Training and Placement Cell, LNCT University, Bhopal

Python CP ASSIGNMENT 3

Submitted By

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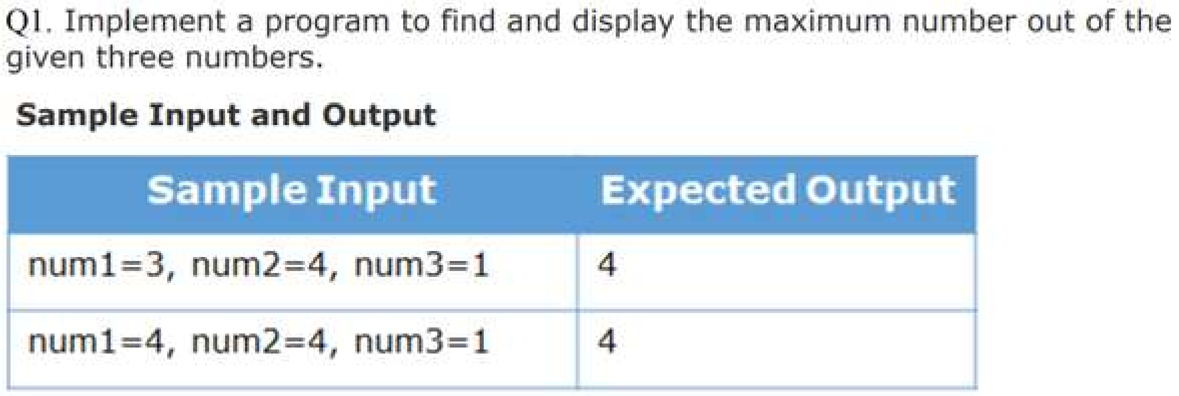


Q1. Implement a program to find and display the maximum number out of the given three numbers.

Sample Input and Output

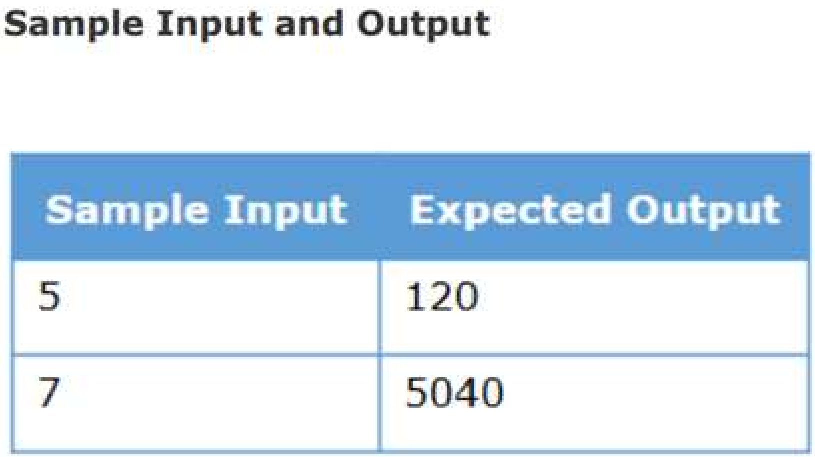
Sample Input	Expected Output
num1=3, num2=4, num3=1	4
num1=4, num2=4, num3=1	4

In [3]:

```
#Program for Question 1:
a=int(input("Enter the first number: "))
b=int(input("Enter the second number: "))
c=int(input("Enter the third number: "))
maximum=a
if maximum<b:
    maximum=b
if maximum<c:
    maximum=c
print(f"The macximum among {a},{b}, and {c} is {maximum}")
```

```
Enter the first number: 10
Enter the second number: 20
Enter the third number: 30
The macximum among 10,20, and 30 is 30
```

Q2. Implement a program to calculate the factorial of a given number.



Sample Input and Output

Sample Input	Expected Output
5	120
7	5040

In [4]:

