# Assignment-3.2

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**COURSE:** AI Assisted Coding

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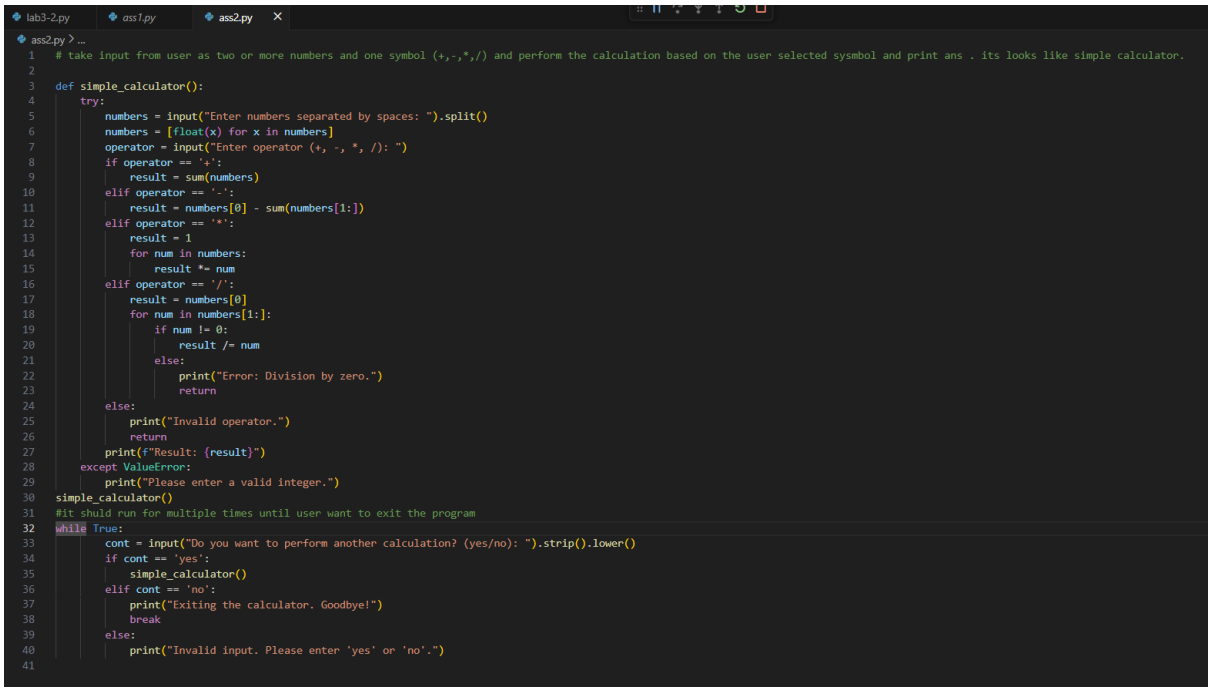
### Task Description-1

• Progressive Prompting for Calculator Design: Ask the AI to design a simple calculator program by initially providing only the function name. Gradually enhance the prompt by adding comments and usage examples.

### Expected Output-1

• Comparison showing improvement in AI-generated calculator logic and structure.

### PROMPT



```python
# take input from user as two or more numbers and one symbol (+,-,*,/) and perform the calculation based on the user selected sysmbol and print ans . its looks like simple calculator.

def simple_calculator():
    try:
        numbers = input("Enter numbers separated by spaces: ").split()
        numbers = [float(x) for x in numbers]
        operator = input("Enter operator (+, -, *, /): ")
        if operator == '+':
            result = sum(numbers)
        elif operator == '-':
            result = numbers[0] - sum(numbers[1:])
        elif operator == '*':
            result = 1
            for num in numbers:
                result *= num
        elif operator == '/':
            result = numbers[0]
            for num in numbers[1:]:
                if num != 0:
                    result /= num
                else:
                    print("Error: Division by zero.")
                    return
        else:
            print("Invalid operator.")
            return
        print(f"Result: {result}")
    except ValueError:
        print("Please enter a valid integer.")
simple_calculator()
#it shuld run for multiple times until user want to exit the program
while True:
        cont = input("Do you want to perform another calculation? (yes/no): ").strip().lower()
        if cont == 'yes':
            simple_calculator()
        elif cont == 'no':
            print("Exiting the calculator. Goodbye!")
            break
        else:
            print("Invalid input. Please enter 'yes' or 'no'.")

