

## **TYPE-C:FLOW OF CONTROL:CH-9**

- 1) Write a Python script that asks the user to enter a length in centimetres. If the user enters a negative length, the program should tell the user that the entry is invalid. Otherwise, the program should convert the length to inches and print out the result. There are 2.54 centimetres in an inch.

**sol:**

```
l=int(input('enter the lenght in cm:'))
if l<0:
    print('enter the valid length')
else:
    inch=l/2.54
    print('the value in inch is:',inch,'inch')
```

**output:**

```
enter the lenght in cm:166
the value in inch is: 65.35433070866142 inch
```

- 2) A store charges ₹120 per item if you buy less than 10 items. If you buy between 10 and 99 items, the cost is ₹100 per item. If you buy 100 or more items, the cost is ₹70 per item. Write a program that asks the user how many items they are buying and prints the total cost.

**sol:**

```
n=int(input('enter the no.of item:'))
if n<10:
    print('the total cost is:',n*120)
if n>10:
    if n >=100:
        print('the total cost is:',n*70)
    else:
        print('the total cost is:',n*100)
```

**output:**

```
enter the no.of item:55
the total cost is: 5500
```

- 3) Write a program that reads from user — (i) an hour between 1 to 12 and (ii) number of hours ahead. The program should then print the time after those many hours, e.g.,

Enter hour between 1-12 : 9

How many hours ahead : 4

Time at that time would be : 1 O'clock

**sol:**

```
hr = int(input("Enter hour between 1-12 : "))
n = int(input("How many hours ahead : "))
s = hr + n
if s > 12:
```

```
s = 12
print("Time at that time would be : ", s, "O'clock")
```

output:

```
Enter hour between 1-12 : 9
How many hours ahead : 4
Time at that time would be : 1 O'clock
```

- 4) Write a program that asks the user for two numbers and prints Close if the numbers are within .001 of each other and Not close otherwise.

sol:

```
a=float(input('enter the number a:'))
b=float(input('enter the number b:'))
if a<b:
    d=b-a
    if d<=0.001:
        print('close')
    else:
        print('not close')
else:
    print('enter number such that b should be greater')
```

output:

```
enter the number a:2
enter the number b:2.98
not close
```

- 5) A year is a leap year if it is divisible by 4, except that years divisible by 100 are not leap years unless they are also divisible by 400. Write a program that asks the user for a year and prints out whether it is a leap year or not.

sol:

```
year=int(input('enter the year:'))
if year % 400 == 0 :
    print(year, "is a Leap Year")
elif year % 100 == 0 :
    print(year, "is not a Leap Year")
elif year % 4 == 0 :
    print(year, "is a Leap Year")
else :
    print(year, "is not a Leap Year")
```

output:

```
enter the year:2024
2024 is a Leap Year
```

- 6) Write a program to input length of three sides of a triangle. Then check if these sides will form a triangle or not.

(Rule is:  $a+b>c; b+c>a; c+a>b$ )

sol:

```

a=int(input('enter side 1:'))
b=int(input('enter side 2:'))
c=int(input('enter side 3:'))
if a+b>c and b+c>a and c+a>b:
    print('triangle is possible')
else:
    print('triangle is not possible')

```

output:

```

enter side 1:6
enter side 2:6
enter side 3:6
triangle is possible

```

7) Write a short program to input a digit and print it in words.

sol:

```

n = int(input("Enter a digit(0-9): "))
if n == 0 :
    print("Zero")
elif n == 1 :
    print("One")
elif n == 2 :
    print("Two")
elif n == 3 :
    print("Three")
elif n == 4 :
    print("Four")
elif n == 5 :
    print("Five")
elif n == 6 :
    print("Six")
elif n == 7 :
    print("Seven")
elif n == 8 :
    print("Eight")
elif n == 9 :
    print("Nine")
else :
    print("Invalid Digit")

```

output:

```

Enter a digit(0-9): 6
Six

```

8) Write a short program to check whether square root of a number is prime or not.

sol:

```

n = int(input("Enter a number: "))
import math
b=0

```

```

a=math.sqrt(n)
for i in range(2,int(a+1)):
    if a%i==0:
        b+=1
    if b>1:
        print('it is not a prime num')
    else:
        print('it is a prime number')

```

output:

```

Enter a number: 49
it is a prime number

```

9) Write a short program to print first n odd numbers in descending order.

sol:

```

n=int(input('enter the maximum value:'))
if n%2==0:
    for i in range(n-1,0,-2):
        print(i)
if n%2!=0:
    for i in range(n,0,-2):
        print(i)

```

output:

```

enter the maximum value:12
11
9
7
5
3
1

```

10)

a) 1 4 7 10 ..... 40.

sol:

```

for i in range(1, 41, 3) :
    print(i, end = ' ')