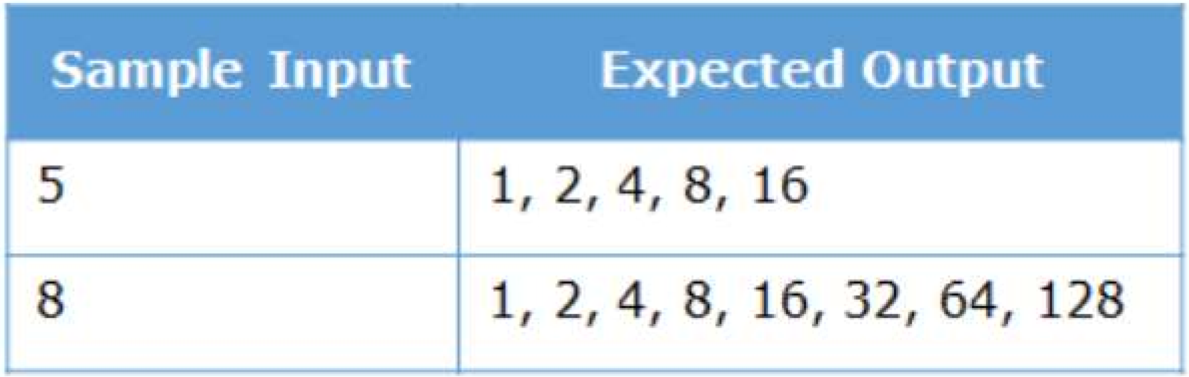
```python
#Program for Question 2
def factorial(n):
    if n==1:
        return 1
    else:
        return n*factorial(n-1)

num=int(input("Enter the number to find its factorial: "))
print(f"The factorial of {num} is {factorial(num)}")
```

```
Enter the number to find its factorial: 5
The factorial of 5 is 120
```

Q3. Problem Statement

Implement a program to display the geometric sequence as given below for a given value n, where n is the number of elements in the sequence.

1, 2, 4, 8, 16, 32, 64, ..., 1024



Sample Input	Expected Output
5	1, 2, 4, 8, 16
8	1, 2, 4, 8, 16, 32, 64, 128

In [9]:

```python
#Program for Question 3
common_ratio=2
n=int(input("How many terms do you want to print: "))
print("1",end="")
for i in range(1,n):
    print(", ",end="")
    print(f"{common_ratio**i}", end="")
```

```
How many terms do you want to print: 8
1, 2, 4, 8, 16, 32, 64, 128
```

Q4. Problem Statement

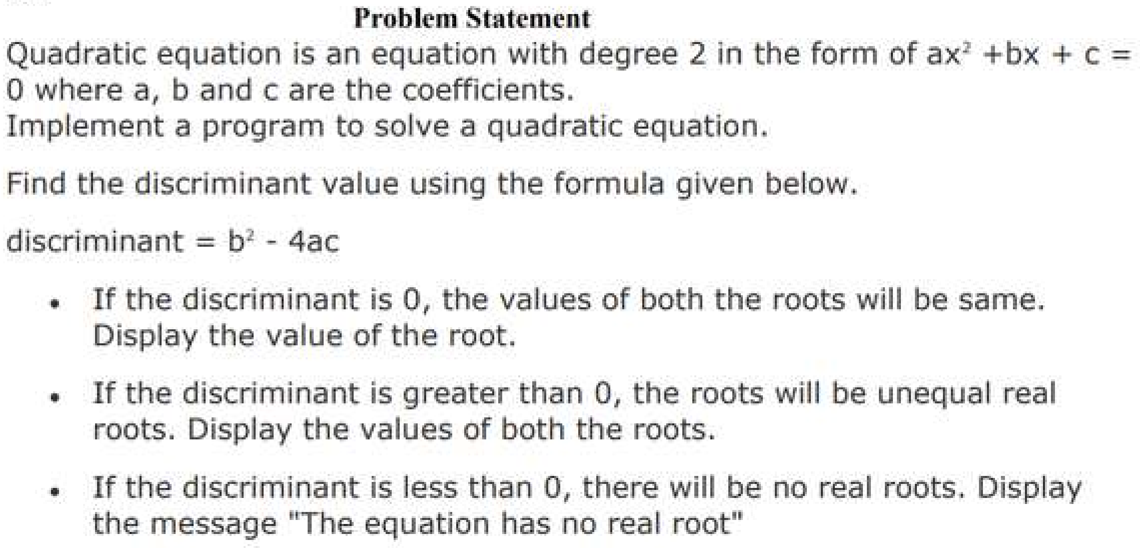
Implement a program to display the sum of two given numbers if the numbers are same. If the numbers are not same, display the double of the sum.

In [12]:

```python
#Program for question 4
a=int(input("Enter the first number: "))
b=int(input("Enter the second number: "))
if a==b:
    print(f"Sum is {2*a}")
else:
    print(f"Sum is {2*(a+b)}")
```

```
Enter the first number: 10
Enter the second number: 20
Sum is 60
```

Q5.



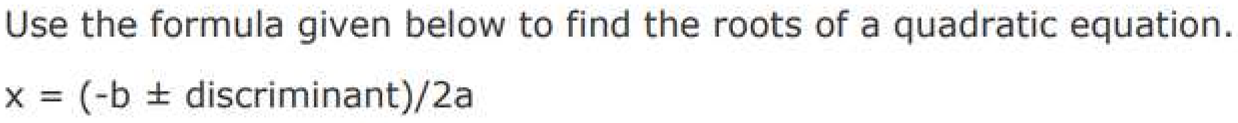
Problem Statement

Quadratic equation is an equation with degree 2 in the form of $ax^2 + bx + c = 0$ where a, b and c are the coefficients.
Implement a program to solve a quadratic equation.

