

# Rajalakshmi Engineering College

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## NeoColab\_REC\_CS23221\_Python Programming

### REC\_Python\_Week 4\_MCQ

Attempt : 1  
Total Mark : 15  
Marks Obtained : 15

#### Section 1 : MCQ

1. What will be the output of the following Python code?

```
def func(a, b=5, c=10):  
    print('a is', a, 'and b is', b, 'and c is', c)
```

```
func(3, 7)  
func(25, c = 24)  
func(c = 50, a = 100)
```

**Answer**

a is 3 and b is 7 and c is 10  
a is 25 and b is 5 and c is 24  
a is 100 and b is 5 and c is 50

**Status :** Correct

**Marks :** 1/1

2. What is the main advantage of using lambda functions in Python?

**Answer**

They allow you to write shorter code than regular functions

**Status :** Correct

**Marks :** 1/1

3. What is the output of the following code snippet?

```
def my_function(x):  
    x += 5  
    return x
```

```
a = 10  
result = my_function(a)  
print(a, result)
```

**Answer**

10 15

**Status :** Correct

**Marks :** 1/1

4. What will be the output of the following code?

```
def display(*args):  
    for arg in args:  
        print(arg)
```

```
display(10, 20, 30)
```

**Answer**

102030

**Status :** Correct

**Marks :** 1/1

5. What keyword is used to define a lambda function in Python?

**Answer**

lambda

**Status :** Correct

**Marks :** 1/1

6. What will be the output of the following Python code?

```
def cube(x):  
    return x * x * x  
x = cube(3)  
print(x)
```

**Answer**

27

**Status :** Correct

**Marks :** 1/1

7. What will be the output of the following code?

```
value = 42  
result = abs(value) + len(str(value))  
print(result)
```

**Answer**

44

**Status :** Correct

**Marks :** 1/1

8. What will be the output of the following Python code?

```
def is_even(number):  
    if number % 2 == 0:  
        return True
```

```
result = is_even(6)  
print(result)
```

**Answer**

True

**Status :** Correct

**Marks :** 1/1

9. What will be the output of the following code?

```
number = 7
result = abs(number) + pow(number, 2)
print(result)
```

**Answer**

56

**Status :** Correct

**Marks :** 1/1

10. What is the output of the code shown below?

```
def f1(x):
    x += 1
    print(x)
```

```
global_variable = 15
f1(global_variable)
print("hello")
```

**Answer**

16hello

**Status :** Correct

**Marks :** 1/1

11. What is the output of the following code snippet?

```
def fun(x, y=2, z=3):
    return x + y + z
```

```
result = fun(1, z=4)
print(result)
```

**Answer**

7

**Status :** Correct

**Marks :** 1/1

12. What will be the output of the following Python code?

```
def maximum(x, y):  
    if x > y:  
        return x  
    elif x == y:  
        return 'The numbers are equal'  
    else:  
        return y
```

```
print(maximum(2, 3))
```

**Answer**

3

**Status :** Correct

**Marks :** 1/1

13. What will be the output of the following Python code?

```
def absolute_value(x):  
    if x < 0:  
        return -x  
    return x
```

```
result = absolute_value(-9)  
print(result, absolute_value(5))
```

**Answer**

9 5

**Status :** Correct

**Marks :** 1/1

14. What is the output of the following code snippet?

```
def square(x):  
    return x ** 2
```

```
result = square(4)  
print(result)
```

**Answer**

16

**Status :** Correct

**Marks :** 1/1

15. What will be the output of the following Python code?

```
multiply = lambda x, y: x * y  
print(multiply(2, 'Hello'))
```

**Answer**

HelloHello

**Status :** Correct

**Marks :** 1/1

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## NeoColab\_REC\_CS23221\_Python Programming

### REC\_Python\_Week 4\_COD\_Updated

Attempt : 1  
Total Mark : 50  
Marks Obtained : 50

#### Section 1 : Coding

##### 1. Problem Statement

Imagine you are developing a text analysis tool for a cybersecurity company. Your task is to create a function that analyzes input strings to categorize and count the characters into four categories: uppercase letters, lowercase letters, digits, and special characters. The company needs this tool to process log files and identify potential security threats.

