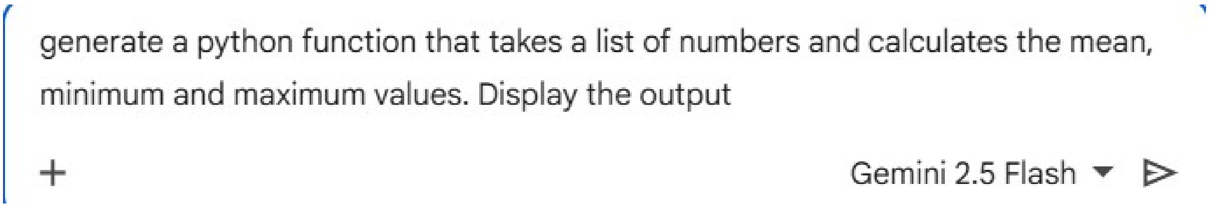
LAB ASSIGNMENT – 2

Name: Shinde Anjali

Hall Ticket No: 2303A54037

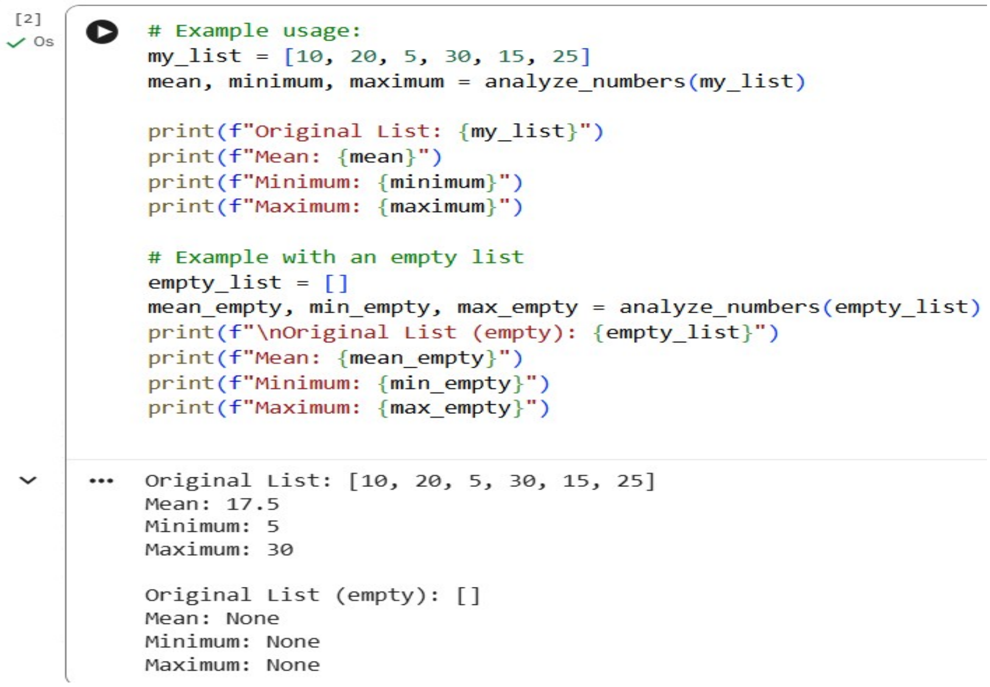
Batch : 48

Task 1: Statistical Summary for Survey Data Prompt:



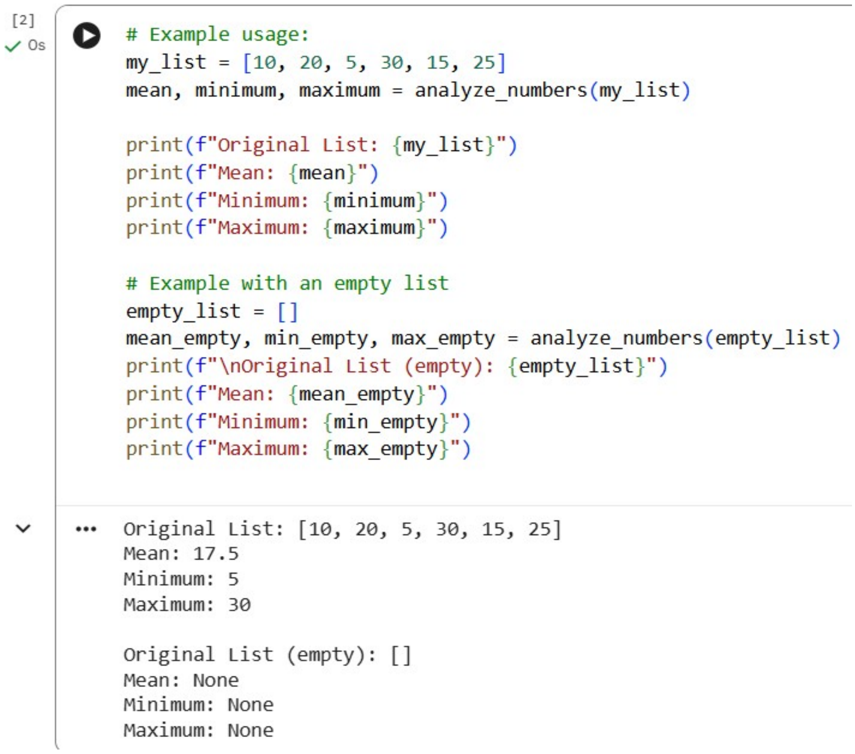
generate a python function that takes a list of numbers and calculates the mean, minimum and maximum values. Display the output

Code & Output:



```
# Example usage:
my_list = [10, 20, 5, 30, 15, 25]
mean, minimum, maximum = analyze_numbers(my_list)

print(f"Original List: {my_list}")
print(f"Mean: {mean}")
print(f"Minimum: {minimum}")
print(f"Maximum: {maximum}")

# Example with an empty list
empty_list = []
mean_empty, min_empty, max_empty = analyze_numbers(empty_list)
print(f"\nOriginal List (empty): {empty_list}")
print(f"Mean: {mean_empty}")
print(f"Minimum: {min_empty}")
print(f"Maximum: {max_empty}")
```

```
Original List: [10, 20, 5, 30, 15, 25]
Mean: 17.5
Minimum: 5
Maximum: 30

Original List (empty): []
Mean: None
Minimum: None
Maximum: None
```



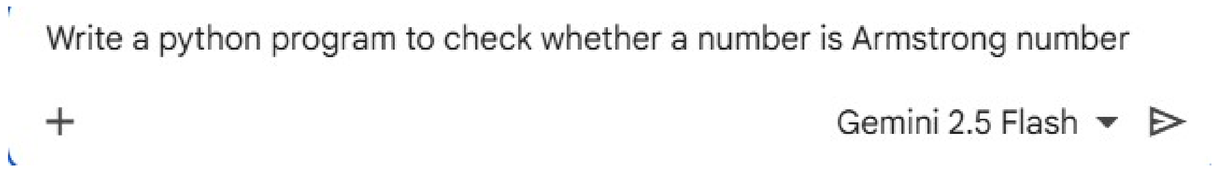
```
# Example usage:
my_list = [10, 20, 5, 30, 15, 25]
mean, minimum, maximum = analyze_numbers(my_list)

print(f"Original List: {my_list}")
print(f"Mean: {mean}")
print(f"Minimum: {minimum}")
print(f"Maximum: {maximum}")

# Example with an empty list
empty_list = []
mean_empty, min_empty, max_empty = analyze_numbers(empty_list)
print(f"\nOriginal List (empty): {empty_list}")
print(f"Mean: {mean_empty}")
print(f"Minimum: {min_empty}")
print(f"Maximum: {max_empty}")
```

```
Original List: [10, 20, 5, 30, 15, 25]
Mean: 17.5
Minimum: 5
Maximum: 30

Original List (empty): []
Mean: None
Minimum: None
Maximum: None
```