Find the discriminant value using the formula given below.

discriminant = b^2 - 4ac

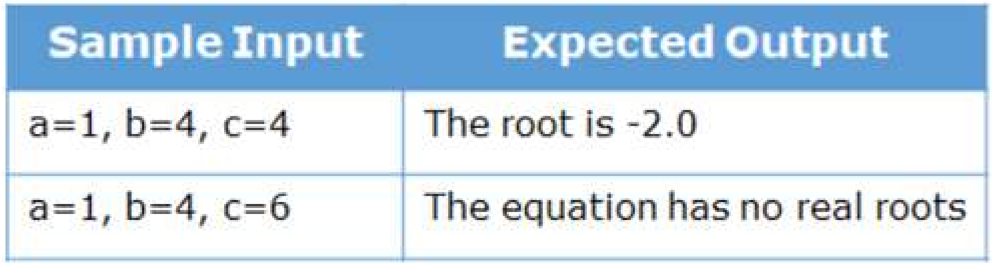
- If the discriminant is 0, the values of both the roots will be same. Display the value of the root.
- If the discriminant is greater than 0, the roots will be unequal real roots. Display the values of both the roots.
- If the discriminant is less than 0, there will be no real roots. Display the message "The equation has no real root"



Use the formula given below to find the roots of a quadratic equation.

x = (-b ± discriminant)/2a

Sample Input and Output



Sample Input	Expected Output
a=1, b=4, c=4	The root is -2.0
a=1, b=4, c=6	The equation has no real roots

In [16]:

```
#Program for Question 5
import math
a=int(input("Enter the coefficient of x^2: "))
b=int(input("Enter the coefficient x : "))
```

```
c=int(input("Enter the contant term :  "))
d = b**2 - 4*a*c
r1=(-b+(d**(0.5)))//2
r2=(-b-(d**(0.5)))//2
if d==0:
    print(f"The values of both the roots will be same and the roots  :{r1}, {r2} ")
elif d>0:
    print(f"The roots are : {r1} and {r2}")
else:
    print("The equation has no real root")
```

```
Enter the coefficient of x^2: 1
Enter the coefficient x : 4
Enter the contant term :  4
The values of both the roots will be same and the roots  :-2.0, -2.0
```

Q6. Problem Statement

Implement a program to calculate the product of three positive integer values. However, if one of the integers is 7, consider only the values to the right of 7 for calculation. If 7 is the last integer, then display -1.

