SHIVAJI COLLEGE, UNIVERSITY OF DELHI

DEPARTMENT OF COMPUTER SCIENCE

INTERNAL ASSIGNMENT

(Academic Year 2023-24)

Name of the Course	: GE-1	Semester	: I
Name of the Paper	: Programming with Python	Maximum Marks	: 20
Faculty Name	: Abha Vasal	Last Date of Submission: 26.11.2023	

Instructions for doing the assignment.

1. Please submit handwritten document
2. Mention your name , rollno, course and Set on top of your sheet
3. Copied assignments will be marked zero
4. Viva voice of assignment will be conducted
5. No assignment will be accepted after the deadline

Abha Vasal

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SET A

Q1 What are the different built_in data types in Python? Specify any five.

Q2 Write two differences between lists and tuples in Python

Q3 Let x be an integer and y be a string variable. Initialize x = 4, y = '24'. Write code to print the arithmetic sum of x and y (for example, in this case 28 would be printed).

Q3 Taking n as an input from the user, write a program in Python to print the nth term of Fibonacci Series

Q4 Consider the following statements:
a = 10
b = a
What is the difference between a == b and a is b?

Q4 Write a program in Python to implement Selection sort on a given list of numbers. Apply Selection sort on the following list. What would the list be after fourth iteration? [4,10,0,9,2,1]

Q5 What will be the output of following. Show step by step calculations

i. math.ceil(12.53)

ii. 14 + 6 * 2 ** 2 !=8 // 4 -3 and 21 >= 21/ 3 +4

iii. 13 & (~ 15)

iv.
```
L=[ a+b for a in range(1,5) for b in range(1,5)]
print(L)
```

v.
```
Sum=0
for x in range(1,5):
    for y in range(1, x+1):
            Sum += x+y
print(Sum)
```

Q6 Write a function perfect that takes n as an input argument and checks if n is a perfect number. Assert that n is a positive number. If n is a perfect number return True else return False

Q7 Write a function counter that accepts a list as input argument. If the list is nonempty ensure that the list only contains positive valued numbers. Determine and return average of all odd numbers present in the list.

Q8 Print the pattern (triangular pattern)

```
   *
  **
 ***
****
***** ( ask user to input number of lines and print pattern accordingly)
```

Q9 Differentiate between split() and partition() functions. Give examples to illustrate the difference

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Q1 Name the string functions to perform the following :

• Checks if all characters in a string are digits
• Checks if all characters in a string are in lower case
• Replaces all occurrences of j with k

Q2 What are the prerequisites for searching a value in a list using Binary Search? Write a Python program to implement Binary Search.

What will be the output of the following code:

```
i = 1

while True:
    if i%2 == 0:
        break
    print( i )
    i += 2
```

Q3 What is the significance of writing functions? Differentiate between local and global parameters giving suitable examples.

Write a function that takes a list as input and returns the square of the maximum value in the list. Write a program that calls this function and prints its output for the input list - lst[12,5,7,1,30,8].

Q4 Give details on different operators available in python

Q5 What will be the output of following. Show step by step evaluations

i. math.ceil(12.33)
ii. 10 + 6 * 2 ** 2 !=9 // 4 -3 and 29 >= 29/ 9
iii. 10 | 15
iv.
```
A= [1,2,4,6,9,10, 14, 15, 17]
for i in range(0, len(A)) :
    if (A[i] %2 ==0):
        A[i] = 5 *i
    elif (A[i] % 3==0):
        A[i]= 6 *2
    else:
        A[i] *=2
print(A)
```

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v.
```
N=5
Sum=0
For i in range(1,N):
    For j in range( i, N):
        Sum= Sum + i+j
print(Sum)
```

Q6 Write a program to read 2 number entered by user. The program should have assert statements to ensure that both the numbers are nonnegative. Write a function HighFactor that takes the 2 numbers as input and returns the highest common factor of the 2 numbers.

Q7 Write a function EvenAvg that accepts a list as input argument. The function should check that the list should not be empty and only consists of numbers. If the list is nonempty determine and return average of all even numbers present in the list.

Q8 Print the pattern

A
AB
ABC
ABCD (ask user to input number of lines and print pattern accordingly)

Q8 Write an assignment statement using single conditional expression

```
If marks >=70
      Remarks=’good’
else:
     Remarks=’average’
```

Q9 What are dictionaries in python. How are they different from Lists.

