Name:Vinay Parmar
Enrollment no.:0103AL231226
Batch:5(MTF)-10:30 AM
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```
Conditional statement:


Q.1Write a program to check whether a number is positive, negative, or
zero.
Sol:-    num=int(input("enter the no."))
If num>0:
    print("no. Is Positive")
If num<0:
    print("no. Is Negative")
If num==0:
    print("no. Is zero")
Q.2  Write a program to check whether a number is even or odd.
Sol:-    num=int(input("enter the no."))
If num%2==0:
    print("no. Is Even")
If num%2!=0:
    print("no. Is Odd")
Q.3 Write a program to check if a given year is a leap year or not.
Sol:-   yr=int(Input("Enter the year")):
If  yr%4==0 and yr%100!=0:
    print(f"{yr} is leap year")
elIf yr%400==0:
    print(f"{yr} is leap year")
else:
              print(f"{yr} is non leap year")
Q.4 Write a program to find the greatest of two numbers.
Sol:-   n=int(input("enter the first no."))
    m=int(input("enter the second no."))
If n>m:
    print(f"{n} is greater")
If n<m:
    print(f"{m} Is Greater")
If n=m:
```

```python
    print(f"{n} and {m} are equal")


Q.5 Write a program to check whether a person is eligible to vote (age >= 18).
Sol:-    age = int(input("enter the age"))
    If age>=18:
        print("Person is eligible for vote")
    If age<18:
        print("person is not eligible for vote")
```

Q.6   Write a program to check whether a given character is a vowel or consonant.
```python
Sol:-    ch = input("enter a character from alphabate")
    vwl=["a", 'e', 'i', 'o', 'u']
    ch=ch.lower()
    If ch in vwl :
        print("it is a vowel")
    else:
        print("it is a consonant")
```

Q.7 Write a program to check if a number is divisible by 5.
```python
Sol:-    n = int(input("enter any no."))
    If n%5==0:
        print(f"{n} is divisible by 5")
    else:
        print(f ' {n} is not divisible by 5")
```

Q.8 Write a program to determine whether a given number is a single-digit, two-digit, or more than two-digit number.

```python
Sol:-    n= int (input"enter any no."))
    i=1
    While n!=0:
        n=n//10
        i+=1
    If i<=2:
        print(f"the no. {n} is {i} digit)
    else:
        print(f"the no {n} is more than two digit")
```

Q.9 Write a program to check whether a student has passed or failed (passing marks = 40).
```python
Sol:-    per = int (input("enter the percentage")
```

```python
    If per>=40 and per<=100:
        print("the student is pass")
    Elif per <40 and per>=0:
        print("the student is fail")
    Else:
        print("enter valid percentage")
```

Q.10 Write a program to find whether the entered number is a multiple of both 3 and 7.

```python
Sol:-    n= int (input("enter any no.")
    If n%3==0 and n%7==0:
        print(f"{n} is multiple of 3 and 7")
    Else:
      print("f{n} is not a multiple of 3 or   7")
```

1. Write a program to find the greatest among three numbers.

```python
a1=int(input("enter the numebr: "))
b1=int(input("enter the numebr: "))
c1=int(input("enter the numebr: "))
if a1>b1 and a1>c1:
    print(a1 , "is greater ")
elif b1>a1 and b1 > c1:
    print(b1, "is greater ")
else:
    print(c1 , "is greater")
```

2. Write a program to classify a person based on age: Child (<13), Teenager (13-19), Adult (20-59), Senior (60+).

```python
Age2=int(input("enter the age: "))
if Age2<=13:
    print("child")
elif Age2<=19:
    print("tennager")
elif Age2>=20:
    print("Adult")
else:
```

```python
        print("Senior")




3. Write a program to assign grades based on marks:
90-100: A,
75-89: B,
50-74: C,
35-49: D,
<35: Fail.


Marks3=int(input("enter the marks : "))
if Marks3>=35:
    if Marks3>=50:
        if Marks3>=75:
            if Marks3>=90:
                print("A")
            else:
                print("B")
        else:
            print("C")
    else:
        print("D")
else:
    print("Fail")




4. Write a program to check the type of triangle (equilateral,
isosceles, or scalene) based on sides.

side1=int(input("enter the length of side1: "))
side2=int(input("enter the length of side2: "))
side3=int(input("enter the length of side3: "))
if side1==side2 and side2==side3:
    print("triangle is equilateral triangle")
elif side1==side2 or side1==side3 or side2==side3:
```

```python
        print("triangle is isosceles triangle")
else:
    print("triangle is scalene triangle")
```

5. Write a program to check if a character is uppercase, lowercase, digit, or special symbol.