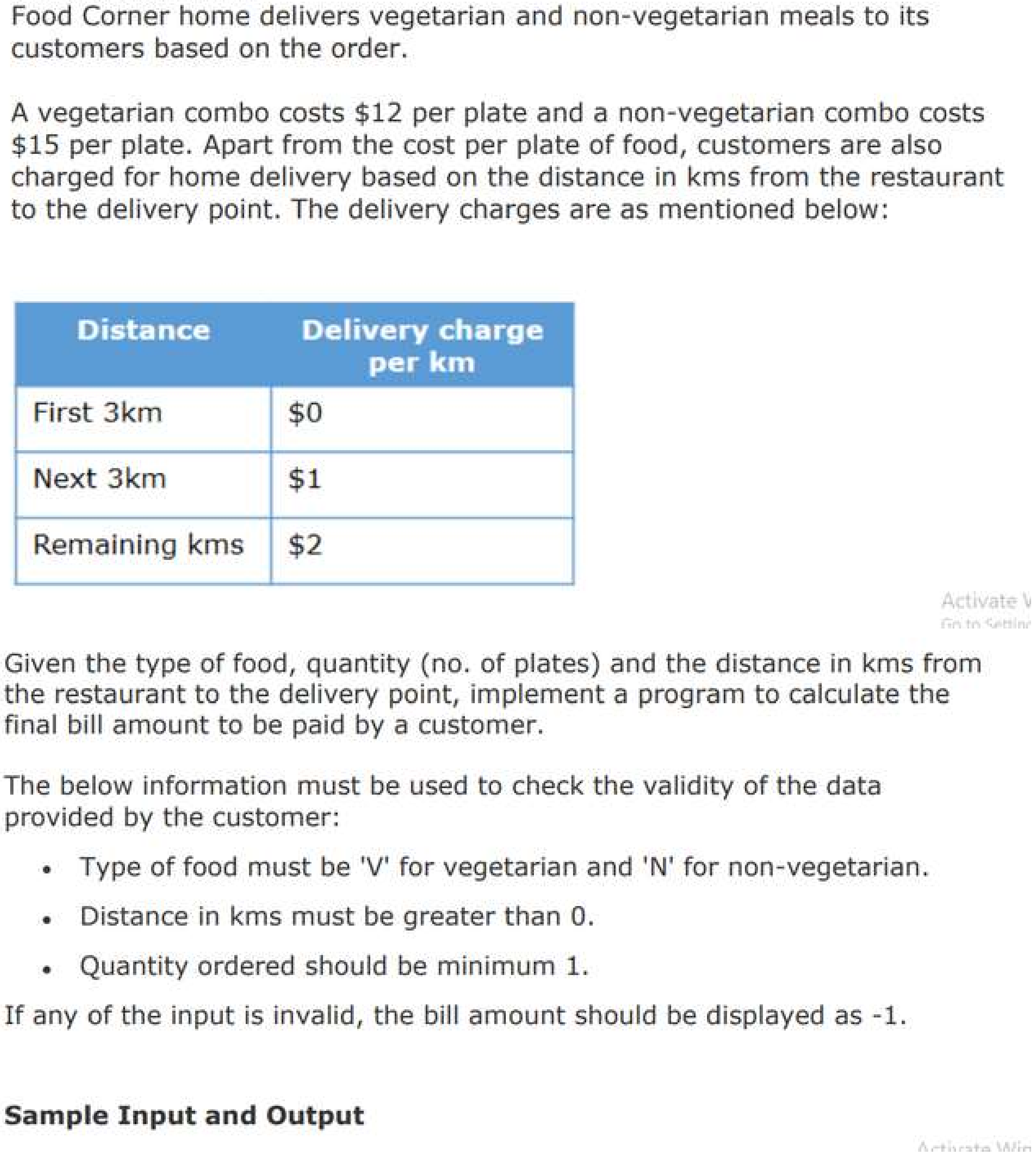
Note: Only one of the three values can be 7.

In [19]:

```
a=int(input("Enter the first number : "))
b=int(input("Enter the second number : "))
c=int(input("Enter the third number :  "))
if 7 not in [a,b,c]:
    print(f"{a*b*c}")
elif a==7:
    print(b*c)
elif b==7:
    print(c)
else:
    print("-1")
```

```
Enter the first number : 4
Enter the second number : 7
Enter the third number :  5
5
```

Q7. Problem Statement



Food Corner home delivers vegetarian and non-vegetarian meals to its customers based on the order.

A vegetarian combo costs $12 per plate and a non-vegetarian combo costs $15 per plate. Apart from the cost per plate of food, customers are also charged for home delivery based on the distance in kms from the restaurant to the delivery point. The delivery charges are as mentioned below:

Distance	Delivery charge per km
First 3km	$0
Next 3km	$1
Remaining kms	$2

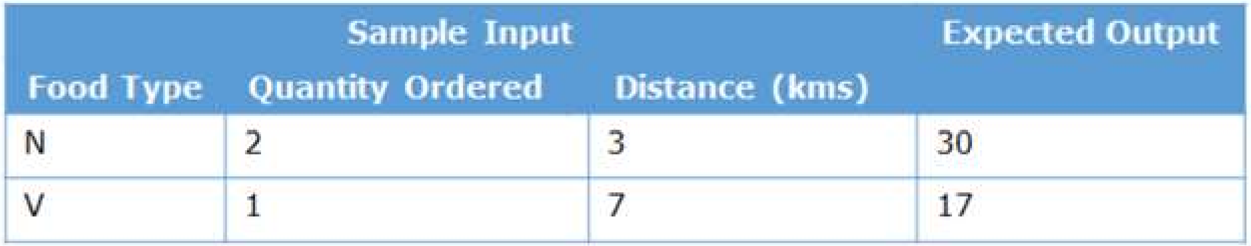
Given the type of food, quantity (no. of plates) and the distance in kms from the restaurant to the delivery point, implement a program to calculate the final bill amount to be paid by a customer.

The below information must be used to check the validity of the data provided by the customer:

- Type of food must be 'V' for vegetarian and 'N' for non-vegetarian.
- Distance in kms must be greater than 0.
- Quantity ordered should be minimum 1.

If any of the input is invalid, the bill amount should be displayed as -1.