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Q1 What would be the output of the following functions:

a)

```
def func1():
    try:
        return 1
    finally:
        return 2
k = func1()
print( k)
```

b)

```
def func2():
    a = 1
    print (a)
 a=123
func2()
print( a)
```

Q2 Write python code for sum of the first **n** terms of following series:
1)$S=1-1/2+1/3-1/4+\cdots$
2)greatest common divisor of two numbers (in addition to **n**, another argument **m** is passed to the function)

Q3
You are given a dictionary priceList = {"Pen" : 10, "Pencil" : 5, "Eraser" : 5, "Ruler" : 20}, representing products and their rates.

a)write a function rate that accepts this dictionary along with the name of a product and returns the price of that product. If the product does not exist in the dictionary, then it should return -1. For example, if the name of the product is Ruler then the function should return 20.

b)write another function update to modify the dictionary. The function should accept the dictionary, name of a product and new rate for it. The function should return the updated dictionary as per the following cases:

Case 1: if the rate of the product is negative or zero and the product exists in the dictionary then the product should be removed from the dictionary
Case 2: if the rate of the product is positive and the product exists in the dictionary then the rate of the product in the dictionary should be changed to the new rate that is passed to the function
Case 3: if the rate of the product is positive and the product does not exist in the dictionary then the product-rate pair should be added to the dictionary

Q4 What are different types of control structures available in python

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Q5 What will be the output of following. Show step by step calculations

i. math.floor(67.33)
ii. -6 * 21 + 8 / 16 * 3 + 60
iii. Not(9)
iv. sentence= 'Hello. welcome to the world of coding'

```
print(len(sentence))

print(sentence[17 :-1])

print(sentence[ : -12] + sentence[-12 :])

print(sentence.rfind('co'))

print(sentence.partition('.'))
```

v.
```
Sum=0
N=5
While N >0:
   If N % 2 ==0:
        Sum= Sum + N*2
   N =N-1
print(sum)
```

Q6 Write a program to read a number entered by user. The program should have assert statements to ensure that the number is positive. Write a function prime that has an argument n and the function returns True if the number is prime else it should return False. In the program, call the function to check if 13 is a prime number.

Q7 Write a function minimum that accepts a list as input argument. The function should check that the list should not be empty. If the list is nonempty determine and return the smallest value in the list else if the list is empty it should return None

Q8 Print the pattern

12345

1234

123

12

1 (ask user to input number of lines and print pattern accordingly)

Q9 What is use of break statement in python. Give example

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SET D

Q1 Which of the following fourteen statements (Line 1 to Line 14) have errors? Identify all errors and justify your answers.

```
str = "Hello There" # Line 1
str[6] = 't' # Line 2
print(str[12]) # Line 3
print(str[-2 : -4]) # Line 4
print(str[2 : 12]) # Line 5
lst = list(str) # Line 6
lst[3] = 'i' # Line 7
print(lst[2 : 4]) # Line 8
s = set(str) # Line 9
s[3] = 'i' # Line 10
print(s[2 : 4]) # Line 11
t = tuple(s) # Line 12
t[3] = 'i' # Line 13
print(s[2 : 4]) # Line 14
```

Q2 Consider the following two tuples showing games played by Ramesh and Suresh:

```
gamesRamesh = ('lawn tennis', 'cricket')
gamesSuresh = ('cricket', 'hockey', 'badminton')
```

Write the statements to compute the following:

- games played by Suresh but not Ramesh
- games that are common to both of them
- all the games that are played by either of them
- games that are not common to both of them

Q3 Write a function that accepts the name of a file as an argument and returns the number of lines in the file. The function should return -1 if the specified file does not exist.

Q4 What will be the output

```
def f(x, L=[]):
    for I in range(x):
            L.append(I * I)
    print(L)
```

What happens under following function calls

a) f(2)
b) f(3,[3,2,1)
c) f(3)

Q5 What will be the output of following. Show step by step calculations

i. Math.floor(67.65)

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ii. 6 % 10 +1 4 -24 * 5 // 5

iii. 7 | 13

iv.
```
lst = [x * y for x in range(3, 11, 2) for y in range(6, 1, -1) if x * y % 2 == 0 ]
print(lst)
```

v.
```
sum=0
for a in range(5):
    sum +=a**2
print(sum)
```

Q6 Write a function coprime that takes the 2 numbers as input and returns True if the number are coprime else it should return False. The program should have assert statements to ensure that the numbers are positive.

Q7 Write a function that takes a string as an argument and returns True if the string is a palindrome else returns False. Check that the string is non empty and only consists of alphabets.

Q8 Print the pattern

1
23
456
78910 (ask user to input number of lines and print pattern accordingly)

Q9 Write an assignment statement using single conditional expression

```
If marks >=60:
      Status='pass'
else:
     Status='fail'
```

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SET E

Q1 What will be the output produced on execution of the following code segments? Justify your answers.

