

# Rajalakshmi Engineering College

Name: Kavyasri M  
Email: 240701248@rajalakshmi.edu.in  
Roll no: 240701248  
Phone: 6383586337  
Branch: REC  
Department: I CSE AH  
Batch: 2028  
Degree: B.E - CSE

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## NeoColab\_REC\_CS23221\_Python Programming

### REC\_Python\_Week 4\_PAH\_Updated

Attempt : 1  
Total Mark : 60  
Marks Obtained : 60

#### Section 1 : Coding

##### 1. Problem Statement

Hussain wants to create a program to calculate a person's BMI (Body Mass Index) based on their weight in kilograms and height in meters. The BMI is a measure of a person's body fat relative to their height.

Your program should take user input for weight and height, calculate the BMI, and display the result.

Function Signature: calculate\_bmi(weight, height)

Formula:  $BMI = \text{Weight} / (\text{Height})^2$

##### ***Input Format***

The first line of input consists of a positive floating-point number, the person's

weight in kilograms.

The second line of input consists of a positive floating-point number, the person's height in meters.

### ***Output Format***

The output displays "Your BMI is: [BM]" followed by a float value representing the calculated BMI, rounded off two decimal points.

Refer to the sample output for the formatting specifications.

### ***Sample Test Case***

Input: 70.0

1.75

Output: Your BMI is: 22.86

### ***Answer***

```
weight = float(input())
```

```
height = float(input())
```

```
# You are using Python
```

```
def calculate_bmi(weight,height):
```

```
    a=height*height
```

```
    b=weight/a
```

```
    print("Your BMI is: %.2f"%b)
```

```
calculate_bmi(weight, height)
```

**Status :** Correct

**Marks :** 10/10

## **2. Problem Statement**

Alice works at a digital marketing company, where she analyzes large datasets. One day, she's tasked with processing customer ID numbers, which are long numeric sequences.

To simplify her task, Alice needs to calculate the digital root of each ID.

The digital root is obtained by repeatedly summing the digits of a number

until a single digit remains.

Help Alice write a program that reads a customer ID number, calculates its digital root, and prints the result using a loop-based approach.

For example, the sum of the digits of 98675 is  $9 + 8 + 6 + 7 + 5 = 35$ , then  $3 + 5 = 8$ , which is the digital root.

Function prototype: `def digital_root(num)`

### ***Input Format***

The input consists of an integer num.

### ***Output Format***

The output prints an integer representing the sum of digits for a given number until a single digit is obtained.

Refer to the sample output for the formatting specifications.

### ***Sample Test Case***

Input: 451110

Output: 3

### ***Answer***

```
num = int(input())  
# You are using Python  
def digital_root(num):  
    while num >= 10:  
        num = sum(int(digit) for digit in str(num))  
    return num
```

```
print(digital_root(num))
```

**Status :** Correct

**Marks :** 10/10

### 3. Problem Statement

Ella is designing a messaging application that needs to handle long text messages efficiently. To optimize storage and transmission, she plans to implement a text compression feature that replaces consecutive repeated characters with the character followed by its count, while leaving non-repeated characters unchanged.

Help Ella create a recursive function to achieve this compression without altering the original message's meaning.

Function Specification: `def compress_string(*args)`

#### ***Input Format***

The input consists of a single line containing the string to be compressed.

#### ***Output Format***

The output consists of a single line containing the compressed string.

Refer to the sample output for the formatting specifications.

#### ***Sample Test Case***

Input: `aaaBBBccc`

Output: `a3B3c3`

#### ***Answer***

# You are using Python

```
def compress_string(s):
```

```
    compressed = ""
```

```
    count = 1
```

```
    for i in range(len(s) - 1):
```

```
        if s[i] == s[i + 1]:
```

```
            count += 1
```

```
        else:
```

```
            compressed += s[i] + (str(count) if count > 1 else "")
```

```
            count = 1
```

```
    compressed += s[-1] + (str(count) if count > 1 else "")
```

```
    return compressed
input_string = input().strip()
print(compress_string(input_string))
```

**Status :** Correct

**Marks :** 10/10

#### 4. Problem Statement

Create a Python program to monitor temperatures in a greenhouse using two sensors. Calculate and display the absolute temperature difference between the two sensor readings to ensure proper temperature control.

Note: Use the `abs()` built-in function.

##### **Input Format**

The first line consists of a floating-point number, representing the temperature reading from Sensor 1.

The second line consists of a floating-point number, representing the temperature reading from Sensor 2.

##### **Output Format**

The output displays the absolute temperature difference between Sensor 1 and Sensor 2, rounded to two decimal places.

Refer to the sample output for the exact format.

##### **Sample Test Case**

Input: 33.2  
26.7

Output: Temperature difference: 6.50 °C

##### **Answer**

```
def calculate_temperature_difference(sensor1, sensor2):
    temp_difference = abs(sensor1 - sensor2)
    print(f"Temperature difference: {temp_difference:.2f} °C")
sensor1 = float(input().strip())
```

```
sensor2 = float(input().strip())  
calculate_temperature_difference(sensor1, sensor2)
```

**Status :** Correct

**Marks :** 10/10

## 5. Problem Statement

Sophia is developing a feature for her online banking application that calculates the total sum of digits in customers' account numbers. This sum is used to generate unique verification codes for secure transactions. She needs a program that takes an account number as input and outputs the sum of its digits.

Help Sophia to complete her task.

Function Specification: `def sum_digits(num)`

### ***Input Format***

The input consists of an integer, representing the customer's account number.

### ***Output Format***

The output prints an integer representing the sum of the digits of the account number.

Refer to the sample output for formatting specifications.

### ***Sample Test Case***

Input: 123245

Output: 17

### ***Answer***

```
num = int(input())  
  
# You are using Python  
def sum_digits(num):  
    return sum(int(digit) for digit in str(num))
```

```
sum = sum_digits(num)
print(sum)
```

**Status :** Correct

**Marks :** 10/10

## 6. Problem Statement

Ravi is working on analyzing a set of integers to determine how many of them are divisible by 3 and how many are divisible by 5. He decides to use lambda functions to filter and count the numbers based on their divisibility.

Write a program that takes a list of integers, calculates how many numbers are divisible by 3, and how many are divisible by 5, and then prints the results.

Additionally, the program should calculate the total sum of all numbers divisible by 3 and divisible by 5 separately.

### **Input Format**

The first line contains an integer  $n$ , representing the number of integers in the list.

The second line contains  $n$  space-separated integers.

### **Output Format**

The first line should print the count of numbers divisible by 3.

The second line should print the count of numbers divisible by 5.

The third line should print the sum of numbers divisible by 3.

The fourth line should print the sum of numbers divisible by 5.

Refer to the sample output for the formatting specifications.

### **Sample Test Case**

Input: 6  
3 5 6 10 15 20

Output: 3  
4  
24  
50

**Answer**

```
# You are using Python
def analyze_numbers(n, numbers):
    divisible_by_3 = list(filter(lambda x: x % 3 == 0, numbers))
    divisible_by_5 = list(filter(lambda x: x % 5 == 0, numbers))
    print(len(divisible_by_3))
    print(len(divisible_by_5))
    print(sum(divisible_by_3))
    print(sum(divisible_by_5))
n = int(input().strip())
numbers = list(map(int, input().strip().split()))
analyze_numbers(n, numbers)
```

**Status :** Correct

**Marks :** 10/10