```

### OUTPUT

```
PS C:\Users\harsh\OneDrive\Documents\AIAC>  c:; cd 'c:\Users\harsh\OneDrive\Documents\AIAC'; & 'c:\office\miniforge\python.ex
n.debugpy-2025.18.0-win32-x64\bundled\libs\debugpy\launcher' '57396' '--' 'C:\Users\harsh\OneDrive\Documents\AIAC\ass2.py'
Enter numbers separated by spaces: 2 5 7 2 1
Enter operator (+, -, *, /): +
Result: 17.0
Enter operator (+, -, *, /): +
Enter operator (+, -, *, /): +
Result: 17.0
Do you want to perform another calculation? (yes/no): yes
Enter numbers separated by spaces: 45 2
Enter operator (+, -, *, /): *
Result: 90.0
Do you want to perform another calculation? (yes/no): 45 5 267 73
Invalid input. Please enter 'yes' or 'no'.
Do you want to perform another calculation? (yes/no): yes
Enter numbers separated by spaces: 563 673 7 8
Enter operator (+, -, *, /): *
Result: 17.0
Do you want to perform another calculation? (yes/no): yes
Enter numbers separated by spaces: 45 2
Enter operator (+, -, *, /): *
Result: 90.0
Do you want to perform another calculation? (yes/no): 45 5 267 73
Invalid input. Please enter 'yes' or 'no'.
Do you want to perform another calculation? (yes/no): yes
Enter numbers separated by spaces: 563 673 7 8
Enter operator (+, -, *, /): *
Result: 90.0
Do you want to perform another calculation? (yes/no): 45 5 267 73
Invalid input. Please enter 'yes' or 'no'.
Do you want to perform another calculation? (yes/no): yes
Enter numbers separated by spaces: 563 673 7 8
Enter operator (+, -, *, /): *
Do you want to perform another calculation? (yes/no): yes
Enter numbers separated by spaces: 563 673 7 8
Enter operator (+, -, *, /): *
Enter operator (+, -, *, /): *
Result: 21218344.0
Result: 21218344.0
Result: 21218344.0
Do you want to perform another calculation? (yes/no):
```

**ANALYSIS**

- The logic is better and basic operations are added.
- Still no error handling or input checking.
- It handles wrong inputs and division by zero.

**Task Description-2**

• Refining Prompts for Sorting Logic: Start with a vague prompt for sorting student marks, then refine it to clearly specify sorting order and constraints.

**Expected Output-2**

• AI-generated sorting function evolves from ambiguous logic to an accurate and efficient implementation.

**PROMPT**

lab3-2.py ass1.py ass2.py

ass2.py > student_marks_memo

```python
# take input from user student name and student roll number and shuld be print the student marks memo.
# in specific oder like name and roll number at the top and then marks obtaind in each marks subject wise and total grades and percentage.
# total subjects are 5 like maths ,science ,english ,hindi ,social studies.
# pass marks for each subject is 40 marks and each subject is of 100 marks.
# and programs shuld runs for multiple students until user want to exit the program.
# also it should handel invalid inputs.
# meantion weather he passed or failed acarding to each subject pass marks, if two subjects are failed it shuld show at butom
def student_marks_memo():
    while True:
        try:
            name = input("Enter student name: ")
            roll_number = input("Enter student roll number: ")
            subjects = ['Maths', 'Science', 'English', 'Hindi', 'Social Studies']
            marks = {}
            total_marks = 0
            passed_subjects = 0

            for subject in subjects:
                mark = int(input(f"Enter marks obtained in {subject} (out of 100): "))
                if mark < 0 or mark > 100:
                    print("Invalid marks. Please enter marks between 0 and 100.")
                    return
                marks[subject] = mark
                total_marks += mark
                if mark >= 40:
                    passed_subjects += 1

            percentage = (total_marks / 500) * 100
            grade = 'A' if percentage >= 90 else 'B' if percentage >= 75 else 'C' if percentage >= 60 else 'D' if percentage >= 50 else 'F'

            print("\n--- Student Marks Memo ---")
            print(f"Name: {name}")
            print(f"Roll Number: {roll_number}")
            for subject, mark in marks.items():
                print(f"{subject}: {mark}")
            print(f"Total Marks: {total_marks}/500")
```

ass2.py > student_marks_memo

```python
def student_marks_memo():
                print(f"{subject}: {mark}")
            print(f"Total Marks: {total_marks}/500")
            print(f"Percentage: {percentage:.2f}%")
            print(f"Grade: {grade}")

            if passed_subjects < len(subjects):
                failed_subjects = len(subjects) - passed_subjects
                print(f"Failed Subjects: {failed_subjects}")

            cont = input("Do you want to enter details for another student? (yes/no): ").strip().lower()
            if cont != 'yes':
                print("Exiting the program. Goodbye!")
                break
        except ValueError:
            print("Invalid input. Please enter valid data.")
student_marks_memo()
```