1)
```
def fun(a = 0, b = 1):
    return a * b
print(fun(5, 6))
print(fun(6))
print(fun(b = 5))
print(fun())
```
2)
```
import copy
lst1 = [13, 23, [38, 42], 52]
lst2 = copy.deepcopy(lst1)
lst3 = lst1
lst2[2][0] = 78
lst3[3] = 61
print(lst1, lst2, lst3)
```

3)
```
def m(s):
    ans = ''
    for i in range(len(s)):
        if i % 2 == 0:
            ans += s[i]
    return ans
print(m('HelloWorld'))
```

Q2 Write a program to find sum of the first **n** terms of following series:
S=1+1/2+ 1/3+ 1/4+⋯

Q3 a)Write differences between List and Sets.
Qb) names=[‘john’,’ben’,’walter’,’mike’]
Write a single line code that sorts the list of elements in the ascending order of length of the elements

Q5 Write a user defined function sumsquares(n) in python that accepts a number n as an argument. The function returns sum of squares of first n numbers. Write a python statement to call this function and print the result for n=6.

Q6 What will be the output of following. Show step by step evaluations

i. math.ceil(65.47)
ii. ‘bye’ < ‘Bye’ or ‘hello’ *5 > ‘hello’
iii. 10 > 12/ 2.0 *2

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iv.
```
import copy
lst1 = [3, 43, [38, 45,90], 74]
lst2 = copy.deepcopy(lst1)
lst3 = lst1
lst2[2][0] = 8
lst3[3] = 6
print(lst1, lst2, lst3)
```

v.
```
sum=0
for i in range(1, 3):
    for j in range(2,4):
        if i==j:
            sum  += i+ j
print("sum is ', sum)
```

Q6. Write a program to read a number entered by user. The program should have assert statements to ensure that the input entered is a number and is positive. Write a function factorial that has an argument n and the function returns the factorial of n. Call the function to find factorial of 5.

Q7 Write a function CountVowel that takes a string as input parameter and calculates & displays the count of vowels. Convert the string in lowercase and then calculate.

Q8 Print the pattern

```
  A
 BB
CCC
DDDD (Ask user to enter number of lines. Check whether n is positive according print pattern)
```

Q9 Write an assignment statement using single conditional expression

```
if age >=18:
    Status='major'
else:
    Status='minor'
```

10. Write a function FnDisnct() to find the distinct elements in given 2 lists L1 and L2 and store them in third List L3. The function should return the List L3

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SET F

Q1 What is the output. Explain

a)lst = [x * y for x in range(3, 9, 2) for y in range(6, 1, -1) if x * y % 2 == 0]
print(lst)

b)def fn(a, n):
try:
print(a[n])
except IndexError:
print("In IndexError")
raise ValueError("An error")
except:
print("Some error")
print("Bye")

lst = [1, 2, 3]
try:
fn(lst, 1)
fn(lst, 3)
fn(lst, 2)
except ValueError as msg:
print(msg)

Q2 You are given a dictionary priceList = {"Rice" : 40, "Wheat" : 30, "Milk" : 25, "Butter" : 45}, representing products and their rates.
a)write a function rate that accepts this dictionary along with the name of a product and returns the price of that product. If the product does not exist in the dictionary, then it should return -1. For example, if the name of the product is Butter then the function should return 45.

b)write another function update to modify the dictionary. The function should accept the dictionary, name of a product and new rate for it. The function should return the updated dictionary as per the following cases:
Case 1: if the rate of the product is negative or zero and the product exists in the dictionary then the product should be removed from the dictionary

Case 2: if the rate of the product is positive and the product exists in the dictionary then the rate of the product in the dictionary should be changed to the new rate that is passed to the function
Case 3: if the rate of the product is positive and the product does not exist in the dictionary then the product-rate pair should be added to the dictionary

Q3 Write a program to copy the contents of file1 in file2.

Q4 Write a program to read three sides of a triangle and display whether the triangle is a scalene or equilateral or isosceles triangle, provided that the sides entered by the user are positive and they form a valid triangle. The program should have **assert** statements to ensure that these two

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conditions are satisfied. Write a python program to accept a string from the user. Replace all vowels in the given string with '*'. Display the modified string.

