

AI ASSISTED CODING

P.Aneesh Reddy

2303A51120

BATCH - 03

20 – 01 – 2026

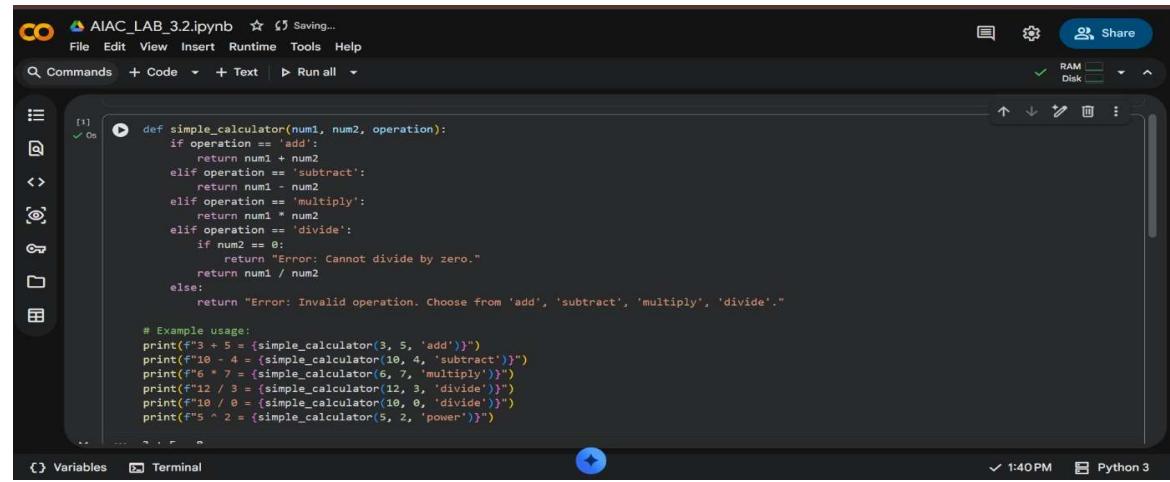
ASSIGNMENT – 3.2

LAB – 03 : Prompt Engineering – Improving Prompts and Context Management.

TASK - 01: Progressive Prompting for Calculator Design.

Prompt – 01: Create a Python function named simple_calculator.

Code :



The screenshot shows a Jupyter Notebook interface with a dark theme. The title bar says "AIAC_LAB_3.2.ipynb". The code cell contains the following Python code:

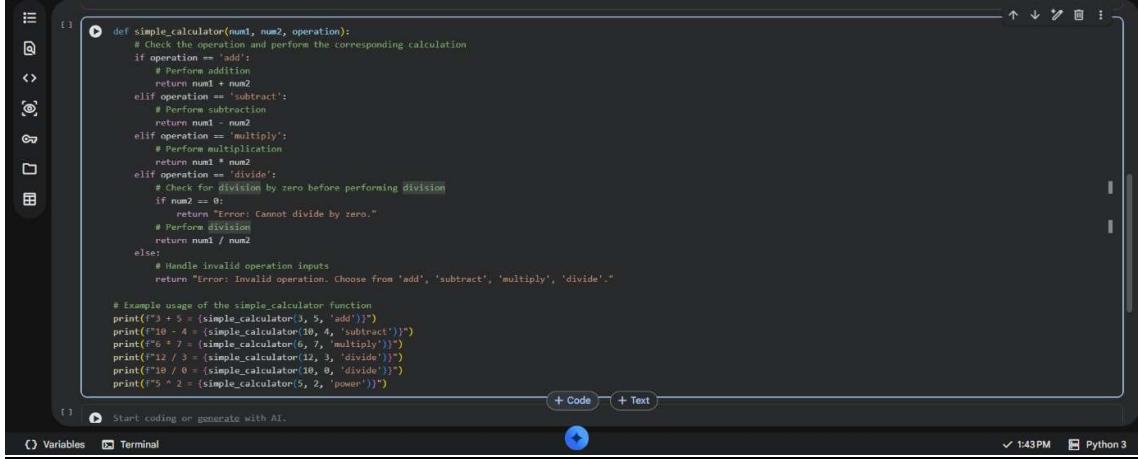
```
[1] def simple_calculator(num1, num2, operation):
    if operation == 'add':
        return num1 + num2
    elif operation == 'subtract':
        return num1 - num2
    elif operation == 'multiply':
        return num1 * num2
    elif operation == 'divide':
        if num2 == 0:
            return "Error: Cannot divide by zero."
        return num1 / num2
    else:
        return "Error: Invalid operation. Choose from 'add', 'subtract', 'multiply', 'divide'."

# Example usage:
print("3 + 5 = ", simple_calculator(3, 5, 'add'))
print("10 - 4 = ", simple_calculator(10, 4, 'subtract'))
print("6 * 7 = ", simple_calculator(6, 7, 'multiply'))
print("12 / 3 = ", simple_calculator(12, 3, 'divide'))
print("10 / 0 = ", simple_calculator(10, 0, 'divide'))
print("5 ^ 2 = ", simple_calculator(5, 2, 'power'))
```