```

output:

```

1 4 7 10 13 16 19 22 25 28 31 34 37 40

```

b) 1 -4 7 -10 ..... -40

sol:

```

x = 1
for i in range(1, 41, 3) :
    print(i * x, end = ' ')
    x *= -1

```

output:

```

1 -4 7 -10 13 -16 19 -22 25 -28 31 -34 37 -40

```

11) Write a short program to find average of list of numbers entered through keyboard.

```
sol:
c=0
n=int(input('enter no.of numbers:'))
for i in range(n):
    num=int(input('enter the num:'))
    c=c+num
average=c/n
print('the average of the given numbers is:',average)
```

output:

```
enter no.of numbers:5
enter the num:10
enter the num:20
enter the num:30
enter the num:40
enter the num:50
the average of the given numbers is: 30.0
```

12) Write a program to input 3 sides of a triangle and print whether it is an equilateral, scalene or isosceles triangle

```
sol:
a=float(input('enter side 1:'))
b=float(input('enter side 2:'))
c=float(input('enter side 3:'))
if a==b and b==c:
    print('its an equilateral triangle')
if a!=b and b!=c and a!=c:
    print('scalene triangle')
else:
    print('isocelese triangle')
output:
enter side 1:10
enter side 2:20
enter side 3:30
scalene triangle
```

13) Write a program to take an integer a as an input and check whether it ends with 4 or 8. If it ends with 4, print "ends with 4", if it ends with 8, print "ends with 8", otherwise print "ends with neither".

```
sol:
a=int(input('enter the integer:'))
b=a%10
if b==4:
    print('ends with four')
elif b==8:
    print('ends with eight')
else:
```

```

    print('ends with neighbor')
output:
    enter the integer:568
    ends with eight

```

- 14) Write a program to take N ( $N > 20$ ) as an input from the user. Print numbers from 11 to N. When the number is a multiple of 3, print "Tipsy", when it is a multiple of 7, print "Topsy". When it is a multiple of both, print "TipsyTopsy".

sol:

```

n=int(input('enter the integer greater than 20:'))
if n<=20:
    print('enter number greater than 20')
else:
    for i in range(11,n+1):
        print(i)
        if i%3==0:
            print('tipsy')
        if i%7==0:
            print('topsy')
        if i%3==0 and i%7==0:
            print('tipsy topsy')

```

output:

enter the integer greater than 20:21

```

11
12
tipsy
13
14
topsy
15
tipsy
16
17
18
tipsy
19
20
21
tipsy
topsy
tipsy topsy

```

- 15) Write a short program to find largest number of a list of numbers entered through keyboard.

sol:

```

s=0
n=int(input('enter the total no.of numbers:'))
for i in range(n):
    l=int(input('enter the num:'))
    if l>s:

```

```
s=1
big=
print('the largest is:',big)
```

output:

```
enter the total no.of numbers:5
enter the num:45
enter the num:25
enter the num:85
enter the num:65
enter the num:45
the largest is: 85
```

16) Write a program to input N numbers and then print the second largest number.

sol:

```
s=0
n=int(input('enter the total no.of numbers:'))
for i in range(n):
    l=int(input('enter the num:'))
    if l>s:
        sb=s
        s=l
        big=l
print('the second largest is:',sb)
```

output:

```
enter the total no.of numbers:5
enter the num:85
enter the num:45
enter the num:65
enter the num:92
enter the num:12
the second largest is: 85
```

17) Given a list of integers, write a program to find those which are palindromes. For example, the number 4321234 is a palindrome as it reads the same from left to right and from right to left.

sol:

```
n=input('enter the number to check:')
a=n[::-1]
if n==a:
    print(n,'is a palindrom')
else:
    print(n,'is not a palindrom')
```

output:

```
enter the number to check:636
636 is a palindrome
```

18) Write a complete Python program to do the following :

- (i) read an integer X.
- (ii) determine the number of digits n in X.
- (iii) form an integer Y that has the number of digits n at ten's place and the most significant digit of X at one's place.
- (iv) Output Y.  
(For example, if X is equal to 2134, then Y should be 42 as there are 4 digits and the most significant number is 2).

sol:

```
x=input('enter the number:')
c=0
for i in (x):
    c+=1
print('length of the number is:',c)
a=x[0]
d=str(c)+a
y=int(d)
print(y)
```

output:

```
enter the number:2134
length of the number is: 4
42
```

- 19) Write a Python program to print every integer between 1 and n divisible by m. Also report whether the number that is divisible by m is even or odd.

sol:

```
m = int(input("Enter m: "))
n = int(input("Enter n: "))
for i in range(1, n) :
    if i % m == 0 :
        print(i, "is divisible by", m)
        if i % 2 == 0 :
            print(i, "is even")
        else :
            print(i, "is odd")
```

output:

```
Enter m: 5
Enter n: 25
5 is divisible by 5
5 is odd
10 is divisible by 5
10 is even
15 is divisible by 5
15 is odd
20 is divisible by 5
20 is even
```

