PRESIDENCY UNIVERSITY

COURSE TITLE & CODE: Programming in Python & CSE 317

SEMESTER/YEAR: VI/III

COURSE CREDIT STRUCTURE: 1- 0- 4-3

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Ex: No. 1 OPERATORS AND EXPRESSIONS

Question 1

1. Write a python program to swap two variables.

```
var1 = input("enter variable 1 : ")
var2 = input("enter variable 2 : ")
print(f"swapped values of {var1} and {var2} ")
var1,var2=var2,var1
print(f"{var1} and {var2} ")
```

```
enter variable 1 : apple
enter variable 2 : bat
swapped values of apple and bat
bat and apple
```

Question 2

2. Write a program to input temperature in Centigrade and convert to Fahrenheit. Temperature conversion formula from degree Celsius to Fahrenheit is given by.

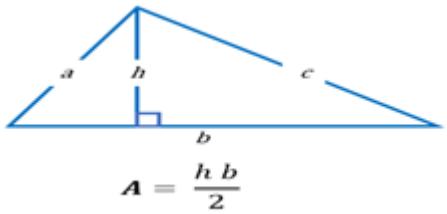
$$°F = \left(°C * \frac{9}{5}\right) + 32$$

```
temp_c = float(input("enter temperature in celscius : "))
print((temp_c*(9/5)+32)," F")
```

```
enter temperature in celscius : 38.4
101.12  F
```

Question 3

3. Write a program to input base and height of a triangle and find area of the given triangle.



$$A = \frac{h\,b}{2}$$

```
base ,height = float(input("enter base : ")),float(input("enter height : "))
print("area of triangle = ",(base*height)/2,"sq.units")
```

```
enter base : 15
enter height : 2
area of triangle =  15.0 sq.units
```

Question 4

4. Write a Python Program to Convert Kilometers to Miles.

```
kms = float(input('enter how many KiloMeters  : '))
print(f'{kms} km = {kms*0.62} miles')
```

```
enter how many KiloMeters  : 3
3.0 km = 1.8599999999999999 miles
```

Question 5

5. Write a program to input marks of five subjects of a student and calculate total and average of all subjects.

```
m1=float(input("Enter marks in subject 1 : "))
m2=float(input("Enter marks in subject 2 : "))
m3=float(input("Enter marks in subject 3 : "))
m4=float(input("Enter marks in subject 4 : "))
m5=float(input("Enter marks in subject 5 : "))
print("total marks in 5 subjects = ",(m1+m2+m3+m4+m5))
```

```
print("Average = ",((m1+m2+m3+m4+m5)/5))
```

```
Enter marks in subject 1 : 10
Enter marks in subject 2 : 20
Enter marks in subject 3 : 30
Enter marks in subject 4 : 40
Enter marks in subject 5 : 50
total marks in 5 subjects =  150.0
Average =  30.0
```

Question 6

6. Write a program to generate a random number between 0 and 9.

```
import random as rd
print(rd.randint(0,10))
```

```
3
```

Question 7

7. Write a program read two integer numbers and performs arithmetic operations like addition, subtraction, multiplication, division, floor division, modulus and exponential(power) on them.

```
num1 = float(input("enter 1st number : "))
num2 = float(input("enter 2nd number : "))
print("Sum = ",num1 + num2)
print("Difference = ",num1 - num2)
print("Product = ",num1 * num2)
print("Quotient = ",num1/num2)
print("Floor division = ",num1//num2)
print("Exponentiation = ",num1**num2)
```

```
enter 1st number : 100
enter 2nd number : 30
Sum =  130.0
Difference =  70.0
Product =  3000.0
Quotient =  3.3333333333333335
Floor division =  3.0
Exponentiation =  1e+60
```

Question 8

8. Write a python program to read characters from the keyboard and print the next characters on the screen.

```
x = input('enter a character : ')
asci = ord(x)
print(f"The next character of {x} is ",chr(asci+1))
```

```
enter a character : c
The next character of c is  d
```

Question 9

9. Write a program to find the maximum of two numbers without using if-else and max predefined functions.

```
a,b = int(input("enter 1st number : ")),int(input("enter 2nd number : "))
res = a * (bool)(a // b) +   b * (bool)(b // a);
print("Greatest is ",res)
```

```
enter 1st number : 15
enter 2nd number : 5
Greatest is  15
```

