Python Programming (20CS31P)

Student Name : _____

Register Number : _____

Roll No : _____

Course Name :	Python Programming
Course Code :	20CS31P
Semester :	III SEM
Programme :	Computer Science and Engineering
College:	Government Polytechnic, Karwar (114)

Course Coordinator **HOD**

List of Programs

Python is a widely used high-level programming language. To write and execute code in python, we first need to install Python on our system.

Installing Python on Windows takes a series of few easy steps.

Step 1: Download the Full Installer

Follow these steps to download the full installer:

- Open a browser window and navigate to the Python.org Downloads page for Windows.
- Under the "Python Releases for Windows" heading, click the link for the Latest Python 3 Release - Python 3.x.x. As of this writing, the latest version was Python 3.10.
- Scroll to the bottom and select either Windows x86-64 executable installer for 64-bit or Windows x86 executable installer for 32-bit.

Step 2 – Run Executable Installer

We downloaded the Python 3.10 Windows 64 bit installer.

Run the installer. Make sure to select both the checkboxes at the bottom and then click Install New.

On clicking the Install Now, The installation process starts.

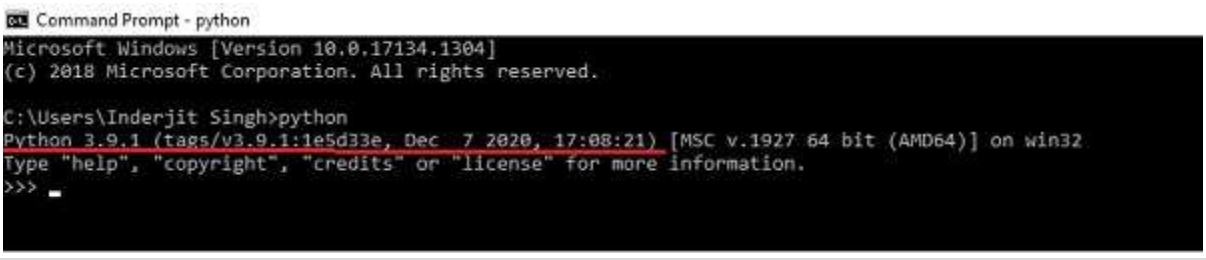
The installation process will take few minutes to complete and once the installation is successful, the following screen is displayed.

Step 3 – Verify Python is installed on Windows

To ensure if Python is successfully installed on your system. Follow the given steps

- Open the command prompt.
- Type 'python' and press enter.

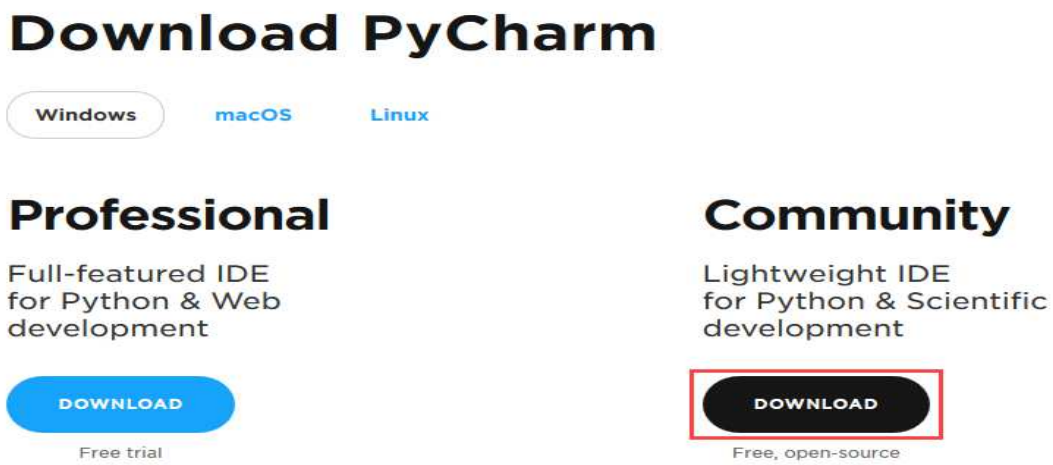
The version of the python which you have installed will be displayed if the python is successfully installed on your windows.



