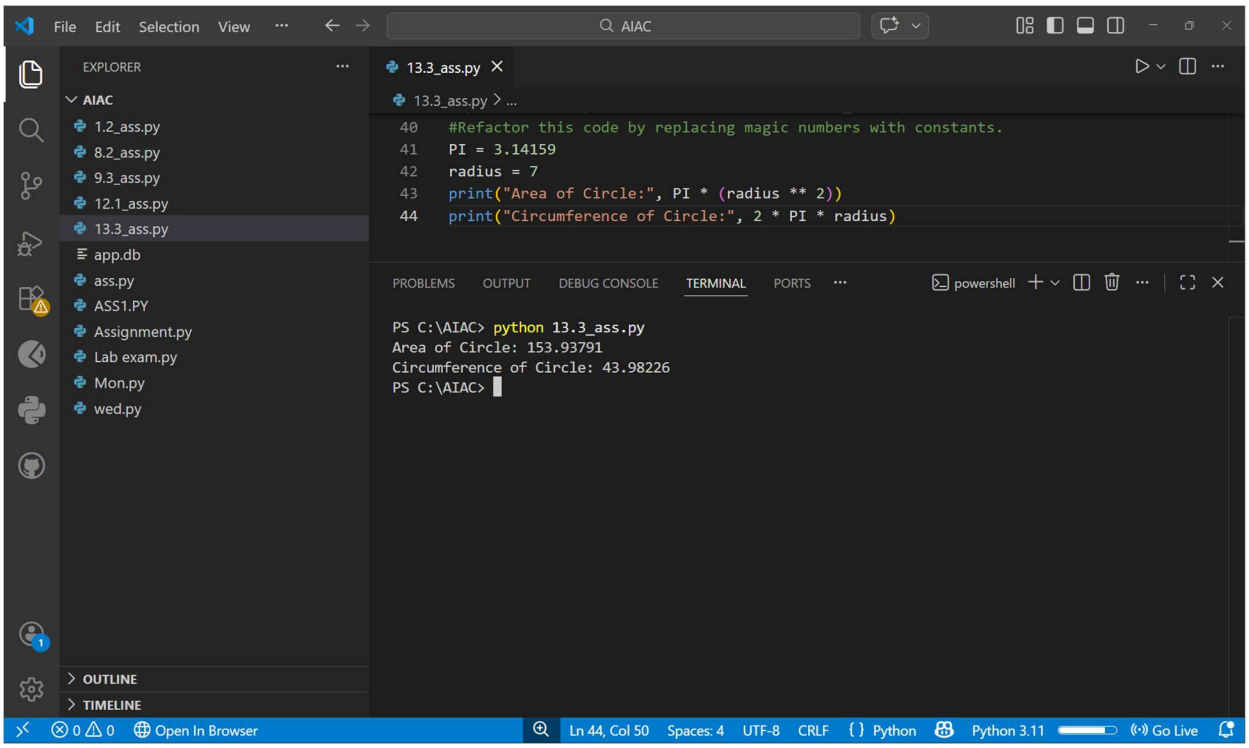
Task 3: Refactoring – Extracting Reusable Functions
Objective
To modularize code by extracting calculations into reusable functions.
Task Description
Refactor a legacy script where price and tax calculations are written inline.
Starter (Legacy) Code

```
price = 250
tax = price * 0.18
total = price + tax
print("Total Price:", total)
price = 500
```

tax = price * 0.18
total = price + tax
print("Total Price:", total)
Expected Outcome



Task 4: Refactoring – Replacing Hardcoded Values with Constants
Objective
To improve maintainability by replacing magic numbers with named constants.
Task Description
Use AI to identify hardcoded values and replace them with constants.
Starter (Legacy) Code
print("Area of Circle:", 3.14159 * (7 ** 2))
print("Circumference of Circle:", 2 * 3.14159 * 7)
Expected Outcome



Task 5: Refactoring – Improving Variable Naming and Readability

Objective

To enhance readability using descriptive variable names and comments.