20)

a) Write Python programs to sum the given sequences:

 $2/9 - 5/13 + 8/17 \dots \dots \text{ (print 7 terms)}$ 

sol:

```

n = 2
d = 9
m = 1
sum = 0
for i in range(7):
    t = n / d
    sum += t * m
    n += 3
    d += 4
    m *= -1
print("Sum =", sum)

```

output:

```
Sum = 0.3642392586003134
```

b) Write Python programs to sum the given sequences:

 $12 + 32 + 52 + \dots + n^2 \text{ (Input } n\text{)}$ 

sol:

```

n=int(input('enter the maximum value:'))
sum=0
for i in range(1,n+1,2):
    a=i**2
    sum+=a
print('sum is:',sum)

```

output:

```
enter the maximum value:11
sum is: 286
```

21) Write a Python program to sum the sequence:

 $1 + 1/1! + 1/2! + 1/3! + \dots + 1/n! \text{ (Input } n\text{)}$ 

sol:

```

n=int(input('enter the maximum value of sequence:'))
sum=0
for i in range(n+1):
    f=1
    for j in range(1,i):
        f*=j
    t=1/f
    sum+=t
print('the sum is:',sum)

```

output:

enter the maximum value of sequence:5  
 the sum is: 3.708333333333333

22) Write a program to accept the age of n employees and count the number of persons in the following age group:

- (i) 26 - 35
- (ii) 36 - 45
- (iii) 46 - 55

sol:

```
n=int(input('total number of employee:'))
c1=c2=c3=c4=0
for i in range(n):
    age=int(input('enter the age:'))
    if age>=26 and age<=35:
        c1+=1
    elif age>=36 and age<=45:
        c2+=1
    elif age>=46 and age<=55:
        c3+=1
    else:
        c4+=1
print(c1,'employees are in the age of 26-35')
print(c2,'employees are in the age of 36-45')
print(c3,'employees are in the age of 46-55')
print(c4,'employees are not in the age category')
```

output:

```
total number of employee:7
enter the age:45
enter the age:65
enter the age:49
enter the age:28
enter the age:14
enter the age:62
enter the age:55
1 employees are in the age of 26-35
1 employees are in the age of 36-45
2 employees are in the age of 46-55
3 employees are not in the age category
```

23)

a) Write programs to find the sum of the following series:

$$x - \frac{x^2}{2!} + \frac{x^3}{3!} - \frac{x^4}{4!} + \frac{x^5}{5!} - \frac{x^6}{6!} \quad (\text{Input } x)$$

sol:

```

x=int(input('enter the maximum value:'))
sum=0
n=1
for i in range(1,7):
    f=1
    for j in range(1,i+1):
        f*=j
        t=x**i/f
        sum+=t*n
        n=n * -1
print('sum=',sum)

```

output:

```

enter the maximum value:4
sum= -1.155555555555556

```

b) Write programs to find the sum of the following series:

$x + x^2/2 + x^3/3 + \dots + x^n/n$  (Input x and n both)

sol:

```

x=int(input('enter the value x:'))
n=int(input('enter the value n:'))
sum=0
for i in range(1,n+1):
    t=x**i/i
    sum+=t
print('sum is',sum)

```

output:

```

enter the value x:5
enter the value n:2
sum is 17.5

```

24)

a) Write programs to print the following shapes:

```

*
* *
* * *
* *
*

```

sol:

```

n=3
for i in range(3):
    for k in range(n-i-1):
        print(' ',end="")
    for j in range(i+1):
        print('* ',end="")
    print()

```

```

n=2
for i in range(2):
    for k in range(i):
        print(' ',end="")
    for j in range(n-i):
        print('* ',end="")
    print()

```

output:

```

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

b) Write programs to print the following shapes:

```

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

sol:

```

for i in range(1,4):
    print('* '*i,end="")
    print()
for j in range(2,0,-1):
    print('* '*j,end="")
    print()

```

output:

```

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

c) Write programs to print the following shapes:

```

*
* *
* *
* *
*
```

```

sol:
for i in range(1,6):
    for j in range(1,6):
        if i+j==4 or i-j==2 or j-i==2 or j+i==8:
            print('*',end="")
        else:
            print(end=' ')
print()

```

output:

```

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

d) Write programs to print the following shapes:

```

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

sol:

```

for i in range(7):
    for j in range(4):
        if i+j==6 or j-i==0 or j==0:
            print('* ',end="")
        else:
            print(end=' ')
print()

```

output:

```

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

25)

a) Write programs using nested loops to produce the following patterns:

```

A
AB
ABC
```