Q5 What will be the output of following. Show step by step evaluation

i. math.ceil(65.65)

ii. 3 ** 4 //3 +5 >9 or 4 !=9

iii. ~ 17

iv.
```
greeting='Good Morning. Have a Good Day!!
A= greeting.spilt()
B= greeting.capitalize()
C=greeting.partition('.')
D=greeting.count('good')
print(A,B, C, D)
```

v.
```
sum=0
for i in range(1, 3):
      for j in range(1,3):
          sum  += i*2 +j
print("sum is ', sum)
```

Q6. Consider thesets s1 and s2 defined below

S1= {"p1", "p2", "p3","p4", "p5"}

S2={"p1","p3","p4"}what will be the output produced on execution of following statements

a) set.symmetric_difference(s1, s2)

b) s1.union(s2)

Q7 Write a function for linear search that accepts two arguments: a list of numbers and a number to be searched. Assume that the list can have duplicate elements. The function should return a list of all the indices corresponding to the element 6 being searched. If the element is not there, then the program should return the list [-1]. Ensure that the list contains only numbers. For example, if the list is [68, 24, 68, 68, 24, 14] and 68 is to be searched then the function should return [0, 2, 3].

Q8 Print the pattern

```
 1
 22 (Ask user to enter number of lines. Check whether n is positive according print pattern)
 333
 4444
```

Q 9 Differentiate between pass and continue statement

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SET G

Q1 Name the string functions to perform the following :
• Checks if all characters in a string are digits
• Checks if all characters in a string are in lower case
• all occurrences of j becomes k
Q2 Write a Python function wordcount to count number of words in a string entered by the user. There can be more than one space between the words.
What will be the output of the following code:

```
i = 1
while True:
    if i%2 == 0:
        break
    print( i )
    i += 2
```

Q3 Write a function that takes a list as input and returns the square of the maximum value in the list. Write a program that calls this function and prints its output for the input list - lst[12,5,7,1,30,8].
Q4 Give details on any 3 different bitwise operators available in python
Q5 What will be the output of following. Show step by step evaluations

i. math.ceil(12.33)
ii. 10 + 6 * 2 ** 2 !=9 // 4 -3 and 29 >= 29/ 9
iii. 10 | 15
iv. A= [1,2,4,6,9,10, 14, 15, 17]

```
for i in range(0, len(A)) :
      if (A[i] %2 ==0):
            A[i] = 5 *i
      elif (A[i] % 3==0):
            A[i]= 6 *2
      else:
            A[i] *=2
print(A)
```

v. N=5

```
Sum=0
For i in range(1,N):
    For j in range( i, N):
        Sum= Sum + i+j
print(Sum)
```

Q6 Write a program to read 2 number entered by user. The program should have assert statements to ensure that both the numbers are nonnegative. Write a function HighFactor that takes the 2 numbers as input and returns the highest common factor of the 2 numbers.

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SET H

1) What is the output of following
1. and, or, not are _____operator
2. max(“hello”, “how”, “are”, “you”)
3. Message=”How, Welcome to Programming”
(I)Find output of Message[7:13]
(II)Give the valid range of indices of Message
4. l=[‘if’, ‘pass’, ‘for’, break’, ‘else’]
Find output of l.sort()

Q2
1. Difference between simple and expression statement
2. Illustrate the use of range() in Python along with example
3. What is a List Comprehension. Give examples to explain
4. Write output of executing the following statements:
list1=[1,2,3]
list2=list1*3
print (list2)
print(list1+list2)

Q3
1. Explain break and continue statements and when do we use it ? Give example
2. What is an assert statement? Why is it used? Write a program that accepts input as length and breath from user and compute the area of triangle, also assert that the sum of the length of any two sides is greater than the third side.

Q4
What is the difference between shallow copy and deep copy with list?
3. How pass statement is different from comment in Python?
4. What is lambda function? What are the characteristic of lambda function? Give example
5. Consider following nested list:
city={[‘Tokyo’,23], [‘Paris’, 34], [‘Amsterdam’, 45]]
Output of following statement:
Print (city[1])
Print (city[1][0])

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SET I

Q1

1. Write a function that sum of digits of a number, passed it as an argument
2. Output of following code

(I)
```
def multiple (a=0, nume=1):
        return a*5
  multiple(5,6)
 multiple(nume=7)
```

(II)
```
for i in range(20,30):
        if(i%9 !=0):
            Continue
        Print (i)
```

Q2

1. l=['if', 'pass', 'for', break', 'else']

Output of l.remove('break')

2. Is Python case sensitive True or False?
3. Write Python statement

   result=2xy-9y/2xy^3

4. Find output 10^6
5. Determine output

result=[x+y for i in range (1,5) for y in range (1,5)]

Q3

1. Rewrite the program using for loop

```
total=0
count=1
while count<5:
        total+=count
        count+=1
print (total)
```