```python
ch = input("Enter a character: ")

if ch.isupper():
    print(ch, "is an Uppercase Letter.")
elif ch.islower():
    print(ch, "is a Lowercase Letter.")
elif ch.isdigit():
    print(ch, "is a Digit.")
else:
    print(ch, "is a Special Symbol.")
```

6. Write a program to calculate electricity bill based on units:
Up to 100 units: ₹5 per unit,
101-200 units: ₹7 per unit,
Above 200 units: ₹10 per unit.

```python
Unit=int(input("enter your unit:"))
if Unit<=100:
    billamount=Unit*5
elif Unit>100:
    billamount=(Unit-100)*7+100*5
else:
    billamount=(Unit-200)*10+100*5+200*7
print(billamount)
```

```python
7. Write a program to determine the largest of four numbers using
nested if.
a7=int(input("enter the number1: "))
b7=int(input("enter the number2: "))
c7=int(input("enter the number3: "))
d7=int(input("enter the number4: "))
if a7>b7 and a7>c7:
    if a7>d7:
        print("Numeber1","is greater")
    else:
        print("Numeber4","is greater")
elif b7>a7 and b7>c7:
    if b7>d7:
        print("Numeber2","is greater")
    else:
        print("Numeber4","is greater")
else:
    if c7>d7:
        print("Numeber3", "is greater")
    else:
        print("Numeber4", "is greater")




8. Write a program to check if a given year is a century year and
also a leap year.

Year=int(input("enter the number: "))
if Year%4==0:
    if Year%100==0:
        print("Century year")
        if Year%400==0:
            print("Leap Year")
        else:
            print("Not a Leap Year")
    else:
```

```python
        print("Leap Year")
else:
    print("Not a Leap Year")




9. Write a program to classify BMI value: Underweight (<18.5),
Normal (18.5-24.9), Overweight (25-29.9),
Obese (30+).
10. Write a program to display the smallest number among three using
nested if.
a10=int(input("enter the number1: "))
b10=int(input("enter the number2: "))
c10=int(input("enter the number3: "))
d10=int(input("enter the number4: "))
if a10<b10 and a10<c10:
    if a10<d10:
        print("Numeber1","is smaller")
    else:
        print("Numeber4","is smaller")
elif b10<a10 and b10<c10:
     if b10<d10:
        print("Numeber2","is smaller")
     else:
        print("Numeber4","is smaller")
else:
     if c10<d10:
        print("Numeber3", "is smaller")
     else:
        print("Numeber4", "is smaller")
```

For Loop Problems:

1. Write a program using a `for` loop to print all Armstrong numbers between 100 and 999. (Armstrong number: sum of cubes of digits equals the number itself. Example: 153 => $1^3+5^3+3^3$ = 153).

```python
for i in range (100,1000):
    s=str(i)
    i1=int(int(s[0])*3 + int(s[1])3 + int(s[2])*3)
    if i1==i:
        print(i1)
```

2. Write a program to generate and display the first n prime numbers using a `for` loop.
error

```python
import math
n=int(input("enter the number : "))
am=1
for j in range(2,n):
    for i in range(2, int(math.sqrt(j)) + 1):
      if j % i == 0:
          print("it is not a prime no.", j)
          am=0
          continue
      else:
          print("it is prime no ", j )
    if am==1:
        print("it is prime no ", j )
```

3. Write a program to display all numbers from 1 to 500 that are divisible by 3, but the sum of their digits should not exceed 10.