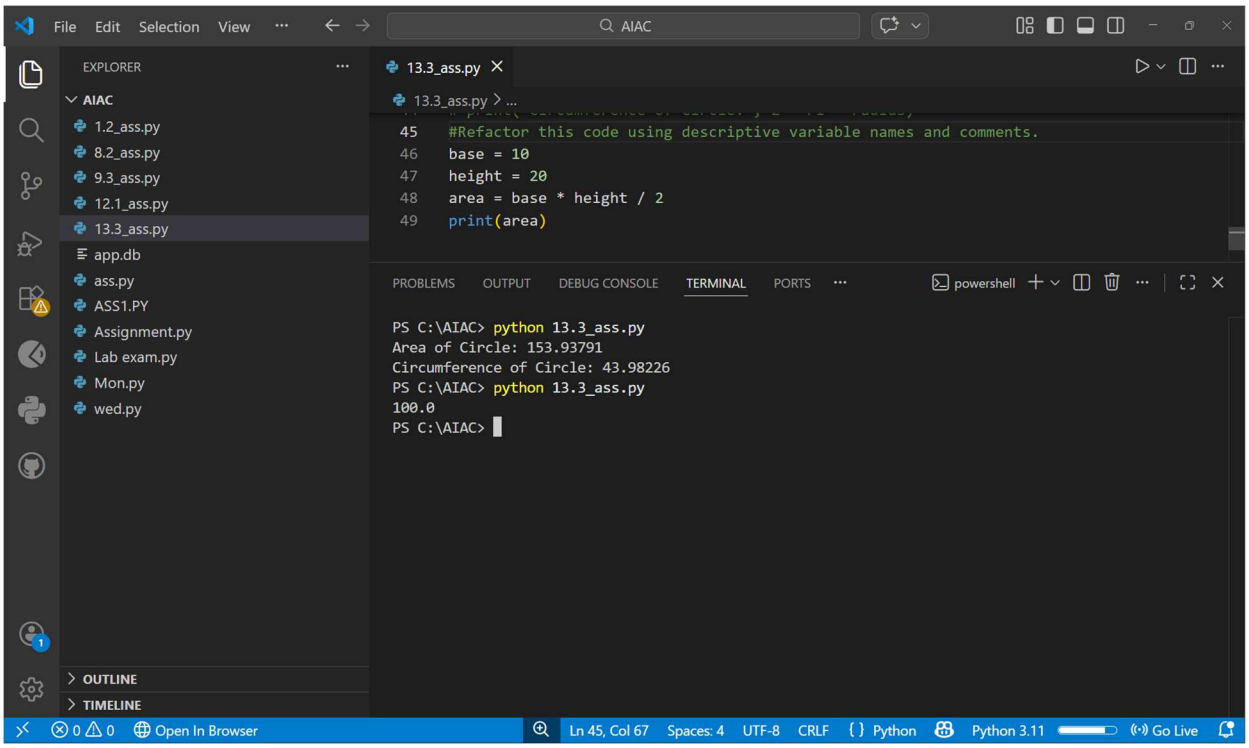
Task Description

Refactor a script with unclear variable names.

Starter (Legacy) Code

```
a = 10
b = 20
c = a * b / 2
print(c)
```

Expected Outcome


File Edit Selection View
AIAC
EXPLORER
AIAC
1.2_ass.py
8.2_ass.py
9.3_ass.py
12.1_ass.py
13.3_ass.py
app.db
ass.py
ASS1.PY
Assignment.py
Lab exam.py
Mon.py
wed.py
OUTLINE
TIMELINE
13.3_ass.py
13.3_ass.py > ...
45 #Refactor this code using descriptive variable names and comments.
46 base = 10
47 height = 20
48 area = base * height / 2
49 print(area)
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS
powershell
PS C:\AIAC> python 13.3_ass.py
Area of Circle: 153.93791
Circumference of Circle: 43.98226
PS C:\AIAC> python 13.3_ass.py
100.0
PS C:\AIAC>
0 0 Open In Browser
Ln 45, Col 67 Spaces: 4 UTF-8 CRLF Python Python 3.11 Go Live