

Programming Assignment

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1 Programming Exercises

1. Write a program display "Hello World!".

```
[1]: print("Hello World!")
```

Hello World!

2. Write a program to find sum of two numbers. Use input() function to take input from the user.

```
[2]: num_1 = int(input("Enter First Number: "))
num_2 = int(input("Enter First Number: "))
print(f"The sum of {num_1} and {num_2} is {num_1+num_2}")
```

Enter First Number: 10

Enter First Number: 20

The sum of 10 and 20 is 30

3. Write a program to calculate discount on the basis of following assumption:

- a) If purchased amount is greater than or equal to 1000, discount is 5%

```
[3]: discount = 0.0
purchased_amount = float(input("Enter the purchase amount: "))
if purchased_amount >= 1000:
    discount = purchased_amount * 0.05
print(f"Discounted Amount is {discount}.\nAmount to be paid is, \n{purchased_amount - discount}")
```

Enter the purchase amount: 2500

Discounted Amount is 125.0.

Amount to be paid is 2375.0

4. Write a program to calculate discount on the basis of following assumption:

- a) If purchased amount is greater than or equal to 1000, discount is 5%

b) If purchased amount is less than 1000, discount is 3%

```
[4]: discount = 0.0
purchased_amount = float(input("Enter the purchase amount: "))
if purchased_amount >= 1000:
    discount = purchased_amount * 0.05
else:
    discount = purchased_amount * 0.03
print(f"Discounted Amount is {discount}.\nAmount to be paid is ₦{purchased_amount - discount}")
```

Enter the purchase amount: 3500

Discounted Amount is 175.0.

Amount to be paid is 3325.0

5. Write a program to calculate discount on the basis of following assumption:

- a) If purchased amount is greater than or equal to 5000, discount is 10%
- b) If purchased amount is greater than or equal to 4000 and less than 5000, discount is 7%
- c) If purchased amount is greater than or equal to 3000 and less than 4000, discount is 5%
- d) If purchased amount is greater than or equal to 2000 and less than 3000, discount is 3%
- e) If purchased amount is less than 2000, discount is 2%

```
[5]: discount = 0.0
purchased_amount = float(input("Enter the purchase amount: "))
if purchased_amount >= 5000:
    discount = purchased_amount * 0.1
elif purchased_amount >= 4000:
    discount = purchased_amount * 0.07
elif purchased_amount >= 3000:
    discount = purchased_amount * 0.05
elif purchased_amount >= 2000:
    discount = purchased_amount * 0.03
else:
    discount = purchased_amount * 0.02
print(f"Discounted Amount is {discount}.\nAmount to be paid is ₦{purchased_amount - discount}")
```

Enter the purchase amount: 250000

Discounted Amount is 25000.0.

Amount to be paid is 225000.0

6. Write a program to calculate the simple interest on the basis of following assumption:

- a) If balance is greater than 99999, interest is 7%
- b) If balance is greater than or equal to 50000 and less than 100000 interest is 5%
- c) If balance is less than 50000, interest is 3%

```
[6]: balance = float(input("Enter the balance: "))
    if (balance>99999):
        interest_rate = 7
    elif (balance>=50000):
        interest_rate = 5
    else:
        interest_rate = 3
    interest = (balance*interest_rate)/100
    print(f"The Interest Rate is {interest_rate}%\nThe Simple Interest is_
    ↪{interest}")
```

Enter the balance: 250000

The Interest Rate is 7%

The Simple Interest is 17500.0

7. Write a program to test whether a number is even or odd.

```
[7]: numb = int(input("Enter a number: "))
    if numb%2==0:
        print(f"The given number {numb} is even")
    else:
        print(f"The given number {numb} is odd")
```

Enter a number: 25

The given number 25 is odd

10. Write a program to display "SMS, TU" 10 times.

```
[8]: # Method 1
    print("### Method 1 ###")
    print("SMS,TU\n"*10)
    print("### Method 2 ###")
    # Method 2
    for i in range(10):
        print("SMS, TU")
```

Method 1

SMS,TU

SMS,TU

SMS,TU

SMS,TU

SMS,TU

SMS,TU

SMS,TU

SMS,TU

SMS,TU

SMS,TU

Method 2

SMS, TU
SMS, TU
SMS, TU
SMS, TU
SMS, TU
SMS, TU
SMS, TU
SMS, TU
SMS, TU
SMS, TU
SMS, TU

11. Write a program to find sum and average of 10 numbers stored in a list.

```
[9]: num_list = [1,2,3,4,5,6,7,8,9,10]
print(f"The Sum of Numbers is the list is {sum(num_list)} and average is_
↪{sum(num_list)/len(num_list)}")
```