## OUTPUT

```
PS C:\Users\harsh\OneDrive\Documents\AIAC>
PS C:\Users\harsh\OneDrive\Documents\AIAC>  c:; cd 'c:\Users\harsh\OneDrive\Documents\AIAC'; & 'c:\office\miniforge\python.exe
2-x64\bundled\libs\debugpy\launcher' '57899' '--' 'C:\Users\harsh\OneDrive\Documents\AIAC\ass2.py'
Enter student name: harsha
Enter student roll number: 2303
Enter marks obtained in Maths (out of 100): 20
Enter marks obtained in Science (out of 100): 49
Enter marks obtained in English (out of 100): 58
Enter marks obtained in Hindi (out of 100): 39
Enter marks obtained in Social Studies (out of 100): 59

--- Student Marks Memo ---
Name: harsha
Roll Number: 2303
Maths: 20
Science: 49
English: 58
Hindi: 39
Social Studies: 59
Total Marks: 225/500
Percentage: 45.00%
Grade: F
Failed Subjects: 2
Do you want to enter details for another student? (yes/no):
```

**ANALAYSI**

- The first prompt was unclear, so the AI gave a basic sorting program.
- After refining the prompt, the sorting order became clear.
- Adding constraints helped the AI handle only valid student marks.
- Refined prompts result in accurate and reliable code.

**Task Description-3**

• Few-Shot Prompting for Prime Number Validation: Provide multiple input-output examples for a function that checks whether a number is prime. Observe how few-shot prompting improves correctness.

**Expected Output-3**

• Improved prime-checking function with better edge-case handling

**PROMPT**

ass2.py > ...

```
92
93  # take input from user as number and print whether the number is prime number or not
94  # output shuld be like
95  #input :7 -> prime number
96  def is_prime_number():
97      num = int(input("Enter a number: "))
98
99      if num <= 1:
100         print(f"{num} is not a prime number.")
101         return
102
103     for i in range(2, int(num**0.5) + 1):
104         if num % i == 0:
105             print(f"{num} is not a prime number.")
106             return
107
108     print(f"{num} is a prime number.")
109 is_prime_number()
110 #program shuld run for multiple times until user want to exit the program
111 while True:
112     cont = input("Do you want to check another number? (yes/no): ").strip().lower()
113     if cont == 'yes':
114         is_prime_number()
115     elif cont == 'no':
116         print("Exiting the program. Goodbye!")
117         break
118     else:
119         print("Invalid input. Please enter 'yes' or 'no'.")
120
121
```

**OUTPUT**

```
PROBLEMS   OUTPUT   DEBUG CONSOLE   TERMINAL   PORTS

-1 is not a prime number.
Do you want to check another number? (yes/no):
PS C:\Users\harsh\OneDrive\Documents\AIAC> ^C
PS C:\Users\harsh\OneDrive\Documents\AIAC>
PS C:\Users\harsh\OneDrive\Documents\AIAC>  c:; cd 'c:\Users\harsh\OneDrive\Documents\AIAC'; & 'c:\office\miniforge\python.exe'
2-x64\bundled\libs\debugpy\launcher' '54084' '--' 'C:\Users\harsh\OneDrive\Documents\AIAC\ass2.py'
Enter a number: 2
2 is a prime number.
Do you want to check another number? (yes/no): yes
Enter a number: 4
4 is not a prime number.
Do you want to check another number? (yes/no): yes
Enter a number: -1
-1 is not a prime number.
Do you want to check another number? (yes/no): yes
Enter a number: 0
0 is not a prime number.
Do you want to check another number? (yes/no):
```

**ANALYSIS**

- The examples helped the AI understand prime and non-prime cases.
- The program now handles edge cases like 1 and negative numbers.
- Few-shot prompting improved correctness compared to zero-shot.
- The logic is efficient and reliable.