2. Evaluate ((not (9==8)) and ((7+1)!=8)) or (6<4.5)
3. What are mutable and immutable type in Python ?
4. Determine the output

```
digit1=set([0,1,2,3])
digit2=set([2,4,5,6])
digit3=set([0,7,8,9,2])
setdifference(digit1, digit2, digit3)
digit1| digit2
```

5. How does function return a value? Give example

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Q4

1. Write a function perfect to determine whether a given number is a perfect number. A perfect number is said to be a perfect number if it is 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!=1+3+5

2. Find output(show stepwise calculations)

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

Faculty Signature:

SET J

1. What will be the output of the following code? Explain
   ```
   for letter in ‘’programming with python’:
       if letter==’a’ or letter==’n’:
           continue
       print(‘current letter ’,letter)
   ```
2. Write a function that takes two files text1.txt and text2.txt as input. The function must read the content of the file text1.txt line by line and should write them to another file text2.txt. Display the contents of file text2.txt. use appropriate exceptions for file handling.
3. Write a function to print every character of a string entered by the user in a new line using the for loop. Also display total number of characters in the string in the end.
4. Consider a tuple T1=(12,3,4,’Hockey’, ‘Anil’,(‘a’,’b’)) write python syntax to answer the following
   a) Display the first element of T1
   b) Display the last element of T1
   c) Display tuple T1 in reverse order
   d) Display ‘b’ from tuple T1
   e) Display ‘Anil’ from tuple T1
5. Write a function Fncommon() to find the common elements in given 2 lists L1 and L2 and store them in third List L3. The function should return the List L3
6. Use the given list L to find the output for the following. Write down updated content of List L after applying each
   L=[1,3,2,12,2,4,3]
   i) L.append(10)
   ii) L.count(2)
   iii) L.index(12)
   iv) L.insert(2,15)
   v) L.remove(2)
7. Identify the error if any. Rectify if error exists
   Str= “Hello Python”
   Str[6]=”S”

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SET K

1. Write Programs for the following:

a) to compute whether a number is a perfect square.

b) to determine whether a string is a palindrome.

c) sum of the first **n** terms of following series:
$S=1-1/2+1/3-1/4+\cdots$

d) greatest common divisor of two numbers (in addition to **n**, another argument **m** is passed to the function)

2. You are given a dictionary `priceList = {"Lemon" : 10, "Mango" : 50, "Banana" : 5, "Apple" : 20}`, representing products and their rates.

   - write a function `rate` that accepts this dictionary along with the name of a product and returns the price of that product. If the product does not exist in the dictionary, then it should return -1. For example, if the name of the product is `Apple` then the function should return 20.

   - write another function `update` to modify the dictionary. The function should accept the dictionary, name of a product and new rate for it. The function should return the updated dictionary as per the following cases:

   A. Case 1: if the rate of the product is negative or zero and the product exists in the dictionary then the product should be removed from the dictionary
   B. Case 2: if the rate of the product is positive and the product exists in the dictionary then the rate of the product in the dictionary should be changed to the new rate that is passed to the function
   C. Case 3: if the rate of the product is positive and the product does not exist in the dictionary then the product-rate pair should be added to the dictionary

3. Consider the following two tuples showing games played by Ramesh and Suresh:
   gamesRamesh = ('lawn tennis', 'cricket')
   gamesSuresh = ('cricket', 'hockey', 'badminton')
   Write the statements to compute the following:

- games played by Suresh but not Ramesh
- games that are common to both of them
- all the games that are played by either of them
- games that are not common to both of them

4. Write a program to read three sides of a triangle and display whether the triangle is a scalene or equilateral or isosceles triangle, provided that the sides entered by the user are positive and they form a valid triangle. The program should have **`assert`** statements to ensure that these two conditions are satisfied.

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5. Write a function that accepts the name of a file as an argument and returns the number of lines in the file. The function should return -1 if the specified file does not exist.

Write a function for linear search that accepts two arguments: a list of numbers and a number to be searched. Assume that the list can have duplicate elements. The function should return a list of all the indices corresponding to the element being searched. If the element is not there, then the program should return the list [-1]. For example, if the list is [68, 24, 68, 68, 24, 14] and 68 is to be searched then the function should return [0, 2, 3].

6. Consider the string s='abcdefxyyzxyzxzxyy'. What will be the output for following
   a) print(s.islower(())
   b) print(s.count('xy')
   c) print(s.find('cd'))
   d) print(s.replace('xy','pq')
   e) print((s.split('x'))
7. What will be the output

```
def f(x, L=[]):
    for I in range(x):
            L.append(I * I)
    print(L)
```

   What happens under following function calls
   d) f(2)
   e) f(3,[3,2,1)
   f) f(3)

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