Function Signature: `analyze_string(input_string)`

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

The input consists of a single string (without space), which may include uppercase letters, lowercase letters, digits, and special characters.

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

The first line contains an integer representing the count of uppercase letters in the format "Uppercase letters: [count]".

The second line contains an integer representing the count of lowercase letters in the format "Lowercase letters: [count]".

The third line contains an integer representing the count of digits in the format "Digits: [count]".

The fourth line contains an integer representing the count of special characters in the format "Special characters: [count]".

Refer to the sample output for the formatting specifications.

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

Input: Hello123

Output: Uppercase letters: 1

Lowercase letters: 4

Digits: 3

Special characters: 0

### ***Answer***

```
def analyze_string(input_string):
```

```
    uc=0
```

```
    lc=0
```

```
    d=0
```

```
    s=0
```

```
    for k in input_string:
```

```
        if k.isupper():
```

```
            uc+=1
```

```
        elif k.islower():
```

```
            lc+=1
```

```
        elif k.isdigit():
```

```
            d+=1
```

```
        else:
```

```
            s+=1
```

```
    return uc,lc,d,s
```

```
input_string = input()
```



```
uppercase_count, lowercase_count, digit_count, special_count =  
analyze_string(input_string)
```

```
print("Uppercase letters:", uppercase_count)  
print("Lowercase letters:", lowercase_count)  
print("Digits:", digit_count)  
print("Special characters:", special_count)
```

**Status :** Correct

**Marks :** 10/10

## 2. Problem Statement

Imagine you are building a messaging application, and you want to know the length of the messages sent by the users. You need to create a program that calculates the length of a message using the built-in function `len()`.

### ***Input Format***

The input consists of a string representing the message.

### ***Output Format***

The output prints an integer representing the length of the entered message.

Refer to the sample output for formatting specifications.

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

Input: hello!!

Output: 7

### ***Answer***

```
def Len(N):  
    return len (N)
```

```
n=input("")  
a=Len(n)  
print(a)
```

**Status :** Correct

**Marks :** 10/10

### 3. Problem Statement

Sara is developing a text-processing tool that checks if a given string starts with a specific character or substring. She needs to implement a function that accepts a string and a character (or substring), and returns True if the string starts with the provided character/substring, or False otherwise.

Write a program that uses a lambda function to help Sara perform this check.

#### **Input Format**

The first line contains a string `str` representing the main string to be checked.

The second line contains a string `n`, which is the character or substring to check if the main string starts with it.

#### **Output Format**

The first line of output prints "True" if the string starts with the given character/substring, otherwise prints "False".

Refer to the sample for the formatting specifications.

#### **Sample Test Case**

Input: Examly

e

Output: False

#### **Answer**

```
s1=input()
s2=input()
starts_with=lambda s,sub:s.startswith(sub)
print(starts_with(s1,s2))
```

**Status :** Correct

**Marks :** 10/10

#### 4. Problem Statement

Implement a program that needs to identify Armstrong numbers. Armstrong numbers are special numbers that are equal to the sum of their digits, each raised to the power of the number of digits in the number.

Write a function `is_armstrong_number(number)` that checks if a given number is an Armstrong number or not.

Function Signature: `armstrong_number(number)`

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

The first line of the input consists of a single integer, `n`, representing the number to be checked.

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

The output should consist of a single line that displays a message indicating whether the input number is an Armstrong number or not.

Refer to the sample output for the formatting specifications.

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

Input: 153

Output: 153 is an Armstrong number.

##### ***Answer***

```
def is_armstrong_number(number):
    a=len(str(number))
    Sum=0
    for k in str(number):
        Sum+=int(k)**a
    if Sum==number:
        print(number,"is an Armstrong number.")
    else:
        print(number,"is not an Armstrong number.")
n=int(input())
is_armstrong_number(n)
```

Status : Correct

Marks : 10/10

## 5. Problem Statement

Sneha is building a more advanced exponential calculator. She wants to implement a program that does the following:

Calculates the result of raising a given base to a specific exponent using Python's built-in `pow()` function. Displays all intermediate powers from  $\text{base}^1$  to  $\text{base}^{\text{exponent}}$  as a list. Calculates and displays the sum of these intermediate powers.