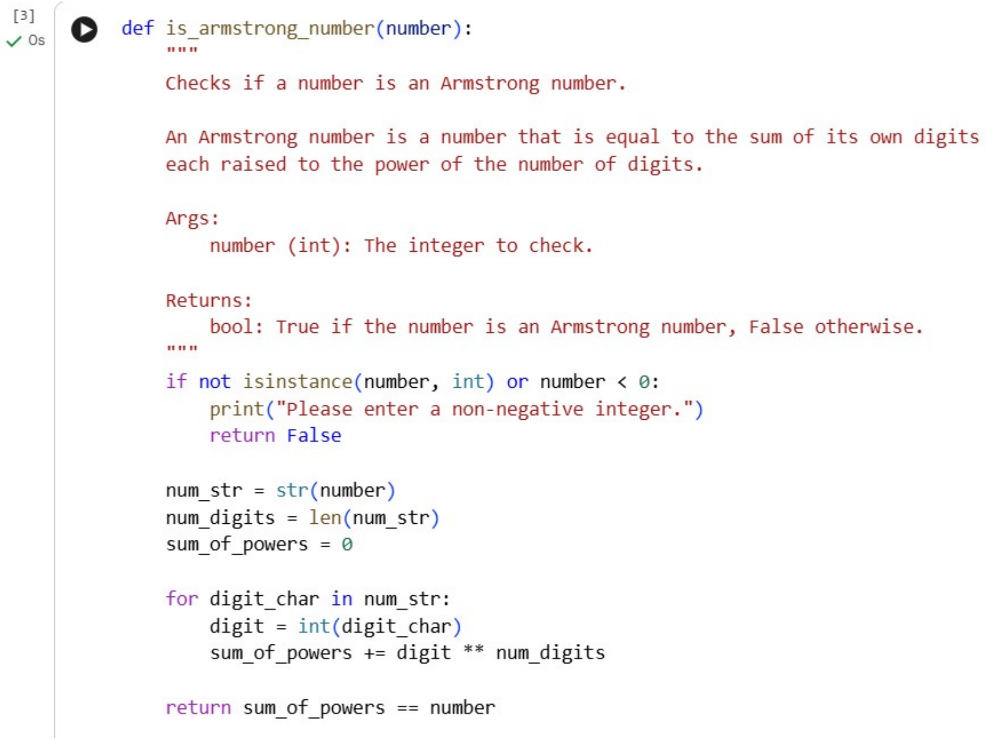
Explanation:

- Gemini produced readable and clear code.
- made effective use of built-in Python functions • The output appeared correctly in Google Colab.

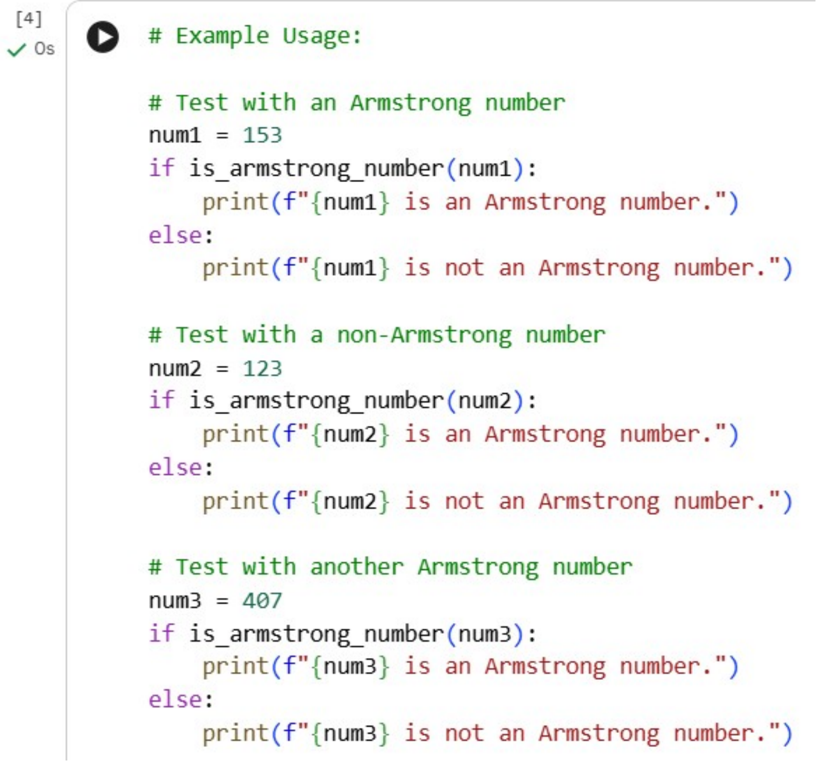
Task 2: Armstrong Number – AI Comparison Prompt:


Write a python program to check whether a number is Armstrong number

Code:

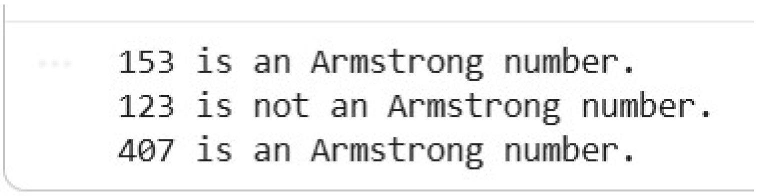


```
def is_armstrong_number(number):
    """
    Checks if a number is an Armstrong number.

    An Armstrong number is a number that is equal to the sum of its own digits
    each raised to the power of the number of digits.

    Args:
        number (int): The integer to check.

    Returns:
        bool: True if the number is an Armstrong number, False otherwise.
    """
    if not isinstance(number, int) or number < 0:
        print("Please enter a non-negative integer.")
        return False

    num_str = str(number)
    num_digits = len(num_str)
    sum_of_powers = 0

    for digit_char in num_str:
        digit = int(digit_char)
        sum_of_powers += digit ** num_digits

    return sum_of_powers == number
```



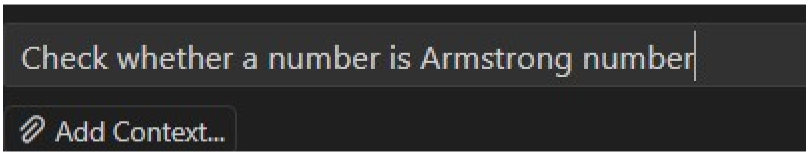
```
# Example Usage:

# Test with an Armstrong number
num1 = 153
if is_armstrong_number(num1):
    print(f"{num1} is an Armstrong number.")
else:
    print(f"{num1} is not an Armstrong number.")

# Test with a non-Armstrong number
num2 = 123
if is_armstrong_number(num2):
    print(f"{num2} is an Armstrong number.")
else:
    print(f"{num2} is not an Armstrong number.")

# Test with another Armstrong number
num3 = 407
if is_armstrong_number(num3):
    print(f"{num3} is an Armstrong number.")
else:
    print(f"{num3} is not an Armstrong number.")
```

Output:



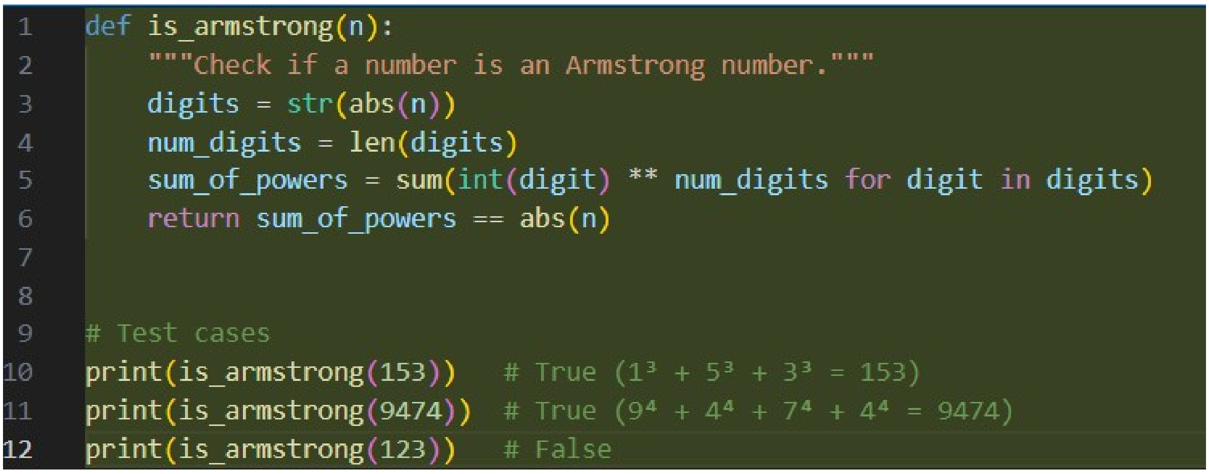
```
153 is an Armstrong number.
123 is not an Armstrong number.
407 is an Armstrong number.
```