The status bar at the bottom right shows "1:40 PM" and "Python 3".

Prompt – 02 : Create a Python function named simple_calculator that performs basic arithmetic operations (addition, subtraction, multiplication, division). Add comments explaining each step.

Code:



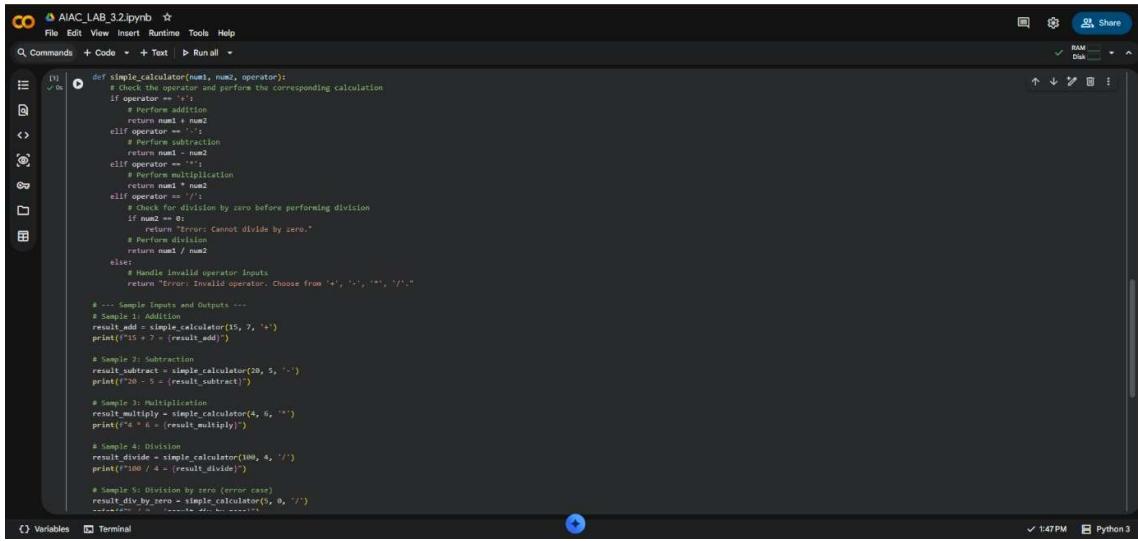
```
def simple_calculator(num1, num2, operation):
    # Check the operation and perform the corresponding calculation
    if operation == 'add':
        # Perform addition
        return num1 + num2
    elif operation == 'subtract':
        # Perform subtraction
        return num1 - num2
    elif operation == 'multiply':
        # Perform multiplication
        return num1 * num2
    elif operation == 'divide':
        # Check for division by zero before performing division
        if num2 == 0:
            return "Error: Cannot divide by zero."
        # Perform division
        return num1 / num2
    else:
        # Handle invalid operation inputs
        return "Error: Invalid operation. Choose from 'add', 'subtract', 'multiply', 'divide'."

# Example usage of the simple_calculator function
print("3 + 5 = ", (simple_calculator(3, 5, 'add')))
print("10 - 4 = ", (simple_calculator(10, 4, 'subtract')))
print("6 * 7 = ", (simple_calculator(6, 7, 'multiply')))
print("12 / 3 = ", (simple_calculator(12, 3, 'divide')))
print("10 / 0 = ", (simple_calculator(10, 0, 'divide')))
print("5 ^ 2 = ", (simple_calculator(5, 2, 'power')))

Start coding on generate with AI.
```

Prompt – 03 : Create a Python function named `simple_calculator` that takes two numbers and an operator (+, -, *, /) as input and returns the result. Include comments and provide at least two sample inputs with outputs.