Help her build this program to automate her calculations.

### **Input Format**

The input consists of line-separated two integer values representing base and exponent.

### **Output Format**

The first line of the output prints the calculated result of raising the base to the exponent.

The second line prints a list of all powers from  $\text{base}^1$  to  $\text{base}^{\text{exponent}}$ .

The third line prints the sum of all these powers.

Refer to the sample output for formatting specifications.

### **Sample Test Case**

Input: 2

3

Output: 8

[2, 4, 8]

14

### **Answer**

```
n=int(input())
```

```
m=int(input())
a=pow(n,m)
print(a)
L=[]
for k in range(1,m+1):
    b=pow(n,k)
    L.append(b)
print(L)
c=sum(L)
print(c)
```

**Status :** Correct

**Marks :** 10/10

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## NeoColab\_REC\_CS23221\_Python Programming

### REC\_Python\_Week 4\_CY

Attempt : 1  
Total Mark : 40  
Marks Obtained : 40

### Section 1 : Coding

#### 1. Problem Statement

You are tasked with designing a shipping cost calculator program that calculates the shipping cost for packages based on their weight and destination. The program utilizes different shipping rates for domestic, international, and remote destinations. The rates for each destination type are provided as global constants.

Constant Values:

DOMESTIC\_RATE = 5.0

INTERNATIONAL\_RATE = 10.0

REMOTE\_RATE = 15.0

Function Signature: calculate\_shipping(weight, destination)

Formula: shipping cost = weight \* destination rate

### ***Input Format***

The first line of the input consists of a float representing the weight of the package.

The second line consists of a string representing the destinations(Domestic or International or Remote).

### ***Output Format***

The program outputs any one of the following:

1. If the input is valid and the destination is recognized, the output should consist of a single line stating the calculated shipping cost for the given weight and destination in the format: "Shipping cost to [destination] for a [weight] kg package: \$[calculated cost]" with two decimal places.
2. If the input weight is not a positive float, print "Invalid weight. Weight must be greater than 0."
3. If the input destination is not one of the valid options, print "Invalid destination."

Refer to the sample output for the formatting specifications.

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

Input: 5.5

Domestic

Output: Shipping cost to Domestic for a 5.5 kg package: \$27.50

### ***Answer***

#

```
def calculate_shipping(weight,destination):
```

```
    dr=5.0
```

```
    ir=10.0
```

```
    rr=15.0
```

```
    if weight>0:
```

```
        if destination=="Domestic":
```

```
            sc=weight*dr
```

```

        return sc
    elif destination=="International":
        sc=weight*ir
        return sc
    elif destination=="Remote":
        sc=weight*rr
        return sc
    else:
        print("Invalid destination.")
else:
    print("Invalid weight.Weight must be greater than 0.")
weight=float(input())
destination=input()
shipping_cost=calculate_shipping(weight,destination)

if shipping_cost is not None:
    print(f"Shipping cost to {destination} for a {weight} kg package:
    ${shipping_cost:.2f}")

```

**Status :** Correct

**Marks :** 10/10

## 2. Problem Statement

Create a program for a mathematics competition where participants need to find the smallest positive divisor of a given integer n. Your program should efficiently determine this divisor using the min() function and display the result.

### **Input Format**

The input consists of a single positive integer n, representing the number for which the smallest positive divisor needs to be found.

### **Output Format**

The output prints the smallest positive divisor of the input integer in the format: "The smallest positive divisor of [n] is: [smallest divisor]".



Refer to the sample output for the exact format.

### **Sample Test Case**

Input: 24

Output: The smallest positive divisor of 24 is: 2

### **Answer**

```
def Min(num):  
    s=0  
    L=[]  
    for k in range(2,num+1):  
        if num%k==0:  
            L.append(k)  
    s=min(L)  
    print("The smallest positive divisor of",num,"is :",s)  
n=int(input())  
Min(n)
```

**Status :** Correct

**Marks : 10/10**

### **3. Problem Statement**

Meena is analyzing a list of integers and needs to count how many numbers in the list are even and how many are odd. She decides to use lambda functions to filter the even and odd numbers from the list.