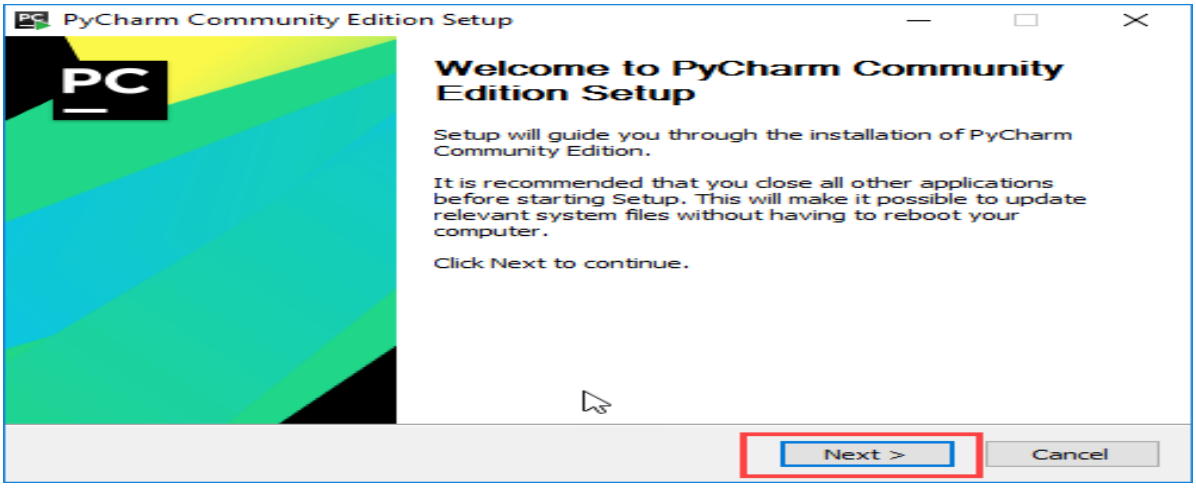
PyCharm is a cross-platform editor developed by JetBrains. Pycharm provides all the tools you need for productive Python development.

Below are the detailed steps for installing PyCharm

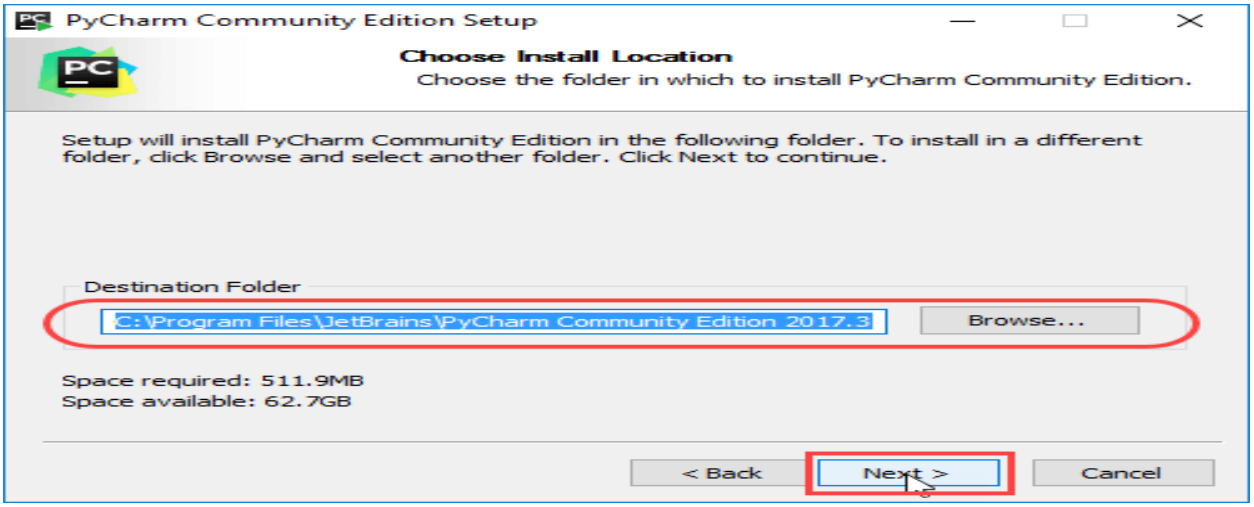
Step1: To download PyCharm visit the website https://www.jetbrains.com/pycharm/download/ and Click the "DOWNLOAD" link under the Community Section.