Code :



```
# Check the operation and perform the corresponding calculation
if operation == '+':
    # Perform addition
    return num1 + num2
elif operation == '-':
    # Perform subtraction
    return num1 - num2
elif operation == '*':
    # Perform multiplication
    return num1 * num2
elif operation == '/':
    # Check for division by zero before performing division
    if num2 == 0:
        return "Error: Cannot divide by zero."
    # Perform division
    return num1 / num2
else:
    # Handle invalid operator inputs
    return "Error: Invalid operator. Choose from '+', '-', '*', '/'.

# --- Sample Inputs and Outputs ---
# Sample 1: Addition
result_add = simple_calculator(15, 7, '+')
print("15 + 7 = ", (result_add))

# Sample 2: Subtraction
result_subtract = simple_calculator(20, 5, '-')
print("20 - 5 = ", (result_subtract))

# Sample 3: Multiplication
result_multiply = simple_calculator(4, 6, '*')
print("4 * 6 = ", (result_multiply))

# Sample 4: Division
result_divide = simple_calculator(100, 4, '/')
print("100 / 4 = ", (result_divide))

# Sample 5: Division by zero (error case)
result_div_by_zero = simple_calculator(5, 0, '/')
print(result_div_by_zero)
```

TASK – 02 : Refining Prompts for Sorting Logic

Prompt – 01 : Write a Python Function to sort the Student Marks.

Code :

A screenshot of a Jupyter Notebook interface. The code cell contains the following Python function:

```
def sort_student_marks(marks_list):
    # Create a copy of the list to avoid modifying the original list in-place
    sorted_marks = sorted(marks_list)
    return sorted_marks

# Example usage:
student_scores = [85, 92, 78, 65, 95, 88, 72]
print(f"Original marks: {student_scores}")
sorted_scores = sort_student_marks(student_scores)
print(f"Sorted marks (ascending): {sorted_scores}")

# Example with descending order (optional)
def sort_student_marks_descending(marks_list):
    # Sorts a list of student marks in descending order.
    return sorted(marks_list, reverse=True)

sorted_scores_desc = sort_student_marks_descending(student_scores)
print(f"Sorted marks (descending): {sorted_scores_desc}")

... Original marks: [85, 92, 78, 65, 95, 88, 72]
Sorted marks (ascending): [65, 72, 78, 85, 88, 92, 95]
Sorted marks (descending): [95, 92, 88, 85, 78, 72, 65]
```

The output shows the original list of scores and two sorted versions: one in ascending order and one in descending order.

Prompt – 02 : Write a Python function that takes a list of student marks and sorts them in ascending order.

Code :

A screenshot of a Jupyter Notebook interface. The code cell contains the following Python function:

```
def sort_student_marksAscending(marks_list):
    # Use the sorted() function to sort the list in ascending order
    sorted_marks = sorted(marks_list)
    return sorted_marks

# Example usage:
student_scores = [85, 92, 78, 65, 95, 88, 72]
print(f"Original marks: {student_scores}")

# Call the function to sort the marks
ascending_sorted_scores = sort_student_marksAscending(student_scores)
print(f"Sorted marks (ascending): {ascending_sorted_scores}")

... Original marks: [85, 92, 78, 65, 95, 88, 72]
Sorted marks (ascending): [65, 72, 78, 85, 88, 92, 95]
```

The output shows the original list of scores and the sorted list in ascending order.

Prompt – 03 : Write an efficient Python function that takes a list of student marks (0–100), sorts them in descending order, removes duplicates, and returns the sorted list.

Code :

A screenshot of a Jupyter Notebook interface titled "AIAC_LAB_3.2.ipynb". The code cell contains Python code for a function named "process_student_marks". The function removes duplicates from a list of marks by converting it to a set and then back to a list. It then sorts the unique marks in descending order. The code includes examples of usage with sample lists of marks.

```
[6]  def process_student_marks(marks_list):
        # Remove duplicates by converting to a set and then back to a list
        unique_marks = list(set(marks_list))

        # Sort the unique marks in descending order
        sorted_unique_marks = sorted(unique_marks, reverse=True)

        return sorted_unique_marks

    # Example usage:
student_scores_with_duplicates = [85, 92, 78, 65, 95, 88, 72, 92, 65, 100, 78]
print(f"Original marks (with duplicates): {student_scores_with_duplicates}")

processed_scores = process_student_marks(student_scores_with_duplicates)
print(f"Processed marks (unique, descending): {processed_scores}")

    # Another example
another_marks = [50, 60, 58, 70, 80, 70, 90, 60]
print(f"\nAnother set of marks: {another_marks}")
processed_another_marks = process_student_marks(another_marks)
print(f"Processed another set of marks: {processed_another_marks}")

... Original marks (with duplicates): [85, 92, 78, 65, 95, 88, 72, 92, 65, 100, 78]
Processed marks (unique, descending): [100, 92, 92, 88, 85, 78, 78]
```