Sample Input and Output



Sample Input			Expected Output
Food Type	Quantity Ordered	Distance (kms)	
N	2	3	30
V	1	7	17

In [8]:

```
#Program for question 7
def calculate_bill(food_type,distance_in_kms,quantity_ordered):
    if (food_type in "VN") and distance_in_kms > 0 and quantity_ordered >= 1:
        delivery_charge = 0
        if distance_in_kms <= 3:
            delivery_charge = 0
        elif distance_in_kms <= 6:
            delivery_charge = (distance_in_kms - 3)
        else:
            delivery_charge = 3 + (distance_in_kms - 6) * 2  # Fix the variable name here

        if food_type == 'V':
            bill_amount = quantity_ordered * 12 + delivery_charge
        else:
            bill_amount = quantity_ordered * 15 + delivery_charge
    else:
        bill_amount = -1
    return bill_amount
food_type=input("Which food you want to order:\n1.Press 'V' for Vegetarian\n2.Press 'N for Non-veegtarian'")
distance_in_kms=int(input("Enter the distance (in kms) : "))
quantity_ordered = int(input("Enter the quantity of the food : "))
bill_amount=calculate_bill(food_type,distance_in_kms,quantity_ordered)
print(f"You bill amount is ${bill_amount}")
```

```
Which food you want to order:
1.Press 'V' for Vegetarian
2.Press 'N for Non-veegtarian'V
Enter the distance (in kms) : 7
Enter the quantity of the food : 1
You bill amount is $17
```

Q8. **Problem Statement**

The Metro Bank provides various types of loans such as car loans, business loans and house loans to its account holders, i.e., customers.

Implement a program to determine the eligible loan amount and the EMI that the bank can provide to its customers based on their salary and the loan type they expect to avail.

The values required for determining the eligible loan amount and the EMI are:

- account number of the customer
- account balance of the customer
- salary of the customer
- loan type
- expected loan amount
- expected no. of EMIs

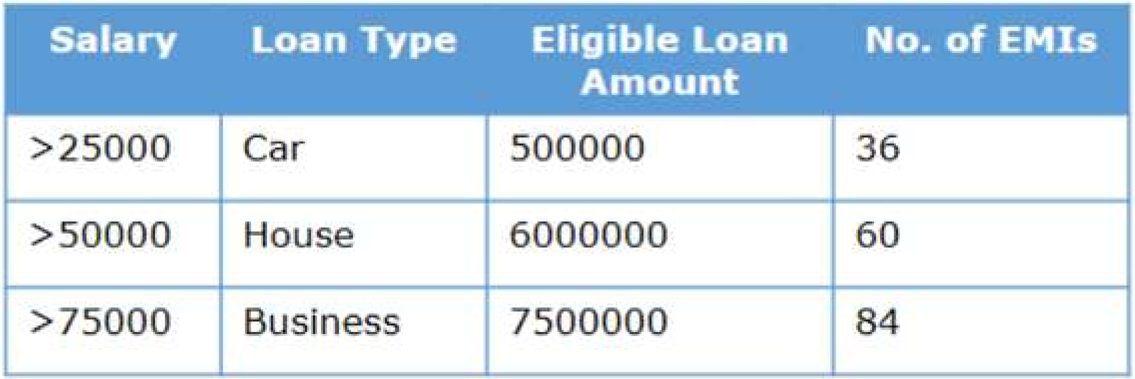
The following validations should be performed:

- The account number should be of 4 digits and its first digit should be 1
- The customer should have a minimum balance of $1000 in the account

Display appropriate error messages if the validations fail.

If the validations pass, determine whether the bank would provide the loan or not.

The bank would provide the loan, only if the loan amount and the number of EMIs expected by the customer is less than or equal to the loan amount and the number of EMIs decided by the bank respectively. The bank decides the eligible loan amount and the number of EMIs based on the below table.

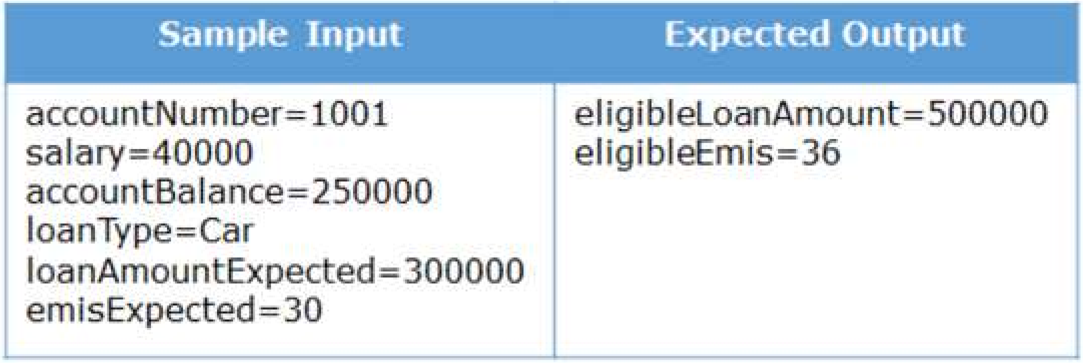


Salary	Loan Type	Eligible Loan Amount	No. of EMIs
>25000	Car	500000	36
>50000	House	6000000	60
>75000	Business	7500000	84

Display the account number, eligible and requested loan amount and the number of EMIs if the bank provides the loan.

