```
n=int(input("enter the year:"))
(n%400==0) and (n%100==0):
 print("leap year")
elif(n%4==0)and(n%100!=0):
 print("leap year")
else:
 print("not a leap year")
```

2.
```
r=int(input("enter the radius value:"))
area_circle=3.14*r*r
print("Area of circle:",area_circle)
base=int(input("enter the base of the triangle:"))
height=int(input("enter the height of the triangle:"))
area_triangle=0.5*base*height
print("Area of triangle:", area_triangle)
```

3.
```
p=int(input("enter the principle amount:"))
r=int(input("enter the rate:"))
t=int(input("enter the time:"))
simple=int(p*(r/100)*t)
compound=round((p*(1+r/100)**t)-p)
print("simple:",simple)
print("compound:", compound)
```

4.
```
n=int(input("enter the number:"))
if(n%2==0):
 print("even number")
else:
 print("odd number")
```

5.
```
n=int(input("enter n: "))
if n>0:
 print("positive")
else:
 print("negative")
```

6. binary=input("enter a binary number:")

decimal=int(binary,2)

octal=oct(decimal)

print("decimal:",decimal)

print("octal:",octal)

7. n=int(input("enter the marks"))

if n>=90:

  print("the grade A")

elif n>=80:

  print("the grade B")

elif n>=70:

  print("the grade C")

elif n>=60:

  print("the grade D")

else:

  print("fail")

8. import itertools

n=input("enter the number:")

res=list(itertools.permutations(n))

for i in res:

print(''.join(i))

9.PRINT SUM OF SERIES

 n=int(input("enter the number:"))

sum=0

for i in range(n+1):

 sum+=i

print("sum is:", sum)

10. SUM OF SQUARES

n=int(input("enter the number:"))

sum=0

for i in range(n+1):

```
sum+=i**2
print("sum:" , sum)
```

11. FACTORIAL

```
n=int(input("enter the number:"))
fact=1
for i in range(1, n+1):
fact*=i
print("factorial:",fact)
```

12. SUM OF THE SERIES

```
n=int(input("enter the number:"))
fac=1
sum=0
for i in range(1, n+1):
fac*=i
sum+=fac
print("factorial sum:",sum)
```

13.PRINT PATTERN

```
n=int(input("enter the number:"))
fact=1
for i in range(1, n+1):
fact*=i
print("factorial:",fact)
```

14.PRINT PATTERN

```
rows = int(input("Enter the number of rows: "))
for i in range(1, rows + 1):
 for j in range(1, i + 1):
 print("+", end=" ")
 print()
```

15.FIBONACCI SERIES

```
n=int(input("enter a number"))
first=0
```

```
second=1
print("fibanocci sequence:")
for i in range(n):
 print(first,end=' ')
 first,second=second,first+second
```

16.ADDITION OF TWO NUMBERS

```
a= [[1,2], [3,4]]
b= [[5,6], [7,8]]
res= [[0,0], [0,0]]
for i in range(len(a)):
 for j in range (len (a)):
 res[i][j] =a[i][j]+b[i][j]
print ("sum:", res)
```

17.MULTLIPLICATION OF TWO MATRIX

```
a= [[1,2], [4,1]]
b= [[5,6], [7,8]]
res= [[0,0], [0,0]]
for i in range(len(a)):
 for j in range (len(b)):
 for k in range (len(res)):
 res[i][j]+=a[i][k]*b[k][j]
print ("product matrix:", res)
```

18.TRANSPOSE A MATRIX

```
a= [[1,2], [3,4]]
res= [[0,0], [0,0]]
for i in range(len(a)):
for j in range (len (res)):
 res[i][j] =a[j][i]
print ("Transpose matrix:", res)
```

19.PERFORM LIST OPERATIONS

```
a=[5,9,3,4,1,6]
```

```
print ("sort:",sorted(a) )
print("reverse:", a[::-1])
print("max:", max(a))
print("min:",min(a))
print("length:",len(a))
```

20.COUNT THE NUMBER OF OCCURANCE

```
a=[1,2,3,3,4,5,5]
n=int(input("Enter the value to count the occurance"))
count=0
for i in a:
 if i==n:
 count=count+1
print(count)
```

21.INDEX OF AN ELEMENT

```
a=[1,2,3,4,5,6]
n=int(input("enter an element to find its index value:"))
for i in range(len(a)):
if n==a[i]:
 print(i)
```

22.ODD OR EVEN

```
a=[1,2,4,3]
even=[]
odd=[]
for i in a:
 if i%2==0:
 even.append(i)
 else:
 odd.append(i)
print("odd: ",odd)
print("even:",even)
```

23.DUPLICATE IN ARRAY

```
a=[1,2,2,3,4,5,5,6]
v=[]
for i in range(len(a)):
for j in range(len(a)):
 if i!=j:
 if a[i]==a[j]:
 if a[i] in v:
 break
else:
 v.append(a[i])
print("duplicate elements are:",v)
```

24.MULTLIPLICATION TABLE

```
n=int(input("enter n: "))
for i in range(1,11):
print(i,"*",n,"=",n*i)
```

25.VOWELS AND CONSONANTS IN A STRING

```
a=input("enter a string: ")
b="aeiouAEIOU"
vow=0
const=0
space=0
for i in a:
 if i in b:
 vow+=1
 elif i.isspace():
 space+=1
 else:
 const+=1
print("no of vowels:",vow)
print("no. of consonants:",const)
```

