

**SIKSHA 'O' ANUSANDHAN**  
**DEEMED TO BE UNIVERSITY**

Admission Batch:

Session:

**Laboratory Record**

**Programming in Python (CSE 3142)**

**Submitted by**

Name: Saswati Mohanty

Registration No.: 1941012407

Branch: Computer Science and Engineering

Semester: 5<sup>th</sup> Section: D



**Department of Computer Science & Engineering**

**Faculty of Engineering & Technology (ITER)**

Jagamohan Nagar, Jagamara, Bhubaneswar, Odisha - 751030

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Minor Assignment - 3

control structures

Q1) Write an assignment statement using a single conditional expression for the following if-else code:

if marks  $\geq 70$ :

    remarks = 'good'

else:

    remarks = 'average'

Program :-

```
marks = int(input("Enter the marks → "))  
print({True: "good", False: "average"}[marks  $\geq 70$ ])
```

Output :-

Enter the marks → 71

good.

Q2) Study the program segments given below. In each case, give the output produced, if any.

a) total = 0

count = 20

    while count  $> 5$ :

        total += count

        count -= 1

    print(total)

b) total = 0

N = 5

for i in range(1, N+1):

    for j in range(1, i+1):

        total += 1

print(total)

c) total = 0

N = 10

for i in range (1, N+1):  
    for j in range (1, i+1):

        total += 1

print (total)

d) total = 0

N = 5

for i in range (1, N+1):

    for j in range (1, i+1):

        total += 1

    total -= 1

print (total)

e) total = 0

N = 5

for i in range (1, N+1):

    for j in range (1, N+1):

        total += i

print (total)

f) total = 0

N = 5

for i in range (1, N+1):

    for j in range (1, i+1):

        total += j

print (total)

g) total = 0

N = 5

for i in range (1, N+1):

    for j in range (1, N+1):

        total += i+j

print (total).

h) total = 0

N = 5

Name: Basawat Mohanty

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```
for l in range (1, N+1):  
    for j in range (1, i+1):  
        for k in range (1, j+1):  
            total += 1  
print (total)
```

i) number = 72958476

a, b = 0, 0

```
while (number > 0):  
    digit = number % 10  
    if (digit % 2 != 0):  
        a += digit  
    else:  
        b += digit  
    number /= 10  
print (a, b)
```

Program :-

```
#a  
total = 0  
count = 20  
while (count > 5):  
    total += count  
    count -= 1  
print (total)
```

```
#b  
total = 0  
N = 5  
for i in range (1, N+1):  
    for j in range (1, i+1):  
        total += 1  
print (total)
```

```
#c  
total = 0  
N = 10
```

```
for i in range (1, N+1):
    for j in range (1, i+1):
        total += 1
print (total)
```

#d

```
total = 0
N = 5
for i in range (1, N+1):
    for j in range (1, i+1):
        total += 1
    total -= 1
print (total)
```

#e

```
total = 0
N = 5
for i in range (1, N+1):
    for j in range (1, N+1):
        total += i
print (total)
```

#f

```
total = 0
N = 5
for i in range (1, N+1):
    for j in range (1, i+1):
        total += j
print (total)
```

#g

```
total = 0
N = 5
for i in range (1, N+1):
```

Name: Saswati Mohanty

```
for j in range (1, N+1):  
    total += i + j  
print (total)
```

```
# h  
total = 0  
N = 5  
for i in range (1, N+1):  
    for j in range (1, i+1):  
        for k in range (1, j+1):  
            total += 1  
print (total)
```

```
# i  
number = 72958476  
a, b = 0, 0  
while (number > 0):  
    digit = number % 10  
    if (digit % 2 == 0):  
        a += digit  
    else:  
        b += digit  
    number /= 10  
print (a, b)
```

Output :-

15  
55  
10  
75  
35  
150  
35  
47. 33333332964336

Q3) Write a function to determine whether a given natural number is a perfect number. A natural number is said to be a perfect number if it is the sum of its divisors. For example, 6 is a perfect number because  $6 = 1+2+3$ , but 15 is not a perfect number because  $15 \neq 1+3+5$ .

Program :-

```
def isPerfect(n):  
    sum = 1  
    i = 2  
    while i * i <= n:  
        if n % i == 0:  
            sum = sum + i + n/i  
        i += 1  
    return (True if sum == n and n != 1 else False)  
n = int(input("Enter any number"))  
if isPerfect(n):  
    print(n, "is a perfect number")  
else:  
    print(n, "is not a perfect number")
```

Output :-

Enter any number : 6  
6 is a perfect number

Q4) Write a function that takes two numbers as inputs parameters and returns their least common multiple.

Program :-

```
def lcm(m, n):  
    if m > n:  
        temp = m  
    else:  
        temp = n
```