Display an appropriate message if the bank does not provide the loan.

Sample Input and Output



Sample Input	Expected Output

accountNumber=1001
salary=40000
accountBalance=250000
loanType=Car
loanAmountExpected=300000
emisExpected=30
	eligibleLoanAmount=500000
	eligibleEmis=36

In [12]:

```python
def eligible_loan_amount_and_emi(account_number, account_balance, salary, loan_type, loan_amount_expected, emi_expected):
    first_digit=account_number//(10**(len(str(account_number))-1))
    if len(str(account_number))==4 and first_digit==1 and account_balance >= 100000:
        if 25000 < salary <=50000 and loan_type == 'Car':
            if loan_amount_expected <=500000 and emi_expected <=36:
                eligible_loan_amount=500000
                bank_emi_expected=36
                print("The customer can avail the amount of Rs.", eligible_loan_amount)
                print("Eligible EMIs :", bank_emi_expected)
            else:
                print("The customer is not eligible for the loan")
        elif 50000 < salary <= 75000 and loan_type == 'House':
            if loan_amount_expected <=6000000 and emi_expected <=60:
                eligible_loan_amount=6000000
                bank_emi_expected=60
                print("The customer can avail the amount of Rs.", eligible_loan_amount)
                print("Eligible EMIs :", bank_emi_expected)
            else:
                print("The customer is not eligible for the loan")
        elif salary > 75000 and loan_type == 'Business':
            if loan_amount_expected <=7500000 and emi_expected <=84:
                eligible_loan_amount=7500000
                bank_emi_expected=84
                print("The customer can avail the amount of Rs.", eligible_loan_amount)
                print("Eligible EMIs :", bank_emi_expected)
            else:
                print("The customer is not eligible for the loan")
        else:
             print("Invalid loan type or salary")
    else:
        if len(str(account_number))!=4 or first_digit!=1:
            print("Invalid account number")
        elif account_balance < 100000:
            print("Insufficient account balance")
        else:
            print("The customer is not eligible for the loan")
############################Reading Customer Inputs######################
account_number=int(input("Enter Your Account Number : "))
account_balance=int(input("Enter Account Balance : "))
salary=int(input("Enter Your Monthly Salary : "))
loan_type=input('''Which type of loan do you want to take:
\n1.Type 'Car' for car loan
\n2.Type 'House' for house loan
\n3.Type 'Business' for Business loan ''' )
loan_expected=int(input("Enter the expected loan amount"))
emi_expected=int(input("Enter expected EMIs : "))
eligible_loan_amount_and_emi(account_number, account_balance, salary, loan_type, loan_expected, emi_expected)
```

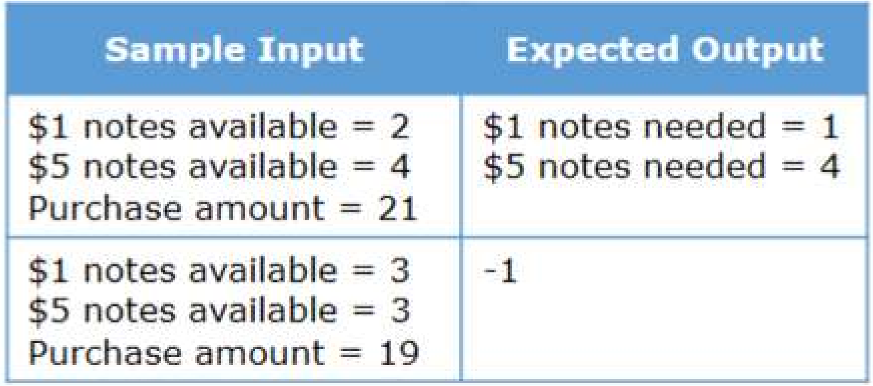
```
Enter Your Account Number : 1001
Enter Account Balance : 250000
Enter Your Monthly Salary : 40000
Which type of loan do you want to take:

1.Type 'Car' for car loan

2.Type 'House' for house loan

3.Type 'Business' for Business loan Car
Enter the expected loan amount300000
Enter expected EMIs : 30
The customer can avail the amount of Rs. 500000
Eligible EMIs : 36
```

Q9. **Problem Statement**

You have x number of $5 notes and y number of $1 notes. You want to purchase an item for amount z. The shopkeeper wants you to provide exact change. You want to pay using a minimum number of notes. How many $5 notes and $1 notes will you use?