```python
for i in range(0,501,3):
```

```
    w=str(i)
    total3=0
    for j in w:
        total3+=int(j)
    if total3<=10:
        print(i)
```
Q.4 4. Write a program using a for loop to print a pyramid of stars (*) of height n. Example for n=4:

```
   *
  ***
 *****
*******
```

```
Sol:  n = int (input("enter any no.")
      for i in range(1,n+1):
          for j in range(n-i):
              print(" ",end="")
          print()
          for j in range(2*i+1):
              print("*",end="")
          print()
          for j in range(n-i):
              print(" ",end="")
          print()
```
Q.5 Write a program to accept a string and check whether it is a pangram (contains all 26 alphabets at least once) using a for loop.
```
Sol:  s= input("enter a sentence:")
      for i in s:
          if
```
Q.6 Write a program using a for loop to print all twin primes between 1 and 100. (Twin primes: pairs of prime numbers with a difference of 2, e.g., (3,5), (11,13)).
```
Sol:  prime = list()
      for i in range(2,100):
          if i == 2:
              prime.append(2)
          elif:
              n=i/2
```

```python
                count=0
                for j in range(2,n):
                        if i%j==0:
                            count+=1
                if count<1:
                        prime.append(i)
    twin_prime=[]
    for i in range(len(prime)):
        if abs(p[i]-p[i-1])==2:
                    twin_prime.append(i)
                    twin_prime.append(i-1)
    for i in twin_prime:
            print(i)
```

Q.7 Write a program that accepts a number from the user and prints whether it is a Harshad number (number divisible by the sum of its digits) using a for loop.

```python
Sol:  n = int (input("enter a no.:")
      s = str(n)
      Sum = 0
      for i in range(len(s)):
            rem = n%10
            sum+=rem
            num//10
      if n%sum==0:
            print("the given no. is a Harshad number")
      else:
            print("the given no. is not a Harshad number")
```

Q.8 Write a program to generate Pascal's Triangle up to n rows using a for loop.

```python
Sol:  n = int (input("enter any no. for printing pascal's triangle")
      rows = n
      triangle = []
       for i in range(rows):
       row = [1]  # Start each row with 1
       if i > 0:
       for j in range(1, i):
             row.append(triangle[i-1][j-1] + triangle[i-1][j])
        row.append(1)  # End each row with 1
        triangle.append(row)
```

```python
# Print the triangle
    for i in range(rows):
    print(' ' * (rows - i), end='')  # Formatting for triangle
shape
    for num in triangle[i]:
        print(num, end=' ')
    print()
```

Q.9 Write a program using a for loop to display the sum of the series:
1**2 + 2**2 + 3**2 + ... + n**2

```python
Sol:  sum = 0
    for i in range(1,n+1):
        sum += i*i
    print(f"the sum of series is : {sum}")
```

Q.10 Write a program that accepts a number from the user and prints whether it is a Strong number (sum of factorials of digits = number itself) using a for loop. Example: 145 => 1! + 4! + 5! = 145.

```python
Sol:n = int(input("enter a no.: "))
    total = 0
    for ch in str(n):
        digit = int(ch)
        factorial = 1
        for j in range(1, digit + 1):
            factorial *= j
        total += factorial
if total == n:
    print(f'{n} is a strong number')
else:
    print(f'{n} is not a strong number')
```

While Loop:-

Q.11   11. Write a program using a while loop to find the reverse of a number and check if the reversed number is prime. Example: Input = 73 → Reverse = 37 → Prime.

```
Sol:-    n= int (input("enter a no.:"))
      rev=0
while n!=0:
        rem=n%10
        rev=rev*10+rem
        n=n//10
i=rev//2
count=0
while i !=0:
    If rev%i==0:
        count+=1
          i-=1
 If count ==1:
print(f"the reverse number {rev} is prime  ")
        else:
        print(f"the reverse number {rev} is not prime")
```

Q.12 Write a program that continues to accept numbers from the user until the sum of digits of all numbers entered becomes greater than 100.

```
Sol:-    sum= 0
    while sum<=100:
        num  = int (input("enter a number:")
        n=abs(num)
        digits_sum = 0
        while n>0:
            digits_sum += n%10
            n//10
        sum += digits_sum
                    print(f"Sum of digit for {num} is
{digit_sum}. Total sum so far:{sum}")
      print(f"\n the total sum of digits has exceeded 100.
Program terminated.")
```

Q.13 13. Write a program using a while loop to check whether a number is a Duck number (a number containing zero but not starting with zero, e.g., 202, 1203).

```
Sol:-   num = int (input("enter a number:"))
while num!=0:
rem=num%10
If rem==0:
print(f"the given number {num} is Duck no.")
break
        else:
            num//10
    else:
        print(f"given number {num} is not a Duck number")
```

Q.14 Write a program using a while loop to accept a number and check if it is a Happy number. (A number is happy if repeatedly replacing it with the sum of squares of its digits eventually reaches 1). Example: 19 is a happy number.