Question 10

10. Write a program to find the minimum of two numbers without using if else and min predefined functions.

```
x,y = int(input("enter 1st number : ")),int(input("enter 2nd number : "))
res =  y ^ ((x ^ y) & -(x < y))
print("Least is ",res)
```

```
enter 1st number : 25
enter 2nd number : 2
Least is  2
```

Question 11

11. Write a python program to read number and find the absolute value without using abs () functions and if-else statement.

```
import math
num=int(input("Enter a number : "))
print(math.sqrt(num*num))
```

```
Enter a number : -5
5.0
```

Question 12

12. Write a python program to read two complex numbers from the users and perform the arithmetic operations.

```
num1 = complex(input("enter 1st complex number : "))
num2 = complex(input("enter 2nd complex number :"))
print("Sum = ",num1+num2)
print("difference = ",num1 - num2)
print("product = ",num1*num2)
print("Quotient = ",num1/num2)
```

```
enter 1st complex number : 1+2j
enter 2nd complex number :3+4j
Sum =  (4+6j)
difference =  (-2-2j)
product =  (-5+10j)
Quotient =  (0.44+0.08j)
```

Ex: No.2 CONTROL STRUCTURES

Question 1

1] VIT university follow the absolute grading system for the CSE program, to assign grades to students at the end of course. The program must do the following:

1. Ask for a student number.
2. Ask for the student's tutorial mark.
3. Ask for the student's test mark.
4. Calculate whether the student's average so far is high enough for the student to be permitted to write the examination. If the average (mean) of the tutorial and test marks is lower than 40%, the student should automatically get an F grade, and the program should print the grade and exit without performing the following steps.
5. Ask for the student's end term examination mark.
6. Calculate the student's final mark. The tutorial and test marks should count for 25% of the final mark each, and the final examination should count for the remaining 50%.
7. Calculate and print the student's grade, according to the following table:

Weighted final score	Final grade
80 <= mark <= 100	A
70 <= mark < 80	B
60 <= mark < 70	C
50 <= mark < 60	D
mark < 50	E

```
id=input("enter ID number : ")
tut=float(input("enter tutorial marks:  "))
test=float(input("enter test marks : "))
avg=(tut+test)/2
if ((avg)<40) :
  print("Grade = 'F' ")
else:
  end = float(input("enter end term marks : "))
  final=(tut+test)*0.25 + end*0.50
  if (final>=80 and final<=100): print("Grade 'A'")
  elif (final>=70 and final<80): print("Grade 'B'")
  elif (final>=60 and final<70): print("Grade 'C'")
  elif (final>=50 and final<60): print("Grade 'D'")
  elif (final<50): print("Grade E")
```

```
enter ID number : 10
enter tutorial marks:  10
enter test marks : 10
Grade = 'F'
```

Question 2

2. An electricity board charges the following rates to domestic users to discourage consumption of energy. For the first 100 units – 60 Paisa per unit. For next 200 units - 80 paisa per unit. Beyond 300 units - 90 Paisa per unit. All users are charged a minimum of Rs. 50.00. If the total amount is more than Rs. 300 then an additional surcharge of 15% is added. Write a program to get the names of the users and the number of units consumed by the user and display the electricity bill for the users.

```
name=input('Enter name:')
units=int(input('Enter the total units that are consumed:'))
if (units<=100):
  cost=50+(0.6*units)
```

```
  print('Total units consumed is',units,'and total cost =Rs.',cost)
elif (units>100 and units<=300):
  cost=50+((100*0.6)+((units-100)*0.8))
  print('Total units consumed is',units,'and total cost =Rs.',cost)
else:
  tot=50+((100*0.6)+(200*0.8)+((units-300)*0.9))
  cost=tot+(0.15*tot)
  print('Total units consumed is',units,'and total cost =Rs.',cost)
```

```
Enter name:ram
Enter the total units that are consumed:500
Total units consumed is 500 and total cost is 517.5
```