Using GitHub Copilot in VS Code:



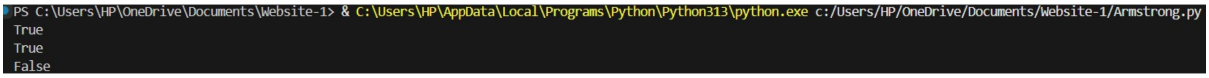
Check whether a number is Armstrong number

Code:



```python
def is_armstrong(n):
    """Check if a number is an Armstrong number."""
    digits = str(abs(n))
    num_digits = len(digits)
    sum_of_powers = sum(int(digit) ** num_digits for digit in digits)
    return sum_of_powers == abs(n)


# Test cases
print(is_armstrong(153))   # True (1³ + 5³ + 3³ = 153)
print(is_armstrong(9474))  # True (9⁴ + 4⁴ + 7⁴ + 4⁴ = 9474)
print(is_armstrong(123))   # False
```

Output:

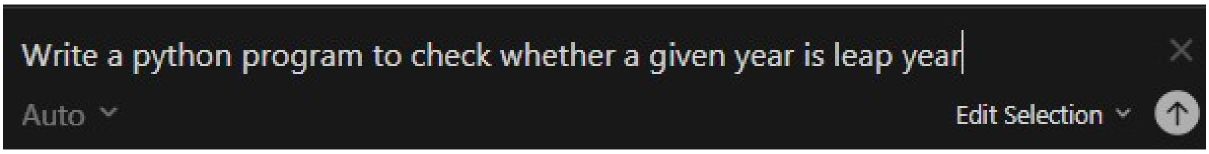


```
PS C:\Users\HP\OneDrive\Documents\Website-1> & C:\Users\HP\AppData\Local\Programs\Python\Python313\python.exe c:/Users/HP/OneDrive/Documents/Website-1/Armstrong.py
True
True
False
```

Explanation:

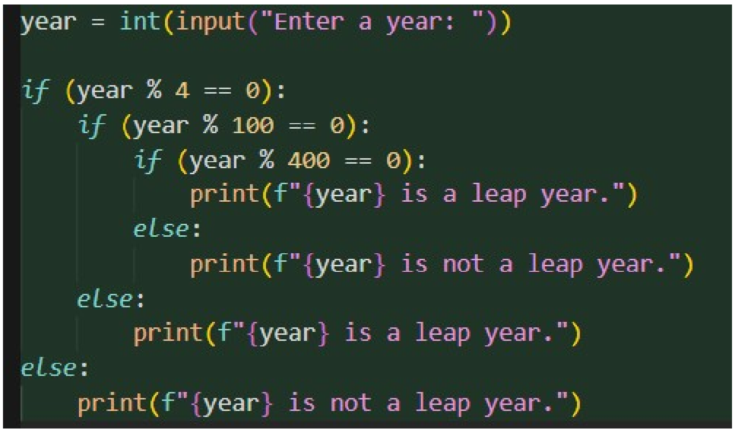
- Gemini is better at learning the basics.
- Copilot generates code that is more polished and optimised.

Task 3: Leap Year Validation Using Cursor AI Prompt 1:



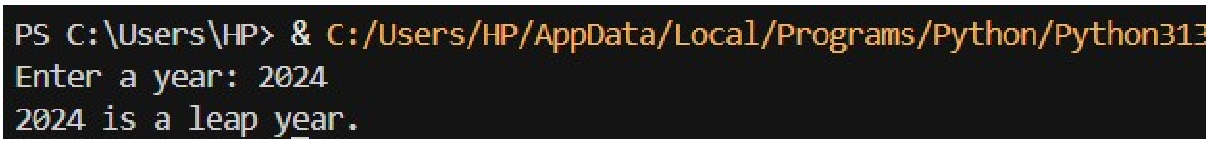
Write a python program to check whether a given year is leap year

Code:



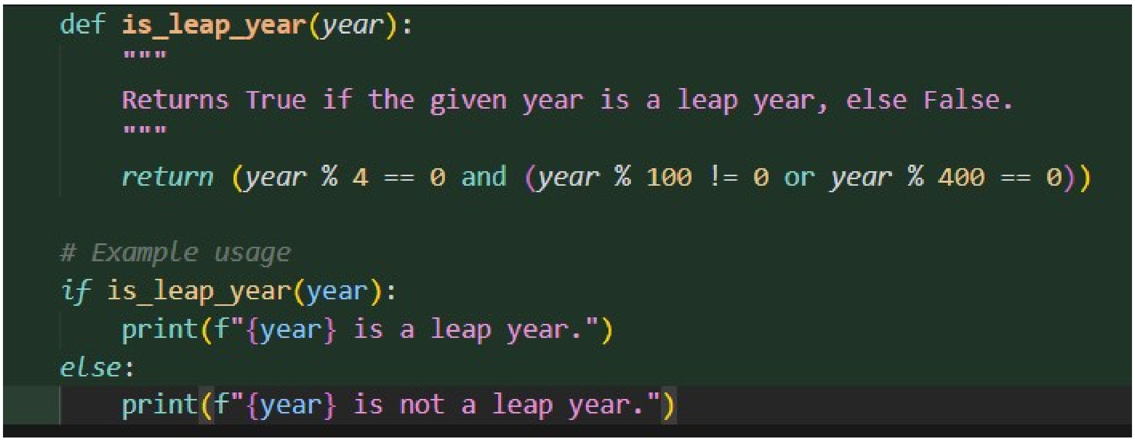
```python
year = int(input("Enter a year: "))

if (year % 4 == 0):
    if (year % 100 == 0):
        if (year % 400 == 0):
            print(f"{year} is a leap year.")
        else:
            print(f"{year} is not a leap year.")
    else:
        print(f"{year} is a leap year.")
else:
    print(f"{year} is not a leap year.")
```

Output:



```
PS C:\Users\HP> & C:/Users/HP/AppData/Local/Programs/Python/Python313
Enter a year: 2024
2024 is a leap year.
```

Prompt 2: Optimised version



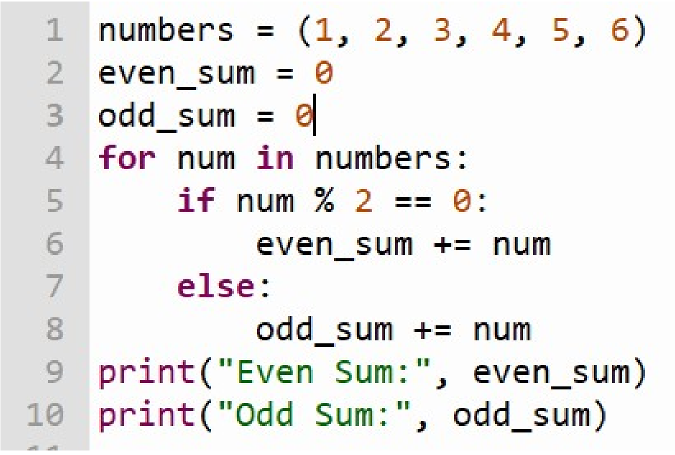
```python
def is_leap_year(year):
    """
    Returns True if the given year is a leap year, else False.
    """
    return (year % 4 == 0 and (year % 100 != 0 or year % 400 == 0))

# Example usage
if is_leap_year(year):
    print(f"{year} is a leap year.")
else:
    print(f"{year} is not a leap year.")
```

Explanation:

- Version 2 is reusable and modular.
- Cursor AI enhanced structure and documentation
- The second prompt produced code that was more polished and tidy.