TASK – 03 : Few-Shot Prompting for Prime Number Validation. Prompt

: Write a Python function `is_prime(n)` that checks whether a given is Prime or Not, Using Examples:

I/P: 2 -> O/P True

I/P: 4 -> O/P False

Handle edge cases like negative numbers and 0 properly.

Code:

A screenshot of a Jupyter Notebook interface titled "AIAC_LAB_3.2.ipynb". The code cell contains Python code for a function named "is_prime". The function handles edge cases: numbers less than or equal to 1 are not prime, and 2 is the only even prime number. It then checks all other odd numbers up to the square root of n for divisibility. The code includes examples of usage with various numbers.

```
[7]  def is_prime(n):
    # Handle edge cases: numbers less than or equal to 1 are not prime
    if n <= 1:
        return False
    # 2 is the only even prime number
    if n == 2:
        return True
    # All other even numbers are not prime
    if n % 2 == 0:
        return False

    # Check for divisibility from 3 up to the square root of n
    # Only check odd numbers
    i = 3
    while i * i <= n:
        if n % i == 0:
            return False
        i += 2

    return True

    # Example usage:
print("Is 2 prime? {is_prime(2)}")      # Expected: True
print("Is 4 prime? {is_prime(4)}")      # Expected: False
print("Is 1 prime? {is_prime(1)}")      # Expected: False
print("Is 17 prime? {is_prime(17)}")    # Expected: True
print("Is 0 prime? {is_prime(0)}")      # Expected: False
print("Is -5 prime? {is_prime(-5)}")    # Expected: False
print("Is 29 prime? {is_prime(29)}")    # Expected: True
print("Is 33 prime? {is_prime(33)}")    # Expected: False
```

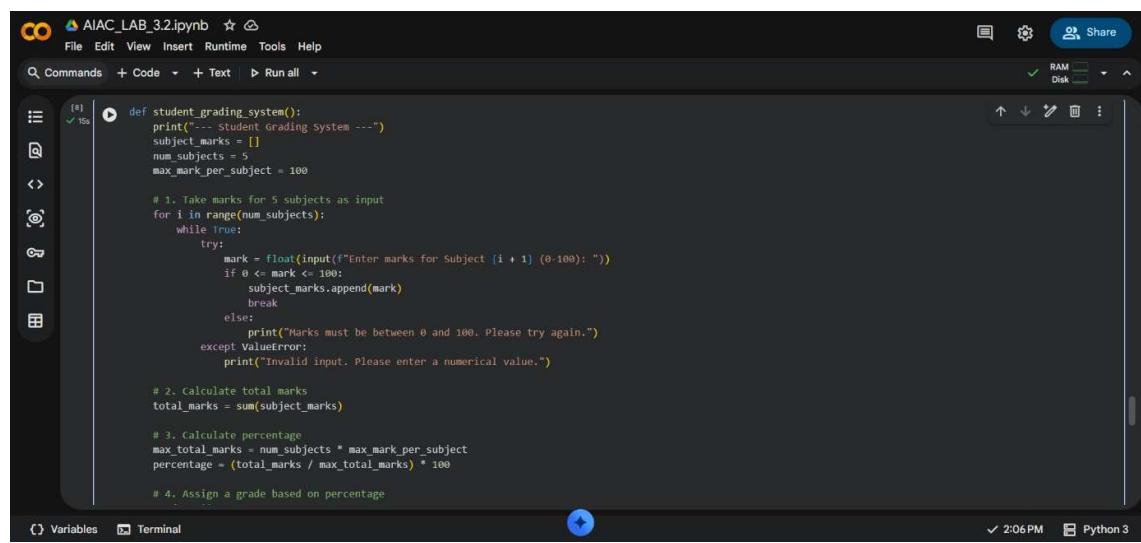
TASK – 04 : Prompt-Guided UI Design for Student Grading System.