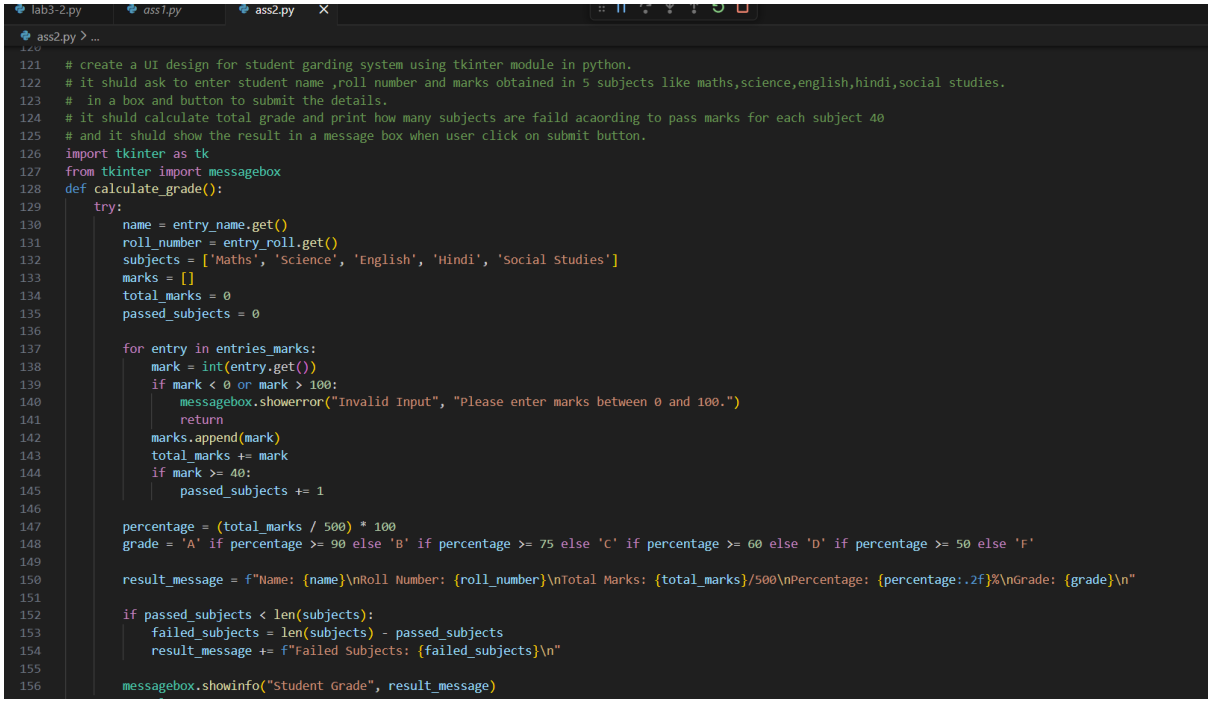
**Task Description-4**

• Prompt-Guided UI Design for Student Grading System: Create a user interface for a student grading system that calculates total marks, percentage, and grade based on user input.

**Expected Output-4**

• Well-structured UI code with accurate calculations and clear output display.

