Topic: Python Basics

Problem 1: Greeting the User

Scenario: Write a program to greet the user by name.

- **Problem Statement:**
  Prompt the user to input their name, then print a message that says, "Hello, [name]! Welcome to Python!"

```
name = input("Enter your name: ")
output = "Hello, {a}! Welcome to Python".format(a = name)
print(output)
```

```
Enter your name:  ILAKKIYAN A V

Hello, ILAKKIYAN A V! Welcome to Python
```

- **Hint:** Use `input()` to get the name and `print()` to display the message.
- **Expected Output:** ``` Enter your name: John Hello, John! Welcome to Python!
- **Starter Code:** ```python name = input("Enter your name: ") print("Hello, " + name + "! Welcome to Python!")

Problem 2: Basic Arithmetic

Scenario: Perform basic arithmetic operations.

- **Problem Statement:**
  Get two numbers from the user and print their sum, difference, product, and quotient.

```
number1 = int(input("Please Enter the 1st Number: "))
number2 = int(input("Please Enter the 2nd Number: "))
print("Sum: ",number1+number2)
print("Difference: ",number1-number2)
print("Multiplication: ",number1*number2)
print("Division: ",number1/number2)
```

```
Please Enter the 1st Number:  73
Please Enter the 2nd Number:  34

Sum:  107
Difference:  39
Multiplication:  2482
Division:  2.1470588235294117
```

- **Hint:** Use arithmetic operators (`+`, `-`, `*`, `/`) to perform calculations.

- **Expected Output:** ``` Enter the first number: 10 Enter the second number: 5 Sum: 15.0 Difference: 5.0 Product: 50.0 Quotient: 2.0
- **Starter Code:** ```python num1 = float(input("Enter the first number: ")) num2 = float(input("Enter the second number: ")) print("Sum: ", num1 + num2) print("Difference: ", num1 - num2) print("Product: ", num1 * num2) print("Quotient: ", num1 / num2)

Problem 3: Even or Odd

Scenario: Check whether a number is even or odd.

- **Problem Statement:**
  Take an integer input from the user and determine whether the number is even or odd.

```
number = int(input("Enter a number: "))
if(number%2==0):
    print("The number is Even.")
else:
    print("The number is Odd.")
```

```
Enter a number:
13891389018409820938109283091820938120983091820938091283091 28
```

```
The number is Even.
```

- **Hint:** Use the modulo operator `%` to check if a number is divisible by 2.
- **Expected Output:** ``` Enter a number: 7 Odd
- **Starter Code:** ```python num = int(input("Enter a number: ")) if num % 2 == 0: print("Even") else: print("Odd")

Problem 4: Temperature Conversion

Scenario: Convert Celsius to Fahrenheit.

- **Problem Statement:**
  Write a program that takes a temperature in Celsius as input and converts it to Fahrenheit using the formula `F = (C * 9/5) + 32`.

```
Temp = int(input("Enter a Temperature to be converted to Farenheit:
"))
f = (Temp*9/5) + 32
print(f)
```

```
Enter a Temperature to be converted to Farenheit:  40
```

```
104.0
```

- **Hint:** Apply the conversion formula provided.
- **Expected Output:**

```
Enter temperature in Celsius: 25
25.0°C is equal to 77.0°F
```

- **Starter Code:** ```python celsius = float(input("Enter temperature in Celsius: ")) fahrenheit = (celsius * 9/5) + 32 print(f"{celsius}°C is equal to {fahrenheit}°F")

Problem 5: Area of a Rectangle

Scenario: Calculate the area of a rectangle.

- **Problem Statement:**
  Prompt the user to input the length and width of a rectangle, and calculate the area.

```
length = int(input("Enter the length of the triangle: "))
width = int(input("Enter the width of the triangle: "))
print("The area of the triangle is ",length*width)

Enter the length of the triangle:  34
Enter the width of the triangle:  233

The area of the triangle is  7922

#Alternate way using format
area = length * width
print(f"The area of the triangle is {area}.")
print("The area of the triange with lenght:{} and width:{} is
{}.".format(length,width,area))
print("The area of the triange with length:{a} and width:{b} is
{c}.".format(a=length,b=width,c=area))

The area of the triangle is 7922.
The area of the triange with lenght:34 and width:233 is 7922.
The area of the triange with length:34 and width:233 is 7922.
```