The Sum of Numbers is the list is 55 and average is 5.5

12. Write a program to display prime numbers up to 100.

```
[10]: for number in range(1,101):
      if number>1:
          for i in range(2,number):
              if(number%i)==0:
                  break
          else:
              print(f"{number}",end=" ")
```

2 3 5 7 11 13 17 19 23 29 31 37 41 43 47 53 59 61 67 71 73 79 83 89 97

13. Write a program to count number of vowels in a string.

```
[11]: vowel_count = 0
text = str(input("Enter a string: "))
text = text.lower()
vowels = 'aeiou'
for char in text:
    if (char in vowels):
        vowel_count+=1
print(f"The number of vowels in the given string is {vowel_count}")
```

Enter a string:

The number of vowels in the given string is 0

14. Write a program to find smallest and largest number among 10 numbers stored in a list.

```
[12]: list1 = [2,3,4,7,8,9,10,8,9,15]
list1.sort()
```

```

print(f"The Smallest Number is List is {list1[0]} and Largest number is_
↳{list1[-1]}")

## Alternative
list1 = [2,3,4,7,8,9,10,8,9,15]
print(f"The Smallest Number is List is {min(list1)} and Largest number is_
↳{max(list1)}")

```

The Smallest Number is List is 2 and Largest number is 15

The Smallest Number is List is 2 and Largest number is 15

15. Write a program to count even numbers and odd numbers stored in a list.

```

[13]: list1 = [2,3,4,7,8,9,10,8,9,15]
even_count = 0
odd_count = 0
for i in list1:
    if i%2==0:
        even_count=even_count+1
    else:
        odd_count=odd_count+1
print(f"Even Count = {even_count}")
print(f"Odd Count = {odd_count}")

```

Even Count = 5

Odd Count = 5

16. Write a program to find sum of two matrices.

```

[14]: X = [[12,7,3],[5,9,3],[2,5,3]]

Y = [[5,8,1],[6,7,3],[4,5,9]]

result = [[0,0,0],
          [0,0,0],
          [0,0,0]]
for i in range(len(X)):
    for j in range(len(X[0])):
        result[i][j] = X[i][j] + Y[i][j]
for r in result:
    print(r)

```

[17, 15, 4]

[11, 16, 6]

[6, 10, 12]

17. Write a program to find product of two matrices.

```
[15]: A = [ [1, 2, 3],[6, 7, 4], [8, 10, 11] ]
      B = [[1, 5, 3],[2, 6, 5], [7, 4, 9] ]

      result=[ [0,0,0],[0,0,0],[0,0,0] ]
      #for rows
      for i in range(len(A)):
          #for columns
          for j in range(len(B[0])):
              #for rows of matrix B
              for k in range(len(B)):
                  result[i][j] += A[i][k] * B[k][j]
      print(result)
```

[[26, 29, 40], [48, 88, 89], [105, 144, 173]]

18. Write a program using function with return type to find sum of two numbers.

```
[16]: def add_two_num(num1,num2):
      return num1+num2
      add_two_num(2,4)
```

[16]: 6

19. Write a program using recursive function to find factorial of a number.

```
[17]: def num_factorial(num):
      if num==0:
          return 1
      else:
          return num*num_factorial(num-1)
      num_factorial(4)
```

[17]: 24

20. Write a program using recursive function to find n th Fibonacci number.

```
[18]: def fib(num):
      if (num<=1):
          return num
      else:
          return fib(num-1)+fib((num-2))
      fib(6)
```

[18]: 8

21. Write a program to read from and write to files.

```
[19]: # Writing to a file
      text = "Hello World"
```

```
with open('example_file.txt','w') as f:
    f.write(text)
```

```
[20]: # Reading from a file
with open('example_file.txt','r') as f:
    print(f.read())
```

Hello World

22. Write a program to find sum and average of numbers stored in a file.

```
[21]: with open('numbers.txt','r') as f:
        data = [int(x) for x in f.read().split()]
        print(f"The sum is {sum(data)} and average is {sum(data)/len(data)}")
```

The sum is 21 and average is 3.5

23. Write a program that reads data from a text file, counts number of vowels in it, and writes number of vowels in a separate text file.

```
[22]: vowel_list = ['a','e','i','o','u']
v_count = 0
with open('vowel.txt','r') as f:
    read_text = f.read()
for ch in read_text:
    if ch.lower() in vowel_list:
        v_count=v_count+1
print("Vowel Count: {}".format(v_count))
with open('vowel_count.txt','w') as f:
    f.write("The total vowel count is {}".format(v_count))
```