Write a program that takes a list of integers, counts the number of even and odd numbers using lambda functions, and prints the results.

#### **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 of output prints an integer representing the count of even numbers.

The second line of output prints an integer representing the count of odd numbers.

Refer to the sample output for the formatting specifications.

### **Sample Test Case**

Input: 7  
12 34 56 78 98 65 23

Output: 5  
2

### **Answer**

```
n=int(input())
l=input().split()
L=[int(i) for i in l]
is_even=lambda x:x%2==0
is_odd=lambda y:y%2!=0
ce=[]
co=[]
for k in L:
    if is_even(k):
        ce.append(k)
    elif is_odd(k):
        co.append(k)
print(len(ce))
print(len(co))
```

**Status : Correct**

**Marks : 10/10**

## **4. Problem Statement**

Imagine you are tasked with developing a function for calculating the total cost of an item after applying a sales tax. The sales tax rate is equal to 0.08 and it is defined as a global variable.

The function should accept the cost of the item as a parameter, calculate the tax amount, and return the total cost.

Additionally, the program should display the item cost, sales tax rate, and total cost to the user.

Function Signature: `total_cost(item_cost)`

### ***Input Format***

The input consists of a single line containing a positive floating-point number representing the cost of the item.

### ***Output Format***

The output consists of three lines:

"Item Cost:" followed by the cost of the item formatted to two decimal places.

"Sales Tax Rate:" followed by the sales tax rate in percentage.

"Total Cost:" followed by the calculated total cost after applying the sales tax, formatted to two decimal places.

Refer to the sample output for formatting specifications.

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

Input: 50.00

Output: Item Cost: \$50.00

Sales Tax Rate: 8.0%

Total Cost: \$54.00

### ***Answer***

#

```
def total_cost(item_cost):  
    SALES_TAX_RATE=0.08*item_cost  
    total=item_cost+SALES_TAX_RATE  
    return total  
item_cost=float(input())  
SALES_TAX_RATE=0.08  
total_cost = total_cost(item_cost)
```

```
print(f"Item Cost: ${item_cost:.2f}")  
print(f"Sales Tax Rate: {SALES_TAX_RATE * 100}%")  
print(f"Total Cost: ${total_cost:.2f}")
```

**Status :** Correct

**Marks :** 10/10

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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

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())
def digital_root(num):
    Sum=0
    for k in str(num):
        Sum+=int(k)
    while Sum>9:
        temp=0
        for i in str(Sum):
            temp+=int(i)
        Sum=temp
    return Sum
```

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

**Status :** Correct

**Marks : 10/10**

## 2. 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***

```
def compress_string(s):
    res=""
    i=0
    while i<len(s):
        count=1
        while i+1<len(s) and s[i]==s[i+1]:
            count+=1
            i+=1
        if count>1:
            res+=s[i]+str(count)
        else:
            res+=s[i]
            i+=1
    return res
```

```
s=input().strip()
print(compress_string(s))
```

**Status :** Correct

**Marks :** 10/10

### 3. 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())
def sum_digits(num):
    s=0
    for k in str(num):
        s+=int(k)
```



```
return s
```

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

**Status :** Correct

**Marks :** 10/10

#### 4. 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())

def calculate_bmi(w,h):
    bmi=w/(h**2)
    print("Your BMI is: %.2f"%(bmi))

calculate_bmi(weight, height)
```

**Status :** Correct

**Marks :** 10/10

**5. 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**

```
n=int(input())
l=input().split()
L=[int(x) for x in l]
s1=[k for k in L if(lambda x:x%3==0)(k)]
s2=[k for k in L if(lambda a:a%5==0)(k)]
count1=len(s1)
count2=len(s2)
sum1=sum(s1)
sum2=sum(s2)
print(count1)
print(count2)
print(sum1)
print(sum2)
```

**Status :** Correct

**Marks :** 10/10

## **6. 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***

```
f1=float(input())  
f2=float(input())  
temp=abs(f1-f2)  
print("Temperature difference: %.2f"%(temp),"°C")
```

**Status :** Correct

**Marks :** 10/10