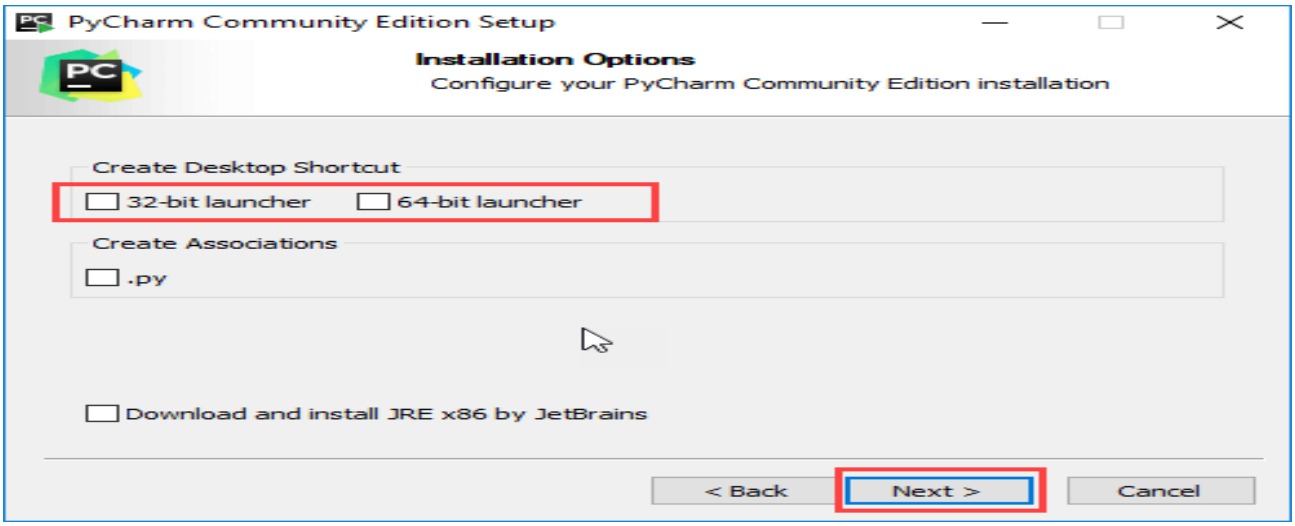
Step 2) Once the download is complete, run the exe for install PyCharm. The setup wizard should have started. Click "Next".