```
while (True):  
    if ((temp % m == 0) and (temp % n == 0)):  
        lcm = temp  
        break  
    temp += 1  
return lcm
```

```
m = int(input("Enter number m: "))  
n = int(input("Enter number n: "))  
print("The L.C.M. is ", lcm(m, n))
```

Output :-

```
Enter number m: 4  
Enter number n: 8  
L.C.M. is 8
```

Q5) Write a function that takes two numbers as input parameters and returns their greatest common divisor.

Program :-

```
def gcd(m, n):  
    if (m == 0):  
        return n  
    if (n == 0):  
        return m  
    if (m == n):  
        return m  
    if (m > n):  
        return gcd(m-n, n)  
    return gcd(m, n-m)  
m = int(input("Enter number m: "))  
n = int(input("Enter number n: "))  
print("The G.C.D. is ", gcd(m, n))
```

Output :-

```
Enter number m: 5
```

Enter number n: 15

The G.C.D. is 5

Q6) write a function that accepts as an input parameter the number of rows to be printed and prints a figure like:

a) 1

```

1 2
1 2 3
1 2 3 4
1 2 3 4 5

```

b)

```

1
2 1 2
3 2 1 2 3
4 3 2 1 2 3 4

```

c) 5 4 3 2 1
4 3 2 1
3 2 1
2 1
1

d) 1

```

2 2
3 3 3
4 4 4 4
5 5 5 5 5

```

e) 1 2 3 4 5
2 3 4 5
3 4 5
4 5
5

f) \* \* \* \* \*
\* \*
\* \*
\* \*
\* \* \* \* \*

g) \* \* \* \* \*
\* \* \* \* \*
\* \* \* \* \*
\* \* \* \* \*
\* \* \* \* \*

h)

```

* 
* * 
* * * 
* * * * 
* * * * *
* * * * * 
* * * * * *

```

i) \* \* \* \* \* \* \*
\* 
\* \* 
\* 
\*

j) \* \* \* \* \* \* \*
\* \* \* \* \* 
\* \* \* \* 
\* \* \* 
\*

k) \* \* \* \* \* 
\* \* \* \* 
\* \* \* 
\* \* 
\*

l)

```

* 
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* * * * *
* * * * * 
* * * * * *
* * * * * * 
* * * * * * *

```

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m) \$ \$ \$ \$ \$  
\$ \$ \$ \$  
\$ \$ \$  
\$ \$  
\$

n)  
#  
# #  
# # #  
# # # #  
# # # # #

Program:-

```
def pattern1():  
    for i in range(1, 6):  
        for j in range(1, i+1):  
            print(j, " ", end=' ')  
        print()  
    print()  
  
def pattern2():  
    count = 1  
    result = '1'  
    for i in range(1, 5):  
        for j in range(1, 5-i):  
            print(' ', end=' ')  
        print(result)  
        count += 1  
        result = str(count) + ' ' + result + ' ' + str(count)  
    print()  
  
def pattern3():  
    for i in range(5, 0, -1):  
        for j in range(i, 0, -1):  
            print(j, ' ', end=' ')  
        print()  
    print()  
  
def pattern4():  
    for i in range(1, 6):  
        for j in range(1, i+1):  
            print(j, " ", end=' ')  
        print()  
    print()
```

```
def pattern5():
    for i in range(1, 6):
        for j in range(1, i):
            print(' ', end=' ')
        for k in range(i, 6):
            print(k, ' ', end=' ')
        print()
```

```
def pattern6():
    for i in range(1, 6):
        for j in range(1, 6):
            if (i == 1 or i == 5 or j == 1 or j == 5):
                print('* ', end=' ')
            else:
                print(' ', end=' ')
        print()
    print()
```

```
def pattern7():
    for i in range(1, 6):
        for j in range(1, 6):
            print('* ', end=' ')
        print()
    print()
```

```
def pattern8():
    result = '*'
    for i in range(1, 5):
        for j in range(1, 5-i):
            print(' ', end=' ')
        print(result)
        result = '*' + result + '*'
    print()
```

```
def pattern9():
    for i in range(1, 5):
```

Name: Sarwot Mohanty

```
for j in range(1,8):
    if (l==1 or i==j or l+j==8):
        print('* ', end=' ')
    else:
        print(' ', end=' ')
    print()
print()

def pattern10():
    for l in range(1,5):
        for j in range(1,8):
            if (l==1 or (j>i and j<=8-i)):
                print('* ', end=' ')
            else:
                print(' ', end=' ')
        print()
    print()

def pattern11():
    for i in range(1,8):
        for j in range(1,8):
            if (i+j==5 or j-i==3 or i-j==3 or i+j==11):
                print('* ', end=' ')
            else:
                print(' ', end=' ')
        print()
    print()

def pattern12():
    for i in range(1,8):
        for j in range(1,8):
            if (i+j>=5 and i-j<=3 and j-i<=3 and i+j<=11):
                print('* ', end=' ')
            else:
                print(' ', end=' ')
        print()
```