Prompt : Design a simple Python-based user interface (CLI or GUI) for a student grading system.

The program should:

- Take marks for 5 subjects as input
- Calculate total marks
- Calculate percentage
- Assign a grade based on percentage
- Display all results clearly.

Code :



A screenshot of a Jupyter Notebook interface titled "AIAC_LAB_3.2.ipynb". The code cell contains the following Python script:

```
def student_grading_system():
    print("--- Student Grading System ---")
    subject_marks = []
    num_subjects = 5
    max_mark_per_subject = 100

    # 1. Take marks for 5 subjects as input
    for i in range(num_subjects):
        while True:
            try:
                mark = float(input(f"Enter marks for Subject {i + 1} (0-100): "))
                if 0 <= mark <= 100:
                    subject_marks.append(mark)
                    break
                else:
                    print("Marks must be between 0 and 100. Please try again.")
            except ValueError:
                print("Invalid input. Please enter a numerical value.")

    # 2. Calculate total marks
    total_marks = sum(subject_marks)

    # 3. Calculate percentage
    max_total_marks = num_subjects * max_mark_per_subject
    percentage = (total_marks / max_total_marks) * 100

    # 4. Assign a grade based on percentage
```

```
# 4. Assign a grade based on percentage
grade = ''
if percentage >= 90:
    grade = 'A+'
elif percentage >= 80:
    grade = 'A'
elif percentage >= 70:
    grade = 'B+'
elif percentage >= 60:
    grade = 'B'
elif percentage >= 50:
    grade = 'C'
elif percentage >= 40:
    grade = 'D'
else:
    grade = 'F'

# 5. Display all results clearly
print("\n--- Results ---")
for i, mark in enumerate(subject_marks):
    print(f"Subject {i + 1} Marks: {mark:.2f}")
print(f"Total Marks: {total_marks:.2f} / {max_total_marks}")
print(f"Percentage: {percentage:.2f}%")
print(f"Grade: {grade}")
print("-----")

# Run the grading system
student_grading_system()
```

Variables Terminal ✓ 2:06PM Python 3

Output:

```
File Edit View Insert Runtime Tools Help
Commands + Code + Text ▶ Run all ▾ RAM Disk Share
print(f"Total Marks: {total_marks:.2f} / {max_total_marks}")
print(f"Percentage: {percentage:.2f}%")
print(f"Grade: {grade}")
print("-----")

# Run the grading system
student_grading_system()

... --- Student Grading System ---
Enter marks for Subject 1 (0-100): 98
Enter marks for Subject 2 (0-100): 54
Enter marks for Subject 3 (0-100): 99
Enter marks for Subject 4 (0-100): 45
Enter marks for Subject 5 (0-100): 32

--- Results ---
Subject 1 Marks: 98.00
Subject 2 Marks: 54.00
Subject 3 Marks: 99.00
Subject 4 Marks: 45.00
Subject 5 Marks: 32.00
Total Marks: 328.00 / 500
Percentage: 65.60%
Grade: B
-----
```

Variables Terminal ✓ 2:06PM Python 3

TASK – 05 : Analyzing Prompt Specificity in Unit Conversion Functions.

Prompt – 01 : Write a function to convert distance.

Code:

```
[1]: def convert_distance(value, unit_in, unit_out):
    # Conversion factors to meters (as a base unit)
    conversion_factors_to_meters = {
        'm': 1.0,           # meters
        'km': 1000.0,       # kilometers to meters
        'mi': 1609.34,      # miles to meters
        'ft': 0.3048        # feet to meters
    }
    # Convert input units to lowercase for case-insensitivity
    unit_in = unit_in.lower()
    unit_out = unit_out.lower()
    if unit_in not in conversion_factors_to_meters:
        return f"Error: Invalid input unit '{unit_in}'. Choose from {list(conversion_factors_to_meters.keys())}."
    if unit_out not in conversion_factors_to_meters:
        return f"Error: Invalid output unit '{unit_out}'. Choose from {list(conversion_factors_to_meters.keys())}."
    # Convert input value to meters first
    value_in_meters = value * conversion_factors_to_meters[unit_in]
    # Convert from meters to the desired output unit
    converted_value = value_in_meters / conversion_factors_to_meters[unit_out]
    return converted_value
# Example Usage:
print("10 kilometers to meters: (convert_distance(10, 'km', 'm')) m")
print("5 miles to kilometers: (convert_distance(5, 'mi', 'km')) km")
print("100 feet to meters: (convert_distance(100, 'ft', 'm')) m")
print("2000 meters to miles: (convert_distance(2000, 'm', 'mi')) mi")
print("100 meters to feet: (convert_distance(100, 'm', 'ft')) ft")
# Examples of invalid units
print("10 league to miles: (convert_distance(10, 'league', 'mi'))")
print("5 meters to yards: (convert_distance(5, 'm', 'yd'))")
```