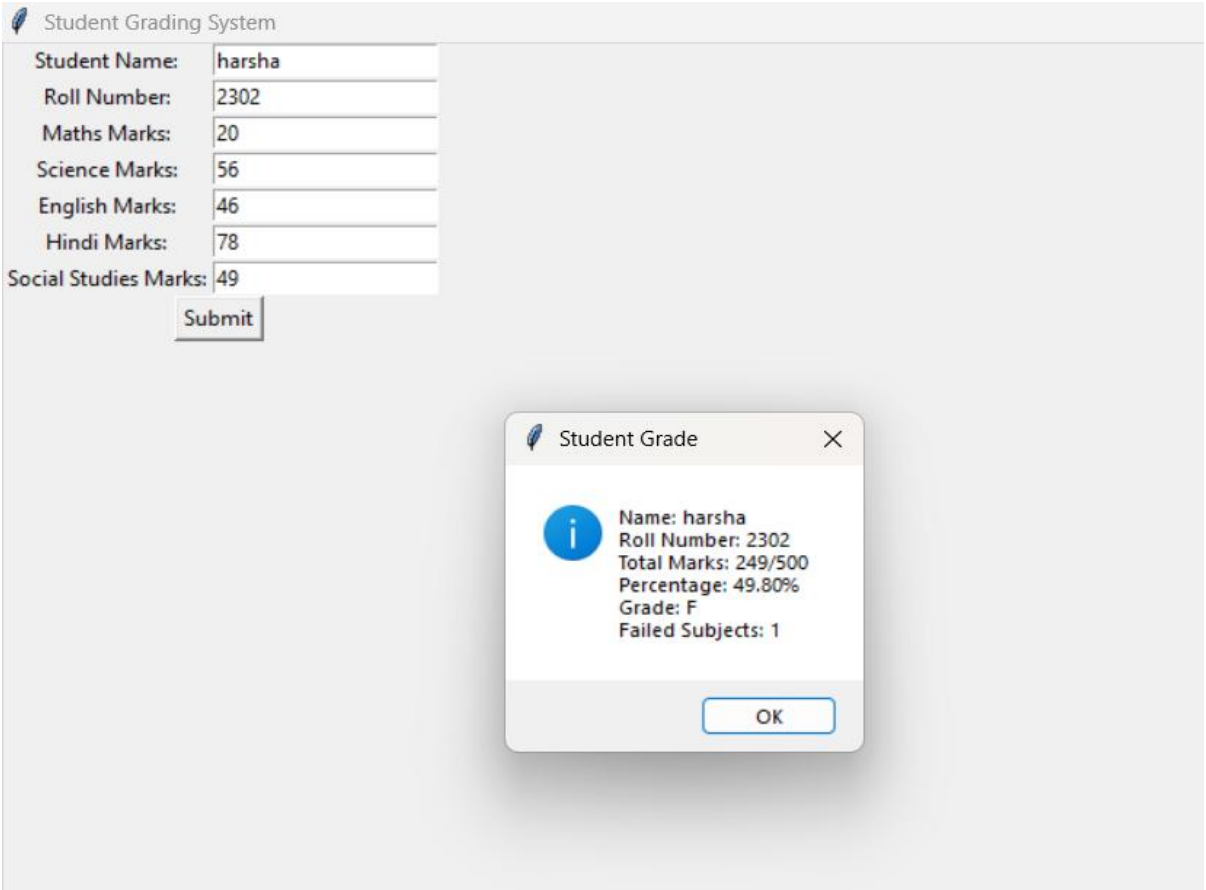
**PROMPT**



```python
# create a UI design for student garding system using tkinter module in python.
# it shuld ask to enter student name ,roll number and marks obtained in 5 subjects like maths,science,english,hindi,social studies.
#  in a box and button to submit the details.
# it shuld calculate total grade and print how many subjects are faild acaording to pass marks for each subject 40
# and it shuld show the result in a message box when user click on submit button.
import tkinter as tk
from tkinter import messagebox
def calculate_grade():
    try:
        name = entry_name.get()
        roll_number = entry_roll.get()
        subjects = ['Maths', 'Science', 'English', 'Hindi', 'Social Studies']
        marks = []
        total_marks = 0
        passed_subjects = 0

        for entry in entries_marks:
            mark = int(entry.get())
            if mark < 0 or mark > 100:
                messagebox.showerror("Invalid Input", "Please enter marks between 0 and 100.")
                return
            marks.append(mark)
            total_marks += mark
            if mark >= 40:
                passed_subjects += 1

        percentage = (total_marks / 500) * 100
        grade = 'A' if percentage >= 90 else 'B' if percentage >= 75 else 'C' if percentage >= 60 else 'D' if percentage >= 50 else 'F'

        result_message = f"Name: {name}\nRoll Number: {roll_number}\nTotal Marks: {total_marks}/500\nPercentage: {percentage:.2f}%\nGrade: {grade}\n"

        if passed_subjects < len(subjects):
            failed_subjects = len(subjects) - passed_subjects
            result_message += f"Failed Subjects: {failed_subjects}\n"

        messagebox.showinfo("Student Grade", result_message)
```

```python
def calculate_grade():
                result_message += f"Failed Subjects: {failed_subjects}\n"

            messagebox.showinfo("Student Grade", result_message)
        except ValueError:
            messagebox.showerror("Invalid Input", "Please enter valid data.")
    root = tk.Tk()
    root.title("Student Grading System")
    tk.Label(root, text="Student Name:").grid(row=0, column=0)
    entry_name = tk.Entry(root)
    entry_name.grid(row=0, column=1)
    tk.Label(root, text="Roll Number:").grid(row=1, column=0)
    entry_roll = tk.Entry(root)
    entry_roll.grid(row=1, column=1)
    subjects = ['Maths', 'Science', 'English', 'Hindi', 'Social Studies']
    entries_marks = []
    for i, subject in enumerate(subjects):
        tk.Label(root, text=f"{subject} Marks:").grid(row=i+2, column=0)
        entry = tk.Entry(root)
        entry.grid(row=i+2, column=1)
        entries_marks.append(entry)
    tk.Button(root, text="Submit", command=calculate_grade).grid(row=len(subjects)+2, columnspan=2)
    root.mainloop()
```