```
Sol:-   num = int (input("enter a number"))
    If num<=0:
        print(f"{n} is not a Happy Number")
    else:

    seen=set()
    while  num !=1 and num not in seen:
        sum=0
        seen.add(num)
        x=num
    while x>0 :
        rem = x%10
        sum=sum+rem**2
        x//10
    num = sum
If num ==1:
    print("Happy Number")
```

```
        else:
            print("not a Happy Number")


    Q.15 Write a program using a while loop to find the largest
prime factor of a given number.
    Sol:-    n = int (input("enter a number:"))
        If n<=1:
            print(f"No prime factor for {n}
        else:
            num =n
            max_pf =0
            while num%2 ==0:
                max_pf  = 2
                num//=2
            i = 3
            While i*i<=num:
                while num%i ==0:
                    max_pf = i
                    num //=i
                i+=2
            If num>1:
                max_pf = num
                print(f"Largest prime factor of {n} is {max_pf}")


    Q.16 Write a program to repeatedly accept a string from the
user until the string entered is a palindrome.
    Sol:-    while True:
            s = input("Enter a strung")
            If s == s[::-1]:
                print(f"{s} is a palindrome )
                Break
            else:
                print(f"{s} is not a palindrome , Try Again")
    Q.17 Write a program using a while loop to compute the sum of
digits of a number until the result becomes a single-digit number
(Digital root). Example: 9875 => 9+8+7+5=29 => 2+9=11 => 1+1=2.


    Sol:-    n = int (input("enter a no.:"))
        If n<0:
            n=n*(-1)
```

```python
        sum = 0
        while n>10:
            rem = n%10
            sum = sum + rem
            n//10
            If sum<10:
                print ("the sum of the digit of {n}  is single
digit)
                break
            else:
                n=sum
```

Q.18 18. Write a program using a while loop to generate the Collatz sequence for a given number. (Rule: If n is even => n/2, if odd => 3n+1. Continue until n=1).

```python
Sol:-   n = int (input("Enter a number for generating the
collatz sequence:")
        collatz_seq=[n]
        while  n>1:
            If n%2==0:
                n=n/2
                collatz_seq.append(n)
            else:
                n=3*n+1
                collatz_seq.append(n)
```

Q.19Write a program using a while loop to accept a number and check whether it is a Kaprekar number.
(Kaprekar number: if square of the number can be split into two parts whose sum equals the number.
Example: 452=2025 => 20+25=45).

```python
Sol:-   n = int (input("enter a no.:")
        If n< =0:
            print(f"{n} is not a karprekar number")
        else;
            sq = n*n
            s= str(sq)
            pos = 1
            is _karprekar = False
            while pos<=len(s):
```

```python
                left = s[ : -pos]
                right = s[-pos : ]
                left_val = int (left) if left != "" else 0
                right_val = int(right) if right != "" else 0
                If left_val + right_val == n:
                Is_karprekar = True
                break
            pos +=1
        If is_karprekar:
            print(f"{n} is a karprekar no."}
        else:
            print(f" {n} is not a karprekar no.")
```

Q.20 Write a program to simulate an ATM machine using a while loop where a user can:
- Check balance
- Deposit money
- Withdraw money (only if balance is sufficient)
- Exit
Continue until the user chooses to exit.

LearnBitByte

```python
Sol:-  amt = 0
        while True:
            print("Hello!, what you want to do form below operations give  the input according to :\n Check Balance : A \n Deposite Money : B \n Withdraw Money : C \n Exit : D")
            choice=input("Enter Your Choice (A or B or C or D):")

        if choice =="A":
            print(f"YOUR CURRENT BALANCE IS: {amt}")
        elif choice=="B":
            dep = int(input("Enter the Amount which you want to Deposite:")
            amt+=dep
            print(f"{dep} deposited successfully .New balance : {amt}")
        elif  choice=="C":
```

```python
        wid = int (input("Enter the Amount which you want to
Withdraw:")
     If wid<=0:
                        print("Invalid amount please enter a positive
value")
                 elif wid > balance:
                     print("Insufficient Balance! Withdraw failed")
                 else:
                     balance-=wid
                     print(f"{wid} withdraw successfully .New
balance : {balance}")


     elif choice==" D":
         print ("Thank you for using the ATM. Have a Good  Day" )
     else:
         print("Invalid choice ! Please enter b/w (A to D)")
```