Variables Terminal ✓ 2:06PM Python 3

Prompt – 02: Write a Python function to convert kilometers to miles.

Code :

```
[1]: USING PROMPT 02
def convert_distance(value, unit_in, unit_out):
    # Conversion factors to meters (as a base unit)
    conversion_factors_to_meters = {
        'm': 1.0,           # meters
        'km': 1000.0,       # kilometers to meters
        'mi': 1609.34,      # miles to meters
        'ft': 0.3048        # feet to meters
    }
    # Convert input units to lowercase for case-insensitivity
    unit_in = unit_in.lower()
    unit_out = unit_out.lower()
    if unit_in not in conversion_factors_to_meters:
        return f"Error: Invalid input unit '{unit_in}'. Choose from {list(conversion_factors_to_meters.keys())}."
    if unit_out not in conversion_factors_to_meters:
        return f"Error: Invalid output unit '{unit_out}'. Choose from {list(conversion_factors_to_meters.keys())}."
    # Convert input value to meters first
    value_in_meters = value * conversion_factors_to_meters[unit_in]
    # Convert from meters to the desired output unit
    converted_value = value_in_meters / conversion_factors_to_meters[unit_out]
    return converted_value
```

Variables Terminal ✓ 2:16PM Python 3

```
[1]: 
value_in_meters = value * conversion_factors_to_meters[unit_in]
# Convert from meters to the desired output unit
converted_value = value_in_meters / conversion_factors_to_meters[unit_out]
return converted_value

def kilometers_to_miles(kilometers):
    # 1 kilometer is approximately 0.621371 miles
    miles = kilometers * 0.621371
    return miles

# Example usage of the dedicated function:
km_value = 10
miles_result = kilometers_to_miles(km_value)
print(f"{km_value} kilometers is equal to {miles_result:.2f} miles (using dedicated function).")

# Example usage with the general convert_distance function:
converted_miles = convert_distance(km_value, 'km', 'mi')
print(f"{km_value} kilometers is equal to {converted_miles:.2f} miles (using general converter.).")

... 10 kilometers is equal to 6.21 miles (using dedicated function).
10 kilometers is equal to 6.21 miles (using general converter).
```

Variables Terminal ✓ 2:16PM Python 3

Prompt – 03 : Write two Python functions:

1. km_to_miles(km)

2. miles_to_km(miles)

Use correct conversion factors, add comments, and provide sample inputs and outputs.

Code :

The screenshot shows a Jupyter Notebook interface with a dark theme. The code cell contains the following Python script:

```
def km_to_miles(km):
    # Conversion factor: 1 kilometer = 0.621371 miles
    miles = km * 0.621371
    return miles

def miles_to_km(miles):
    # Conversion factor: 1 mile = 1.60934 kilometers
    km = miles * 1.60934
    return km

# --- Sample Inputs and Outputs for km_to_miles ---
kilometers_1 = 10
miles_output_1 = km_to_miles(kilometers_1)
print(f"{kilometers_1} kilometers is equal to {miles_output_1:.2f} miles")

kilometers_2 = 50
miles_output_2 = km_to_miles(kilometers_2)
print(f"{kilometers_2} kilometers is equal to {miles_output_2:.2f} miles")

# --- Sample Inputs and Outputs for miles_to_km ---
miles_1 = 6.21
km_output_1 = miles_to_km(miles_1)
print(f"{miles_1} miles is equal to {km_output_1:.2f} kilometers")

miles_2 = 31.07
km_output_2 = miles_to_km(miles_2)
print(f"{miles_2} miles is equal to {km_output_2:.2f} kilometers")
```

The notebook also includes tabs for 'Variables' and 'Terminal' at the bottom, and a status bar indicating '2:19 PM' and 'Python 3'.

THANK YOU!!