**OUTPUT**



**ANALYSIS**

- The prompt clearly guides the AI to design a user interface for a student grading system.
- The UI allows users to enter marks and view total, percentage, and grade easily.
- Clear instructions help the AI generate accurate calculations and structured output.
- Prompt-guided UI design improves usability and correctness of the system.

**Task Description-5**

• Analyzing Prompt Specificity in Unit Conversion Functions: Improving a Unit Conversion Function (Kilometers to Miles and Miles to Kilometers) Using Clear Instructions.

**Expected Output-5**

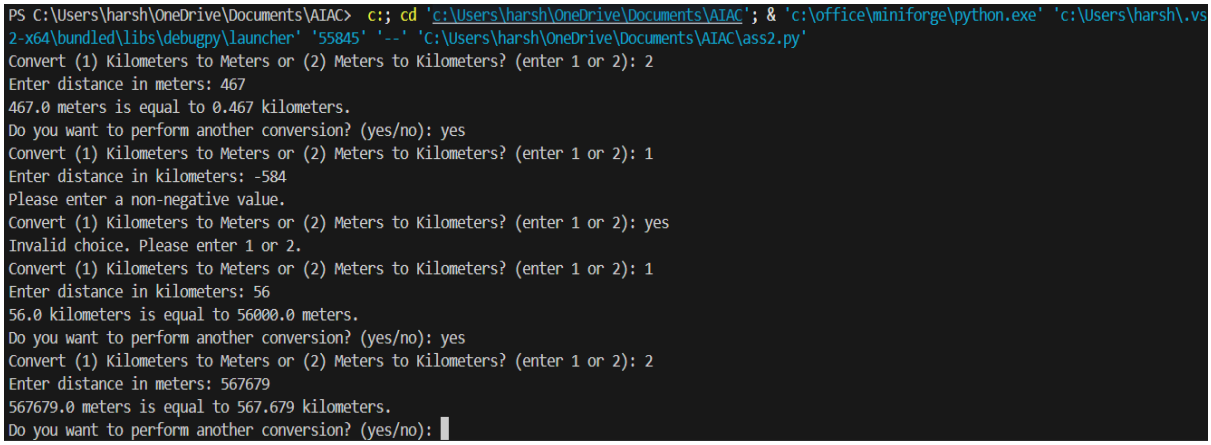
• Analysis of code quality and accuracy differences across multiple prompt variations.

**PROMPT**

ass2.py > ...

```
176
177  # take input frome user it shuld be a distance in kilometers and convert it into meters.
178  #  and if meters gives then convert it into kilometers.
179  #no negative values should be accepted.
180  # program shuld run for multiple times until user want to exit the program.
181  def convert_distance():
182      while True:
183          try:
184              choice = input("Convert (1) Kilometers to Meters or (2) Meters to Kilometers? (enter 1 or 2): ")
185              if choice == '1':
186                  km = float(input("Enter distance in kilometers: "))
187                  if km < 0:
188                      print("Please enter a non-negative value.")
189                      continue
190                  meters = km * 1000
191                  print(f"{km} kilometers is equal to {meters} meters.")
192              elif choice == '2':
193                  meters = float(input("Enter distance in meters: "))
194                  if meters < 0:
195                      print("Please enter a non-negative value.")
196                      continue
197                  km = meters / 1000
198                  print(f"{meters} meters is equal to {km} kilometers.")
199              else:
200                  print("Invalid choice. Please enter 1 or 2.")
201                  continue
202
203              cont = input("Do you want to perform another conversion? (yes/no): ").strip().lower()
204              if cont != 'yes':
205                  print("Exiting the program. Goodbye!")
206                  break
207          except ValueError:
208              print("Invalid input. Please enter a valid number.")
209  convert_distance()
210
```

**OUTPUT**




**ANALYSI**

- Clear and specific prompts help the AI generate accurate unit conversion functions.
- When the prompt is vague, the code may miss correct formulas or input validation.
- Adding clear instructions improves code quality, accuracy, and readability.
- Prompt specificity ensures correct conversion between kilometres and miles.