Implement a program to find out how many $5 notes and $1 notes will be used. If an exact change is not possible, then display -1.

Sample Input and Output



Sample Input	Expected Output
$1 notes available = 2 $5 notes available = 4 Purchase amount = 21	$1 notes needed = 1 $5 notes needed = 4
$1 notes available = 3 $5 notes available = 3 Purchase amount = 19	-1

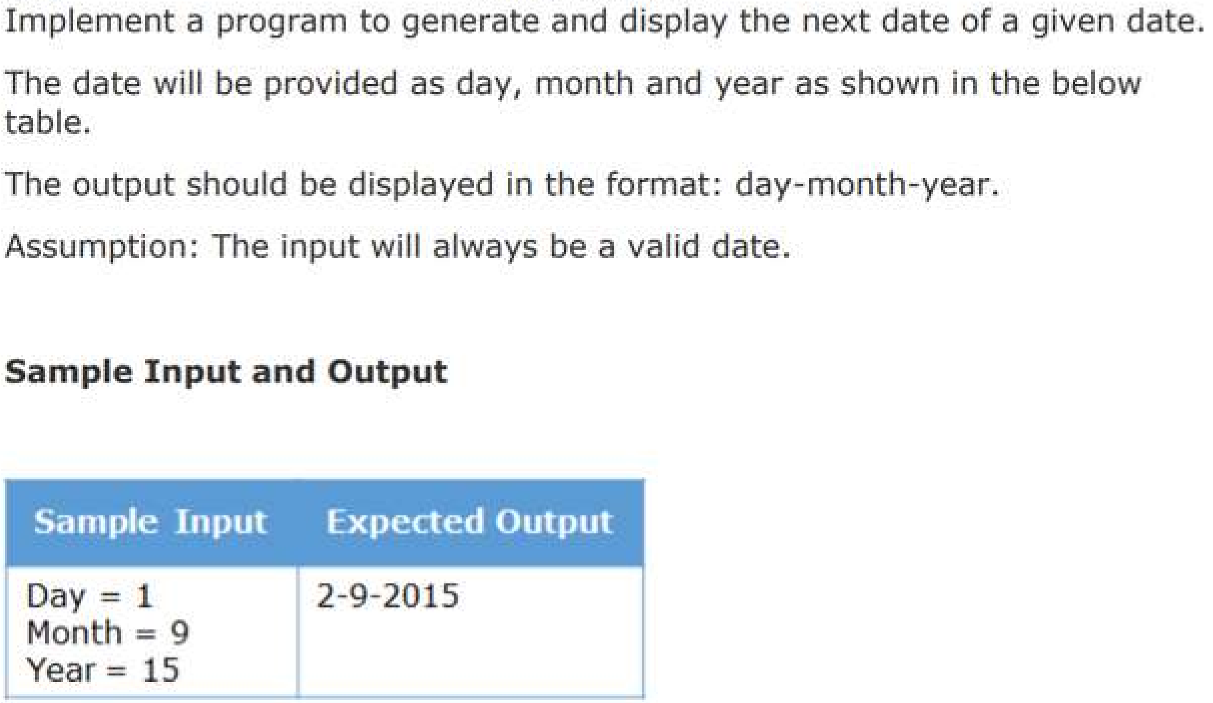
In [8]:

```
def no_of_notes(no_of_five,no_of_one,rupees_to_make):
    if (no_of_five*5+no_of_one) < rupees_to_make:
        print(-1)
    else:
```

```python
        if no_of_five*5 >=rupees_to_make:
            five_needed=rupees_to_make//5
            if rupees_to_make%5 <= no_of_one:
                one_needed=rupees_to_make%5
                print("No. of $1 needed  :", one_needed)
                print("No. of $5 needed :", five_needed)
            else:
                print(-1)
        else:
            five_needed=no_of_five
            if (rupees_to_make-(no_of_five*5))<=no_of_one:
                one_needed=rupees_to_make-(no_of_five*5)
                print("No. of $1 needed  :", one_needed)
                print("No. of $5 needed :", five_needed)
            else:
                print(-1)
no_of_one=int(input("$1 Available : "))
no_of_five=int(input("$5 Available : "))
rupees_to_make=int(input("Purchase Amount: "))
no_of_notes(no_of_five,no_of_one,rupees_to_make)
```

```
$1 Available : 2
$5 Available : 4
Purchase Amount: 21
No. of $1 needed  : 1
No. of $5 needed : 4
```

Q10. Problem Statement



Implement a program to generate and display the next date of a given date.