Question 3

3. Library charges a fine for every book returned late. For first 5 days the fine is 50 paisa, for 6-10 days fine is one rupee and above 10 days fine is 5 rupees. If you return the book after 30 days your membership will be cancelled. Write a program to accept the number of days the member is late to return the book and display the fine or the appropriate message.

```
etc=int(input('Enter the num of extra days the book was kept for...'))
if (etc<=5):
  fine=etc*0.50
  print('Fine = Rs.',fine)
elif (etc>=6 and etc<=10):
  fine=((5*0.50)+((etc-5)*1))
  print('Fine is',fine)
elif (etc>=10 and etc<=30):
  fine=((5*0.50)+(5*1)+((etc-10)*5))
  print('Fine = Rs.',fine)
else:
  print('Membership has been cancelled')
```

```
Enter the num of extra days the book was kept for...9
Fine is 6.5
```

Question 4

Consider the following assessment method and Course Completion Criteria used by programming in python lab based theory course conducted in Presidency University.

Sl.no	Assessment type	Marks	weightage
1	Daily Experiment evaluations	20	10%
2.	Continuous assessment-1	20	10%
3	Continuous assessment-2	20	10%
4	Mid term	40	20%
5	Continuous assessment-3	10	5%
6	Continuous assessment-4	30	15%
7	End term Lab and Theory examination	60	30%

Course Completion Criteria

I. Minimum attendance is 75%. Otherwise “NP”. (not permitted to appear end term exam) II. Minimum marks in continuous assessment: 40%. Otherwise “NE” (not eligible) III. Minimum marks in end term practical and theory: 30%. Otherwise “F” grade.

The program must do the following: Read student roll number, student’s attendance percentage, student’s assessment marks and check the student’s attendance percentage is less than 75%, print NP grade terminate program, otherwise calculate whether the student’s average so far is high enough for the student to be permitted to write the examination. If the average (mean) of all pre end term continuous assessment is lower than 40%, the student should automatically get an NE grade, and the program should print the grade and exit without performing the following steps. Ask for the student’s end term examination mark. Calculate the percentage and check if it is less than 30% percentage print F grade otherwise print Student is Pass.

```
rno=input("Roll no:")
at=float(input('Attendance percentage:'))
if (at<75):
 print('Not Permitted')
else:
  de=int(input("Enter daily expt evaluation marks out of 20:"))
  ca1=int(input("Enter continuous assessment 1 marks out of 20:"))
  ca2=int(input("Enter continuous assessment 2 marks out of 20:"))
  mt=int(input("Enter midterm marks out of 40:"))
  ca3=int(input("Enter continuous assessment 3 marks out of 10:"))
  ca4=int(input("Enter continuous assessment 4 marks out of 30:"))
  mean=((de+ca1+ca2+mt+ca3+ca4)/140)*100
if (mean<40):
  print('Not eligible')
else:
    tm=int(input('Enter the end term marks out of 60:'))
if (tm<(0.3*60)):
  print('Fail')
else:
  print('Pass')
```

```
Roll no:621
Attendance percentage:80
Enter daily expt evaluation marks out of 20:20
Enter continuous assessment 1 marks out of 20:18
Enter continuous assessment 2 marks out of 20:19
Enter midterm marks out of 40:40
Enter continuous assessment 3 marks out of 10:9
Enter continuous assessment 4 marks out of 30:28
Enter the end term marks out of 60:58
Pass
```

Question 5

5. Indian government tax the salaried citizen based on the following table.

   Income tax slabs for resident Individual below 60 years of age

Taxable income slabs	Income tax rates and cess
Up to Rs 2.5 lakh	Nil
Rs 2,50,001 to Rs 5,00,000	5% of (Total income minus Rs 2,50,000)
Rs 5,00,001 to Rs 10,00,000	Rs 12,500 + 20% of (Total income minus Rs 5,00,000)
Rs 10,00,001 and above	Rs 1,12,500 + 30% of (Total income minus Rs 10,00,000)

Income tax slabs for resident individual between 60 and 80 years of age (Senior Citizen)

Taxable income slabs	Income tax rates and cess
Up to Rs 3 lakh	Nil
Rs 3,00,001 to Rs 5,00,000	5% of (Total income minus Rs 3,00,000)
Rs 5,00,001 to Rs 10,00,000	Rs 10,000 + 20% of (Total income minus Rs 5,00,000)
Rs 10,00,001 and above	Rs 1,10,000 + 30% of (Total income minus Rs 10,00,000)