- **Hint:** Use the formula `area = length * width` to calculate the area.
- **Expected Output:** ``` Enter the length of the rectangle: 5 Enter the width of the rectangle: 3 The area of the rectangle is 15.0
- **Starter Code:**

```
length = float(input("Enter the length of the rectangle: "))
width = float(input("Enter the width of the rectangle: "))
area = length * width
print(f"The area of the rectangle is {area}")
```

Problem 6: Sum of Natural Numbers

Scenario: Calculate the sum of the first N natural numbers.

- **Problem Statement:**
  Prompt the user to input a number `N`, and then calculate the sum of numbers from 1 to `N`.

```
number = int(input("Enter a Number: "))
count = 0
for i in range(1,number+1):
    count= count+i
print(number)
print(count)
answer=("The sum of the numbers from 1 to {n} is
{c}.".format(n=number,c=count))
print(answer)


Enter a Number:  23

23
276
The sum of the numbers from 1 to 23 is 276.

#Alternate
number = int(input("Enter a Number: "))
sum_of_numbers = sum(range(1,number+1))
print("The sum of the numbers from 1 to {} is {}.".format(number,
sum_of_numbers))

Enter a Number:  23

The sum of the numbers from 1 to 23 is 276.
```

- **Hint:** Use `range(1, N+1)` to iterate over numbers from 1 to N, and `sum()` to calculate the sum.
- **Expected Output:** ``` Enter a number: 5 The sum of numbers from 1 to 5 is 15
- **Starter Code:** ```python N = int(input("Enter a number: ")) sum_of_numbers = sum(range(1, N + 1)) print(f"The sum of numbers from 1 to {N} is {sum_of_numbers}")

Problem 7: Simple Calculator

Scenario: Build a basic calculator.

- **Problem Statement:**
  Write a program that allows the user to select an arithmetic operation (+, -, *, /) and perform the operation on two numbers entered by the user.

```
number1 = float(input("Please Enter the 1st Number: "))
number2 = float(input("Please Enter the 2nd Number: "))
operation = str(input("Please enter any one of the four following
operation to be performed between the two numbers(+,-,*,/): "))
if (operation == "+"):
    print("The sum of the two numbers is: ",number1+number2)
elif (operation == "-"):
    print("The difference between the two numbers is: ",number1-
number2)
elif (operation == "*"):
    print("The multiplication of the two numbers is:
",number1*number2)
elif (operation == "/"):
    print("The division of the two numbers is: ",number1/number2)
else:
    print("Enter the correct operation!")
```

```
Please Enter the 1st Number:  2137812738127637876128 9
Please Enter the 2nd Number:  12381289361892378917 2
Please enter any one of the four following operation to be performed
between the two numbers(+,-,*,/):  /

The division of the two numbers is:  172.66479085025523
```

- **Hint:** Use `if-elif-else` to check for the selected operation and perform the corresponding calculation.
- **Expected Output:** ``` Enter the first number: 10 Enter the second number: 5 Choose an operation (+, -, , //: Result: 50.0
- **Starter Code:**

```
num1 = float(input("Enter the first number: "))
num2 = float(input("Enter the second number: "))
operation = input("Choose an operation (+, -, *, /): ")

if operation == "+":
    print(f"Result: {num1 + num2}")
elif operation == "-":
    print(f"Result: {num1 - num2}")
elif operation == "*":
    print(f"Result: {num1 * num2}")
elif operation == "/":
    print(f"Result: {num1 / num2}")
else:
    print("Invalid operation")
```

Problem 8: Leap Year Check

Scenario: Check whether a given year is a leap year.

- **Problem Statement:**
  Prompt the user to input a year and check whether it's a leap year.

```
year = int(input("Please Enter an year: "))
if(year%4==0 and year%100!=0) or (year%400==0):
    print("The Entered year is a leap year!")
else:
    print("The year is not a leap year!")
```

```
Please Enter an year:  2023

The year is not a leap year!
```

- **Hint:** A year is a leap year if divisible by 4, but divisible by 100 only if also divisible by 400.
- **Expected Output:** ``` Enter a year: 2024 Leap year
- **Starter Code:** ```python year = int(input("Enter a year: ")) if (year % 4 == 0 and year % 100 != 0) or (year % 400 == 0): print("Leap year") else: print("Not a leap year")

Problem 9: Count Vowels in a String

Scenario: Count the vowels in a string.