The date will be provided as day, month and year as shown in the below table.

The output should be displayed in the format: day-month-year.

Assumption: The input will always be a valid date.

Sample Input and Output

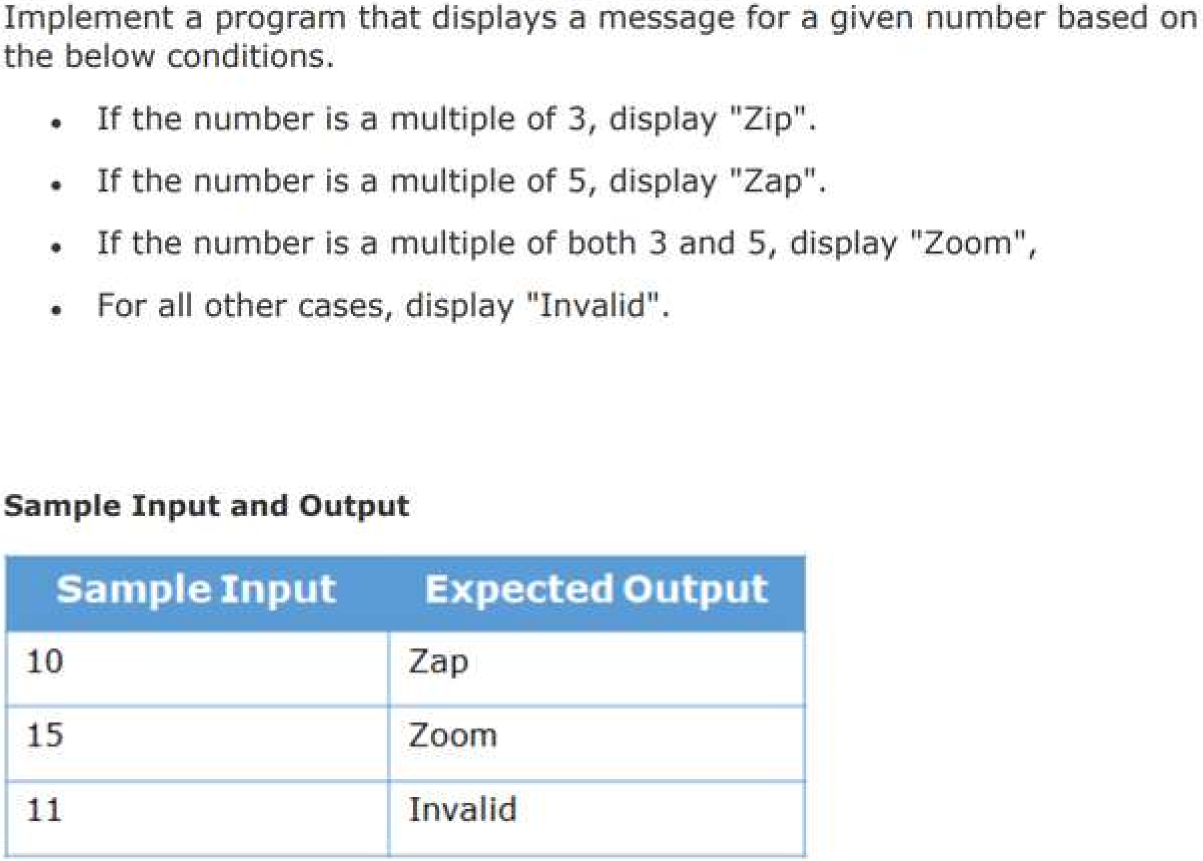
Sample Input	Expected Output

Day = 1
Month = 9
Year = 15
	2-9-2015

```
In [9]: day=int(input("Enter the date : "))
        month=int(input("Enter the month : "))
        year=int(input("Enter the year : "))
        print(f"{day+1}-{month}-{2000+year}")
```

```
Enter the date : 1
Enter the month : 9
Enter the year : 15
2-9-2015
```

Q11. **Problem Statement**



Implement a program that displays a message for a given number based on the below conditions.

- If the number is a multiple of 3, display "Zip".
- If the number is a multiple of 5, display "Zap".
- If the number is a multiple of both 3 and 5, display "Zoom",
- For all other cases, display "Invalid".

Sample Input and Output

Sample Input	Expected Output
10	Zap
15	Zoom
11	Invalid

In [10]:

```
num=int(input("Enter the number : "))
if num%3==0:
    print('Zip')
elif num%5==0:
    print('Zap')
elif num%15==0:
    print('Zoom')
else:
    print('Invalid')
```

```
Enter the number : 15
Zip
```