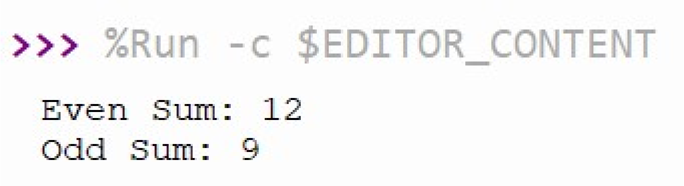
Task 4: Student Logic + AI Refactoring (Odd/Even Sum) Own

Code:



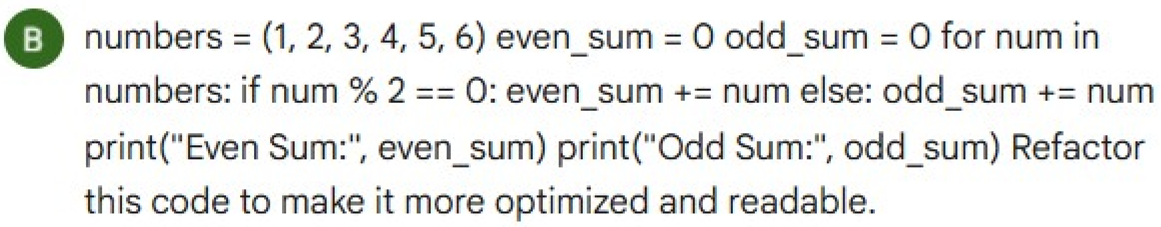
```python
numbers = (1, 2, 3, 4, 5, 6)
even_sum = 0
odd_sum = 0
for num in numbers:
    if num % 2 == 0:
        even_sum += num
    else:
        odd_sum += num
print("Even Sum:", even_sum)
print("Odd Sum:", odd_sum)
```

Output:



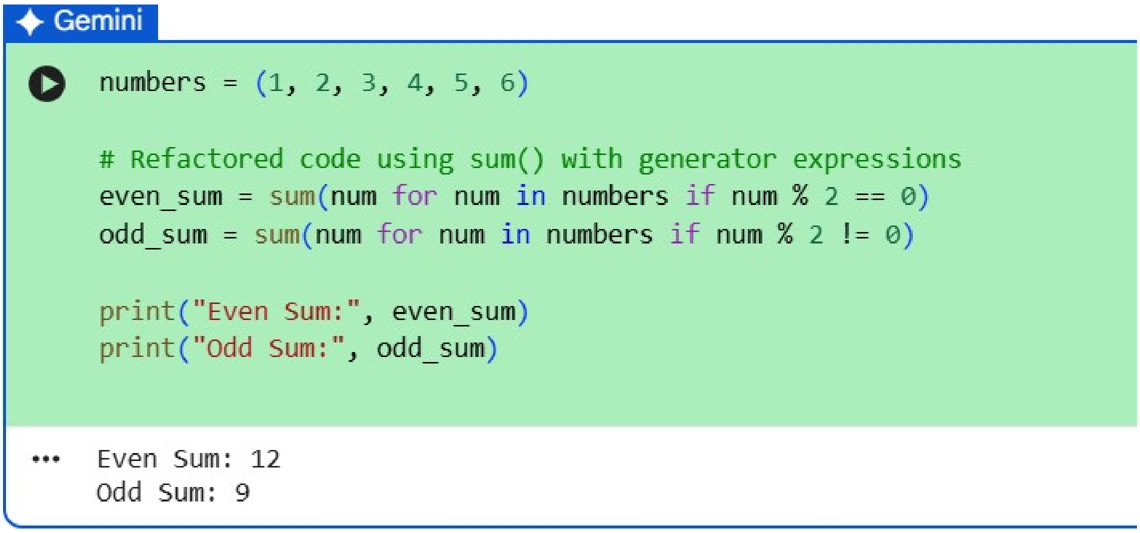
```
>>> %Run -c $EDITOR_CONTENT

  Even Sum: 12
  Odd Sum: 9
```

Refactored Code:



numbers = (1, 2, 3, 4, 5, 6) even_sum = 0 odd_sum = 0 for num in numbers: if num % 2 == 0: even_sum += num else: odd_sum += num print("Even Sum:", even_sum) print("Odd Sum:", odd_sum) Refactor this code to make it more optimized and readable.

Code & Output:



```python
numbers = (1, 2, 3, 4, 5, 6)

# Refactored code using sum() with generator expressions
even_sum = sum(num for num in numbers if num % 2 == 0)
odd_sum = sum(num for num in numbers if num % 2 != 0)

print("Even Sum:", even_sum)
print("Odd Sum:", odd_sum)
```

```
Even Sum: 12
Odd Sum: 9
```

Explanation:

- In refactored code, the number of lines are reduced

- And such codes are very useful for large data sets.