- **Problem Statement:**
  Write a program that counts the vowels (`a, e, i, o, u`) in a string provided by the user.

```
word = str(input("Enter a word to count the vowels: "))
vowels = "aeiou"
count = 0
for char in word:
    if char.lower() in vowels:
        count += 1
print(f"Vowels in '{word}': {count}")
```

```
Enter a word to count the vowels:
aeiouaeiouaeiouaeiouaeiouaeiouaeiouaeiouaeiouaeiouaeiou

Vowels in 'aeiouaeiouaeiouaeiouaeiouaeiouaeiouaeiouaeiouaeiouaeiou': 50
```

- **Hint:** Loop through the string and check each character against the list of vowels.
- **Expected Output:**

- If the user inputs `"hello"`:

```
Enter a string: hello
Vowels in 'hello': 2
```

- If the user inputs `"Python programming"`:

```
Enter a string: Python programming
Vowels in 'Python programming': 4
```

- If the user inputs `"aeiou"`:

```
Enter a string: aeiou
Vowels in 'aeiou': 5
```

- **Starter Code:** ```python string = input("Enter a string: ") vowels = "aeiou" count = 0 for char in string: if char.lower() in vowels: count += 1 print(f"Vowels in '{string}': {count}")

Problem 10: Reverse a String

Scenario: Reverse a string entered by the user.

- **Problem Statement:**
  Write a program that takes a string input from the user and reverses it.

```
word = str(input("Enter a word to reverse: "))
reversed_word=word[::-1]
print(reversed_word)

Enter a word to reverse:  ilakkiyan

nayikkali
```

- **Hint:** Use string slicing to reverse the string.
- **Expected Output:** ``` Enter a string: Python The reversed string is: nohtyP
- **Starter Code:** ```python string = input("Enter a string: ") reversed_string = string[::-1] print(f"The reversed string is: {reversed_string}")

Solutions: Python Basics

1. name = input("Enter your name: ") print("Hello, " + name + "! Welcome to Python!")
1. num1 = float(input("Enter the first number: ")) num2 = float(input("Enter the second number: ")) print("Sum: ", num1 + num2) print("Difference: ", num1 - num2) print("Product: ", num1 * num2) print("Quotient: ", num1 / num2)
1. num = int(input("Enter a number: ")) if num % 2 == 0: print("Even") else: print("Odd")

1. celsius = float(input("Enter temperature in Celsius: ")) fahrenheit = (celsius * 9/5) + 32 print(f"{celsius}°C is equal to {fahrenheit}°F")
1. length = float(input("Enter the length of the rectangle: ")) width = float(input("Enter the width of the rectangle: ")) area = length * width print(f"The area of the rectangle is {area}")
1. N = int(input("Enter a number: ")) sum_of_numbers = sum(range(1, N + 1)) print(f"The sum of numbers from 1 to {N} is {sum_of_numbers}")
1. num1 = float(input("Enter the first number: ")) num2 = float(input("Enter the second number: ")) operation = input("Choose an operation (+, -, *, /): ")

if operation == "+": print(f"Result: {num1 + num2}") elif operation == "-": print(f"Result: {num1 - num2}") elif operation == " *": print(f"Result: {num1* num2}") elif operation == "/": print(f"Result: {num1 / num2}") else: print("Invalid operation")

1. year = int(input("Enter a year: ")) if (year % 4 == 0 and year % 100 != 0) or (year % 400 == 0): print("Leap year") else: print("Not a leap year")
1. string = input("Enter a string: ") # Taking input from the user vowels = "aeiou" # Defining the vowels count = 0 # Initializing the count variable

for char in string: if char.lower() in vowels: # Checking if the character is a vowel count += 1 # Incrementing count if it's a vowel

print(f"Vowels in '{string}': {count}")

1. string = input("Enter a string: ") reversed_string = string[::-1] print(f"The reversed string is: {reversed_string}")