```
        print()  
        print()  
  
def pattern13():  
    for i in range(1,6):  
        for j in range(1,i):  
            print(' ', end=' ')  
        for k in range(i,6):  
            print('# ', end=' ')  
        print()  
    print()  
  
def pattern14():  
    for i in range(1,6):  
        for j in range(1,6-i):  
            print(' ', end=' ')  
        for k in range(1,i+1):  
            print('# ', end=' ')  
        print()  
    print()  
  
def main():  
    pattern1()  
    pattern2()  
    pattern3()  
    pattern4()  
    pattern5()  
    pattern6()  
    pattern7()  
    pattern8()  
    pattern9()  
    pattern10()
```

pattern11()

pattern12()

pattern13()

pattern14()

if-name\_ == 'main':

main()

output :-

1  
1 2  
1 2 3  
1 2 3 4  
1 2 3 4 5

1  
2 1 2  
3 2 1 2 3  
4 3 2 1 2 3 4

5 4 3 2 1  
4 3 2 1  
3 2 1  
2 1  
1

1  
2  
3 3 3  
4 4 4 4  
5 5 5 5 5

1 2 3 4 5  
2 3 4 5  
3 4 5  
4 5  
5

\* \* \* \* \*  
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Faculty of Engineering & Technology (ITER)

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A cluster of small, dark, cross-shaped marks representing birds in flight.

\$ \$ \$ \$ \$

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Name: Sagrat Mohandy

Q7) Write a function that finds the sum of the n terms of the following series:

a)  $1 - x^2/2! + x^4/4! - x^6/6! + \dots + x^n/n!$

b)  $e^x = 1 + x/1! + x^2/2! + x^3/3! + \dots$

Program :-

import math

#a

```
def seriesa(x,n):  
    res = 1  
    pos = 1  
    temp = 2  
    for i in range (1,n):  
        fact = 1  
        for j in range (1,temp+1):  
            fact *= j  
        pos *= (-1)  
        m = pos * math.pow (x,temp)/fact  
        res += m  
        temp += 2  
    return res
```

#b

```
def seriesb(x,n):  
    res = 1.0  
    for i in range (n,0,-1):  
        res = 1 + x * res/i  
    return res
```

x = int(input("Enter the value of x: "))

n = int(input("Enter the value of n: "))

print(seriesa(x,n))

print(seriesb(x, n))

Output :-

Enter the value of x: 2

Enter the value of n: 2

-0.41614683654756973

7. 388994708994709

Q8) Write a function that returns true or false depending on whether the given number is a palindrome.

Program :-

```
def isPalindrome(word):
    return word == word[::-1]
n = input("Enter Input: ")
print(isPalindrome(n))
```

Output :-

Enter Input: malayalam

True

Q9) Write a function that returns the sum of digits of a number, passed to it as an argument.

Program :-

```
def printsum(n):
    s = 0
    for i in n:
        s = s + int(i)
    print(s)
n = input("Enter the number: ")
printsum(n)
```

Output :-

Enter the number: 89461213216584

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Q10) Write a program that prints Armstrong numbers in the range 1 to 1000. An Armstrong number is a number whose sum of the cubes of the digits is equal to the number itself. For example:

$$370 = 3^3 + 7^3 + 0^3$$

Program :-

```
num = int(input("Enter a number : "))

sum = 0
temp = num

while temp > 0:
    digit = temp % 10
    sum += digit ** 3
    temp //= 10

if (num == sum):
    print(num, "is an Armstrong number")
else:
    print(num, "is not an Armstrong number")
```

Output:-

Enter a number : 370  
370 is an Armstrong number.

Q11) Write a function that takes two numbers as input parameters and returns True or False depending on whether they are co-primes. Two numbers are said to be co-prime if they do not have any common divisor other than one.

Program :-

```
def coprime(m, n):
    gcd = 1
    for i in range(1, m+1):
        if m % i == 0 and n % i == 0:
            gcd = i
    return (True if gcd == 1 else False)
```

```
m = int(input("Enter number m: "))  
n = int(input("Enter number n: "))  
print(coprime(m, n))
```

Output :-

Enter number m: 5

Enter number n: 2

True

Q12) Write a function to multiply two non-negative numbers by repeated addition, for example,

$$7 * 5 = 7 + 7 + 7 + 7 + 7$$

Program :-

```
def multiply(m, n):  
    if(n == 0):  
        return 0  
    return (m + multiply(m, n-1))  
m = int(input("Enter number m: "))  
n = int(input("Enter number n: "))  
print(multiply(m, n))
```

Output :-

Enter number m: 7

Enter number n: 5

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