Income tax slabs for resident individual above 80 years of age (Super Senior Citizen)

Taxable income slabs	Income tax rates and cess
Up to Rs 5 lakh	Nil
Rs 5,00,001 to Rs 10,00,000	20% of (Total income minus Rs 5,00,000)
Rs 10,00,001 and above	Rs 1,00,000 + 30% of (Total income minus Rs 10,00,000)

Write a program to read the name of citizen, age, salary and compute the income tax of citizen.

```
name = input("Enter citizen's name : ")
salary,age = float(input("Enter citizen`s salary : ")),int(input("Enter citizen age : "))
if (age<60):
  if (salary<=250000):
    tax=0 ; print("tax = RS.",tax)
  elif (salary>=250001 and salary<=500000):
    tax=(250000-(0.05*salary)) ; print("tax = RS.",tax)
  elif (salary>=500001 and salary<=1000000):
    tax=(12500+(0.2*(salary-500000))) ; print("tax =RS. ",tax)
  elif (salary>1000001):
    tax=(112500 + (0.3*(salary-1000000))) ; print("tax =RS. ",tax)

if (age>=60 and age<=80):
```

```
    if (salary<=300000):
      tax=0 ;  print("tax = RS.",tax)
    elif (salary>=300001 and salary<=500000):
      tax=(300000-(0.05*salary)) ; print("tax = RS.",tax)
    elif (salary>=500001 and salary<=1000000):
      tax=(10000+(0.2*(salary-500000))) ; print("tax = RS.",tax)
    elif (salary>1000001):
      tax=(110000 + (0.3*(salary-1000000))) ; print("tax =RS. ",tax)

  if (age>80):
    if (salary<=500000):
      tax=0 ;  print("tax =RS. ",tax)
    elif (salary>=500001 and salary<=1000000):
      tax=0.2*(salary-500000) ; print("tax = RS.",tax)
    elif (salary>1000001):
      tax=(100000 + (0.3*(salary-1000000))) ; print("tax = RS.",tax)
```

```
Enter citizen's name : abcd
Enter citizen`s salary : 550000
Enter citizen age : 85
tax = RS. 10000.0
```

Ex: No.3 SELECTIVE AND REPETITIVE STRUCTURES

Question 1

1. Develop Guess number that prompt user to enter a number. If the number is equal 99 print “congratulations”. If the number is less than 99 print enter again and aim higher else print enter again lower number. The program should print enter again a lower number. The program should run until the user guesses the correct the number that is 99.

```
correct=99
while (True):
  guess = int(input("Enter a guess number :"))
  if (guess<99):
    print("Enter again & aim higher")
  elif (guess>99) :
    print("Enter again & aim lower")
  elif (guess==correct):
    print("Well guessed!!")
    break
```

```
Enter a guess number :100
Enter again & aim lower
Enter a guess number :90
Enter again & aim higher
Enter a guess number :99
Well guessed!!
```

Question 2

2. Implement a simple calculator with a menu. Display the following options to the user, prompt for a selection, and carry out the requested action (e.g. prompt for two numbers and add them). After each operation, return the user to the menu. Exit the program when the user selects 0. If the user enters a number which is not in the menu, ignore the input and redisplay the menu. You can assume that the user will enter a valid integer:

-- Calculator Menu --

0. Quit
1. Add two numbers
2. Subtract two numbers
3. Multiply two numbers
4. Divide two numbers

```
while (True):
  num1,num2 = float(input("Enter 1st number : ")),float(input("Enter 2nd number : "))
  choice = int(input("Select the option:- \n 0.Quit 1.Add 2 numbers 2.Subtract 2 numbers 3
  if (choice==1):
    print(f"Sum of {num1} & {num2} = {num1+num2}")
  elif (choice==2):
    print(f"Difference of {num1} & {num2} = {num1-num2}")
  elif (choice==3):
    print(f"Product of {num1} & {num2} = {num1*num2}")
  elif (choice==4):
    print(f"Quotient of {num1} & {num2} = {num1/num2}")
  elif (choice==0) :
    print("successfully quit ") ; break
  else :
    print("Invalid")
  x=input("Do you want to repeat calculation? yes/no ").lower()
  if (x=='no'): break
```

```
Enter 1st number : 10
Enter 2nd number : 20
Select the option:-
 0.Quit 1.Add 2 numbers 2.Subtract 2 numbers 3.Multiply 2 numbers 4.Divide 2 numbers
Sum of 10.0 & 20.0 = 30.0
Do you want to repeat calculation? yes/noyes
Enter 1st number : 10
Enter 2nd number : 20
Select the option:-
 0.Quit 1.Add 2 numbers 2.Subtract 2 numbers 3.Multiply 2 numbers 4.Divide 2 numbers
Difference of 10.0 & 20.0 = -10.0
Do you want to repeat calculation? yes/nono
```

Question 3

3. Write a program to read number of row from the users and print following pattern as follows.

I. Square Star Pattern

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

```
n = 5
for i in range(n):
    for i in range(n):
        print('*', end = '')
    print()
```

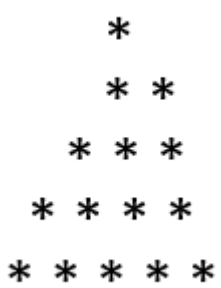
```
*****
*****
*****
*****
*****
```

II. Right Triangle star pattern

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

```
n=6
for i in range(n):
  for j in range(1,i+1):
    print("*",end=" ")
  print("\n")
```

III. Mirrored Right Triangle



```
n=5
for i in range(1,n+1,1):
  for j in range(1,n-i,1):
    print(" ",end=" ")
  for k in range(1,i+1,1):
    print("*",end=" ")
  print(" ")
```

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

IV. Pyramid star pattern

```
n=5
for i in range(1,n+1,1):
  for j in range(1,n-i+1,1):
    print(" ",end=" ")
  for k in range(1,i+1,1):
    print("  *",end=" ")
  print(" ")
```

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

V. Half Diamond star pattern

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

```
n=5;
for i in range(n):
      for j in range(i):
           print ('* ', end="")
      print('')
for i in range(n,0,-1):
     for j in range(i):
          print('* ', end="")
     print('')
```

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

VI. X Star Pattern

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

```
i = 0 ; j = 6
for row in range(7):
    for column in range(7):
        if(column == i or column == j):
            print("*",end="")
```

```
        else:
            print(" ",end="")
    print("\n")
    i += 1 ; j -= 1
```

```
 *     *

  *   *

   * *

    *

   * *

  *   *

 *     *
```

VII . Diamond Star pattern

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

```
rows = 5
k = 2 * rows - 2
for i in range(0, rows):
    for j in range(0, k):
        print(end=" ")
    k = k - 1
    for j in range(0, i + 1):
        print("* ", end="")
    print("")
k = rows - 2
for i in range(rows, -1, -1):
    for j in range(k, 0, -1):
        print(end=" ")
    k = k + 1
    for j in range(0, i + 1):
        print("* ", end="")
    print("")
```

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

Question 4

4. Write a program that reads an unspecified number of integers, determines how many positive and negative values have been read, and computes the total and average of the input values (not counting zeros). Your program ends with the input 0. Display the average as a floating-point number.

```
i = int(input("Enter a num (0 terminates input) : "))
pos = 0 ; neg = 0 ; total = 0
if (i != 0):
  while (i != 0):
    if (i > 0):
      pos += 1
    elif (i < 0):
      neg += 1
    total += i
    i = int(input("Enter a num (0 terminates input) : "))
    count = pos + neg
    average = total / count
  print ("Positive numbers = ", pos)
  print ("Negatives numbers = ",neg)
  print ("Total = ", total)
  print ("Average = ", float(average))
else:
  print ("You didn't enter any number.")
```

```
Enter a num (0 terminates input) : 15
Enter a num (0 terminates input) : 20
Enter a num (0 terminates input) : -9
Enter a num (0 terminates input) : 5
Enter a num (0 terminates input) : -1
Enter a num (0 terminates input) : 0
Positive numbers =  3
Negatives numbers =  2
Total =  30
Average =  6.0
```