Vowel Count: 12

24. Write a program that reads a CSV file with eight fields (SID, Name, and Marks in five subjects) and displays name and total marks obtained by each student.

```
[23]: import csv
with open('marks.csv','r') as f:
    reader = csv.reader(f)
    line_count = 0
    for row in reader:
        if line_count==0:
            print()
        else:
            print(f"Name: {row[1]} Total Marks: {sum([int(x) for x in row[2:
↵]])}")
            line_count=line_count+1
```

Name: 'Person 1' Total Marks: 270

Name: 'Person 2' Total Marks: 320
Name: 'Person 3' Total Marks: 270
Name: 'Person 4' Total Marks: 340

25. Create a class Circle containing radius as instance variable and two functions area() and circumference() to find area and circumference of circles respectively. Create at least two objects of the Circle class to test the program.

```
[24]: from math import pi
class Circle:
    def __init__(self,radius):
        self.radius=radius
    def area(self):
        return pi*(self.radius**2)
    def circumference(self):
        return 2*pi*self.radius
```

```
[25]: c1 = Circle(5)
c2 = Circle(10)
print(f"Area c1 = {c1.area()} and Circumference c1 = {c1.circumference()}")
print(f"Area c2 = {c2.area()} and Circumference c2 = {c2.circumference()}")
```

Area c1 = 78.53981633974483 and Circumference c1 = 31.41592653589793
Area c2 = 314.1592653589793 and Circumference c2 = 62.83185307179586

26. Create a class Rectangle containing length and breadth as instance variables and two functions area() and perimeter() to find area and perimeter of rectangles respectively. Create at least two objects of the Rectangle class to test the program.

```
[26]: class Rectangle:
    def __init__(self,length,breadth):
        self.length = length
        self.breadth = breadth
    def area(self):
        return self.length*self.breadth
    def perimeter(self):
        return 2*(self.length+self.breadth)
```

```
[27]: r1 = Rectangle(5,10)
r2 = Rectangle(3,5)
print(f"Area r1 = {r1.area()} and Perimeter r1 = {r1.perimeter()}")
print(f"Area r2 = {r2.area()} and Perimeter r2 = {r2.perimeter()}")
```

Area r1 = 50 and Perimeter r1 = 30
Area r2 = 15 and Perimeter r2 = 16

27. Create a class Distance containing feet and inches as instance variables and two functions add() and compare() for adding and comparing two distance objects. Create two objects to add and compare the objects.


```
[28]: class Distance:
    def __init__(self,feet,inches):
        self.feet = feet
        self.inches = inches
    def add(self,d):
        total_feet = self.feet+d.feet
        total_inches = self.inches+d.inches
        if total_inches>=12:
            total_feet+=1
            total_inches-=12
        return total_feet,total_inches
    def compare(self,d):
        in_inch_self = self.feet*12+self.inches
        in_inch_d = d.feet*12+d.inches
        if (in_inch_self>in_inch_d):
            print("D1 is Larger")
        elif(in_inch_self<in_inch_d):
            print("D2 is Larger")
        else:
            print("Both are Equal")
    def display(self):
        print(f"Feet = {self.feet} and Inches = {self.inches}")
```

```
[29]: d1 = Distance(2,10)
      d2 = Distance(1,9)
```

```
[30]: d1.add(d2)
```

```
[30]: (4, 7)
```

```
[31]: d1.compare(d2)
```

D1 is Larger

28. Create a class Student with name, roll number, and marks in five subjects. Add two functions to calculate total and percentage of marks obtained. Use this class to find percentage and division of five students.

```
[32]: class Student:
    def __init__(self,name,roll,marks):
        self.name=name
        self.roll=roll
        self.marks=marks
    def calculate_total(self):
        return sum(self.marks)
    def calculate_percentage(self):
        return (self.calculate_total()/500)*100
    def get_division(self):
```

```

        if self.calculate_percentage()>=80:
            return 'Distinction'
        elif self.calculate_percentage()>=60:
            return 'First Division'
        elif self.calculate_percentage()>=50:
            return 'Second Division'
        elif self.calculate_percentage()>=40:
            return 'Third Division'
        else:
            return 'Fail'

```

```

[33]: with open('marks.csv','r') as f:
        reader = csv.reader(f)
        line_count = 0
        for row in reader:
            if line_count==0:
                print()
            else:
                s = Student(row[1],int(row[0]),[float(x) for x in row[2:]])
                print(f"Name: {s.name} Percentage: {s.calculate_percentage()}␣
↪Division: {s.get_division()}")
                line_count=line_count+1

```

```

Name: 'Person 1' Percentage: 54.0 Division: Second Division
Name: 'Person 2' Percentage: 64.0 Division: First Division
Name: 'Person 3' Percentage: 54.0 Division: Second Division
Name: 'Person 4' Percentage: 68.0 Division: First Division

```