A B C D  
A B C D E  
A B C D E F

**sol:**

```
n = 6
for i in range(n) :
    t = 65
    for j in range(i + 1) :
        print(chr(t), end = ' ')
        t += 1
    print()
```

**output:**

A  
A B  
A B C  
A B C D  
A B C D E  
A B C D E F

b) Write programs using nested loops to produce the following patterns:

A  
B B  
C C C  
D D D D  
E E E E E

**sol:**

```
n = 5
t = 65
for i in range(n) :
    for j in range(i + 1) :
        print(chr(t), end = ' ')
        t += 1
    print()
```

**output:**

A  
B B  
C C C  
D D D D  
E E E E E

c) Write programs using nested loops to produce the following patterns:

0  
2 2  
4 4 4  
6 6 6 6

8 8 8 8 8

sol:

```
for i in range(0, 10, 2):
    for j in range(0, i + 1, 2):
        print(i, end = ' ')
    print()
```

output:

0  
2 2  
4 4 4  
6 6 6 6  
8 8 8 8 8

d) Write programs using nested loops to produce the following patterns:

2  
4 4  
6 6 6  
8 8 8 8

sol:

```
for i in range(2, 10, 2):
    for j in range(2, i + 1, 2):
        print(i, end = ' ')
    print()
```

output:

2  
4 4  
6 6 6  
8 8 8 8

26) Write a program using nested loops to produce a rectangle of \*'s with 6 rows and 20 \*'s per row

sol:

```
for i in range(6):
    for j in range(20):
        print('*', end = '')
    print()
```

output:

\*\*\*\*\*  
\*\*\*\*\*  
\*\*\*\*\*  
\*\*\*\*\*  
\*\*\*\*\*  
\*\*\*\*\*

- 27) Given three numbers A, B and C, write a program to write their values in an ascending order. For example, if A = 12, B = 10, and C = 15, your program should print out:

Smallest number = 10  
 Next higher number = 12  
 Highest number = 15

sol:

```
a=int(input('enter the num1:'))
b=int(input('enter the num2:'))
c=int(input('enter the num3:'))
if a>b and a>c:
    print(a,'is greater')
    if b>c:
        print(c,'is smaller')
        print(b,'is second biggest')
    if c>b:
        print(b,'is smaller')
        print(c,'is second biggest')
if b>a and b>c:
    print(b,'is greater')
    if a>c:
        print(c,'is smaller')
        print(a,'is second biggest')
    if c>a:
        print(a,'is smaller')
        print(c,'is second biggest')
if c>b and c>a:
    print(c,'is greater')
    if b>a:
        print(a,'is smaller')
        print(b,'is second biggest')
    if a>b:
        print(b,'is smaller')
        print(a,'is second biggest')
```

output:

```
enter the num1:85
enter the num2:44
enter the num3:23
85 is greater
23 is smaller
44 is second biggest
```

- 28) Write a Python script to input temperature. Then ask them what units, Celsius or Fahrenheit, the temperature is in. Your program should convert the temperature to the other unit. The conversions are:

$$F = \frac{9}{5}C + 32 \text{ and } C = \frac{5}{9}(F - 32).$$

sol:

```
temp=float(input('enter the temperature:'))
```

```

n=input('farenheit or celcius:')
if n=='celsius':
    f=(9/5*temp)+32
    print(f,'farenheit')
if n=='farenheit':
    c=5/9*(temp*32)
    print(c,'celsius')

```

output:

```

enter the temperature:48.76
farenheit or celcius:celsius
119.768 farenheit

```

- 29) Ask the user to enter a temperature in Celsius. The program should print a message based on the temperature:

If the temperature is less than -273.15, print that the temperature is invalid because it is below absolute zero.  
If it is exactly -273.15, print that the temperature is absolute 0.  
If the temperature is between -273.15 and 0, print that the temperature is below freezing.  
If it is 0, print that the temperature is at the freezing point.  
If it is between 0 and 100, print that the temperature is in the normal range.  
If it is 100, print that the temperature is at the boiling point.  
If it is above 100, print that the temperature is above the boiling point.

sol:

```

temp = float(input("Enter Temperature in Celsius: "))
if temp < -273.15 :
    print("Temperature is invalid as it is below absolute zero")
elif temp == -273.15 :
    print("Temperature is absolute zero")
elif -273.15 <= temp < 0:
    print("Temperature is below freezing")
elif temp == 0 :
    print("Temperature is at the freezing point")
elif 0 < temp < 100:
    print("Temperature is in the normal range")
elif temp == 100 :
    print("Temperature is at the boiling point")
else :
    print("Temperature is above the boiling point")

```

output:

```

Enter Temperature in Celsius: 92.6
Temperature is in the normal range

```