26.STRING OPERATIONS

```
#concatination
a="hello"
b="world"
c= a+b
print(c)
#reverse
c=c[::-1]
print(c)
#length
length=len(c)
print("length:",length)
#slice
d=c[::2]
print(d)
```

27.SUBSTRING

```
a=input("enter string: ")
b=input("enter substring: ")
if b in a:
print("yes it is a substring")
else:
print("not a substring")
```

28.UPPERCASE AND LOWERCASE

```
a=input("enter string:")
print("uppercase:",a.upper())
print("lowercase:",a.lower())
```

29.PALINDROME

```
a=input("enter string:")
b=a[::-1]
if a==b:
print("palindrome")
else:
```

```
print("not a palindrome")
```

30.NO OF WORDS IN A STRING

```
n=input("enter string: ")
b=n.split()
print(b)
print("no of words:",len(b))
```

31.PERFECT NUMBER

```
n = int(input("Enter any Number: "))
Sum = 0
for i in range(1, n):
if(n% i == 0):
 Sum = Sum + i
if (Sum == n):
print("Perfect Number")
else:
print(" not a Perfect Number" )
```

32.ARMSTRONG

```
n=int(input("enter n: "))
a=[int(i) for i in str(n)]
sum=0
for i in a:
sum+=i**3
if sum==n:
print("amstrong number")
else:
print("not a amstrong number")
```

33.PRIME OR NOT

```
n=int(input("enter n:"))
flag=0
for i in range(2,n):
if n%i==0:
```

```
 print("non prime")
 break
else:
 print("prime")
```

34.COMPOSITE OR NOT

```
n=int(input("enter n:"))
flag=0
for i in range(2,n):
if n%i==0:
 print("composite")
 break
else:
 print("non composite")
```

35.HARSHAD NUMBER

```
num=int(input("Enter the number:"))
Sum=0
temp=num
while temp>0:
 digit=temp%10
 Sum+=digit
 temp=temp//10
if num%Sum==0:
print("Harshad Number")
else:
print("Not a Harshad Number")
```

36.MEAN MEDIAN MODE

```
import statistics
a=[1,2,3,4,5,5]
mean=statistics.mean(a)
print(mean)
median=statistics.median(a)
```

```
print(median)
mode=statistics.mode(a)
print(mode
```

37. LCM GCD

```
import math
a=int(input("Enter the a value"))
b=int(input("Enter the b value"))
c=math.lcm(a,b)
d=math.gcd(a,b)
print("LCM value=",c)
print("GCD value=",d)
```

38.BONUS SALARY

```
grade=input("enter the grade of the employee:")
salary=float(input("enter the employee salary"))
bonus=0
if grade=='A':
   bonus=salary*0.05
elif grade=='B':
   bonus==salary*0.1
if salary<10000:
   bonus+=salary*0.02
total_salary=salary+bonus
print("salary=",salary)
print("bonus=",bonus)
print("total to be paid:",total_salary)
```

39.HALLOW SQUARE

```
num=int(input("enter number"))
for i in range(0,num):
   for j in range(0,num):
      if i==0 or j==0 or j==num-1 or i==num-1:
         print("$",end="")
```

```
        else:
            print(" ",end="")
    print()
```

40.HAPPY NUMBER

```
n=int(input("enter the number:"))
sum=0
rem=0
while(n>0):
    rem=n%10
    sum=sum+rem*rem
    n=n//10
if (sum==1):
    print("n is happy number")
else:
    print("n is not a happy number")
```

41.ARMSTRONG

```
num=int(input("enter the number"))
sum=0
temp= num
while temp>0:
    digit=temp%10
    sum+=digit**3
    temp=temp//10
if num==sum:
    print("armstrong number",num)
else:
    print("not a armstrong number",num)
```

42.ISOMERPHIC

```
def is_isomorphic(s, t):
    return len(set(zip(s, t))) == len(set(s)) == len(set(t))
```

```
# Example usage
s = "egg"
t = "add"
print(is_isomorphic(s, t))  # Output: True
```

43.PYTHROGREAN

```
Import math
p=int(input(“enter the number”))
q=int(input(“enter the number”))
a=p*p
b=q*q
c=a+b
r=math.sqrt©
print(c)
```

44.TECH OR NOT

```
def is_tech_number(n):
    s = str(n)
    if len(s) % 2 == 0:
        half = len(s) // 2
        return (int(s[:half]) + int(s[half:])) ** 2 == n
    return False

# Example usage
n = 2025
print(is_tech_number(n))  # Output: True
```

45.SIMPLE INTEREST

```
def simple_interest(p, t, senior):
    rate = 15 if senior else 12
    return (p * rate * t) / 100
print(simple_interest(10000, 5, True))
print(simple_interest(10000, 5, False))
```

46.BINARY STRING

```
def add_binary(a, b):
    return bin(int(a, 2) + int(b, 2))[2:]
a = "101"
b = "110"
print(add_binary(a, b))  # Output: "1011"
```

47. GREATEST BINARY

```
def greatest_binary(a, b, c):
    return bin(max(int(a, 2), int(b, 2), int(c, 2)))[2:]

# Example usage
print(greatest_binary("101", "110", "111"))  # Output: "111"
```

48.REVERSE NUMBER

```
def arrange_letters(word):
    return ''.join(sorted(word)), ''.join(sorted(word, reverse=True))
print(arrange_letters("python"))  # Output: ('hnopty', 'ytponh')
```