**Lab 2: To study and implement basic algorithms in Python**

1. **Write a program to generate a dictionary that contains (i,sqrt(i)), where *i* is an integer between 1 and n. *n* is a number input by the user.**

**from**math **import** sqrt  
a = int(input(**"enter a number"**))  
dic = {}  
**for** r **in** range(1,a+1):  
dic [r] = sqrt(r)  
print(dic)

enter a number3

{1: 1.0, 2: 1.4142135623730951, 3: 1.7320508075688772}

**2. Write a simple calculator program using functions add, sub, mul and div. The program should accepts two numbers and an operator and calls the corresponding function to perform the operation.**

**import** math  
a = int(input(**"enter the 1st num"**))  
b = int(input(**"enter the 2nd num"**))  
op = input(**"enter the operator"**)  
**def**add(a,b):  
 z = a+b  
**return** z  
**def**sub(a,b):  
 z = a-b  
**return** z  
**def**mul(a,b):  
 z = a\*b  
**return** z  
**def**div(a,b):  
 z = a/b  
**return** z  
**if**(op == **"+"**):  
 z = add(a,b)  
print(z)  
**if**(op == **"-"**):  
 z = sub(a,b)  
print(z)  
**if**(op == **"\*"**):  
 z = mul(a,b)  
print(z)  
**if**(op == **"/"**):  
 z = div(a,b)  
print(z)

enter the 1st num3

enter the 2nd num4

enter the operator\*

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**3. Write a function that generates a list with values that are square of number between 1 and 20.**

list = []  
**def**sqr(a):  
 p = a\*a  
**return** p  
**for** r **in** range(1,21):  
list.append(sqr(r))  
print(**"the square of "**,r,**" is "**,list[r-1])

The square of 1 is 1

The square of 2 is 4

The square of 3 is 9

The square of 4 is 16

The square of 5 is 25

The square of 6 is 36

The square of 7 is 49

The square of 8 is 64

The square of 9 is 81

The square of 10 is 100

The square of 11 is 121

The square of 12 is 144

The square of 13 is 169

The square of 14 is 196

The square of 15 is 225

The square of 16 is 256

The square of 17 is 289

The square of 18 is 324

The square of 19 is 361

The square of 20 is 400

**4. Define a class named Shape with static method printType. Define methods draw() and area(). Now define two class Rectangle and Triangle. Rectangle has two attributes length and width. The Triangle class has attributes a,b and c. Override the two methods of shape class. Demonstrate the functionality of class by creating its objects.**

**class** Shape():  
@staticmethod  
**def**printType():  
print(**"static method"**)  
**def**draw(self):  
print(**"draw"**)  
**def**area(self):  
print(**"area"**)  
**class** rectangle(Shape):  
**def**\_\_init\_\_(self):  
self.width = 23  
self.length =34  
**class** triangle(Shape):  
**def**\_\_init\_\_(self):  
self.a = 2  
self.b = 3  
self.c = 4  
**def**draw(self):  
print(**"draw again2"**)  
**def**area(self):  
print(**"area again2"**)  
s = Shape()  
Shape.printType()  
t = triangle()  
r = rectangle()  
s.area()  
s.draw()  
r.draw()  
t.draw()

static method

area

draw

draw

draw again2

**5. Using recursion, write a program to calculate the reverse of a string.**

str = input(**"Enter the String"**)  
**def**rec(st):  
**if**(st==**""**):  
**return ""  
else**:  
**return** rec(st[1:])+st[0]  
a = rec(str)  
print(a)

Enter the String

Khan Sahib

bihaSnahK