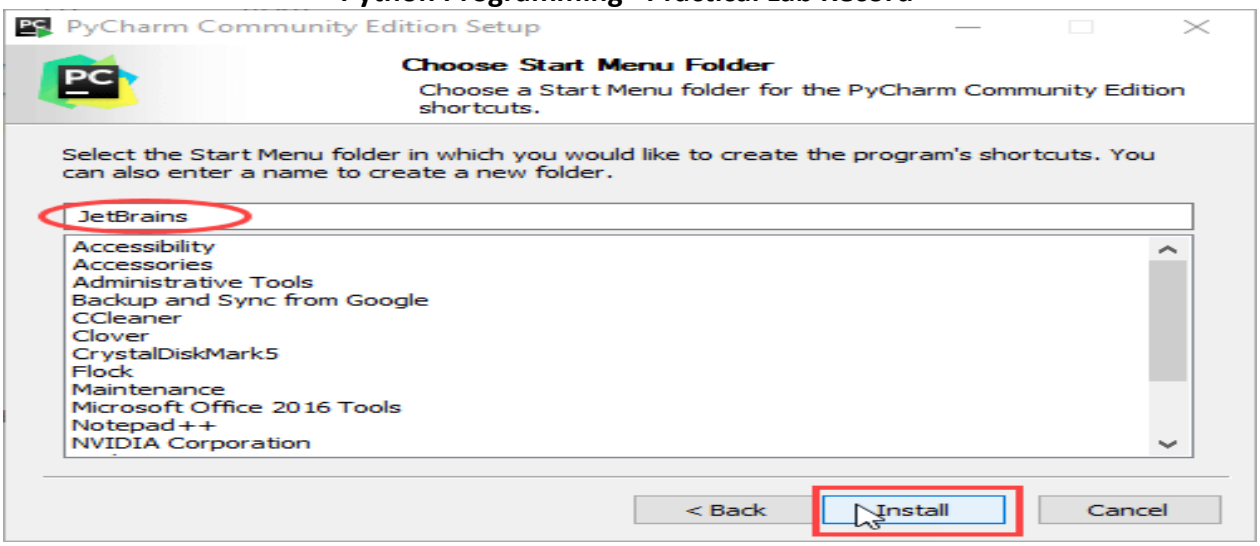
Step 3) On the next screen, Change the installation path if required. Click "Next".



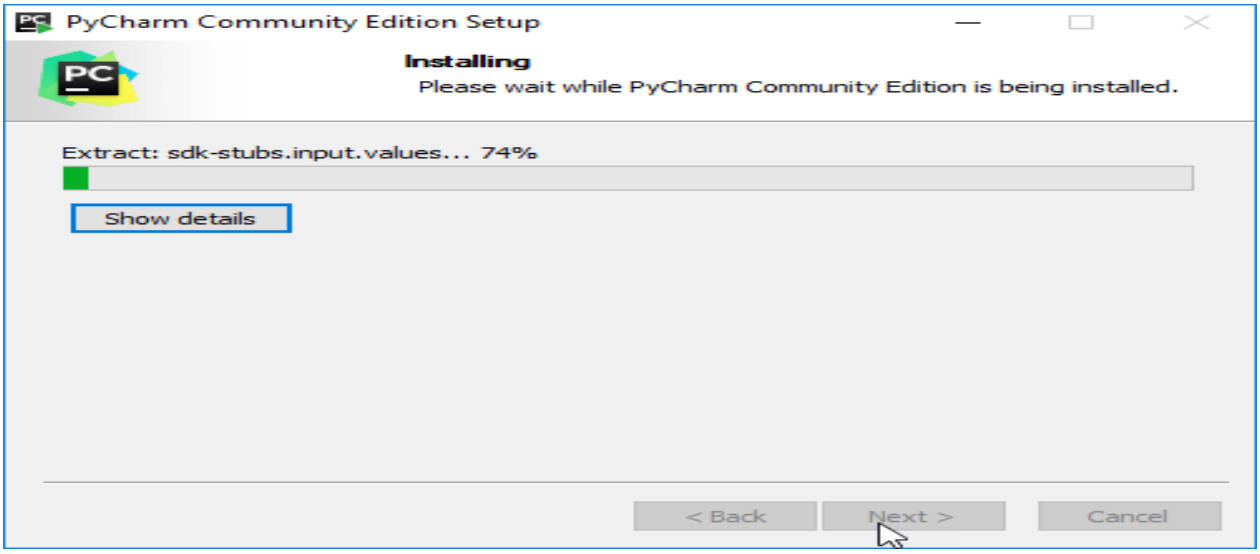
Step 4) On the next screen, you can create a desktop shortcut if you want and click on "Next".



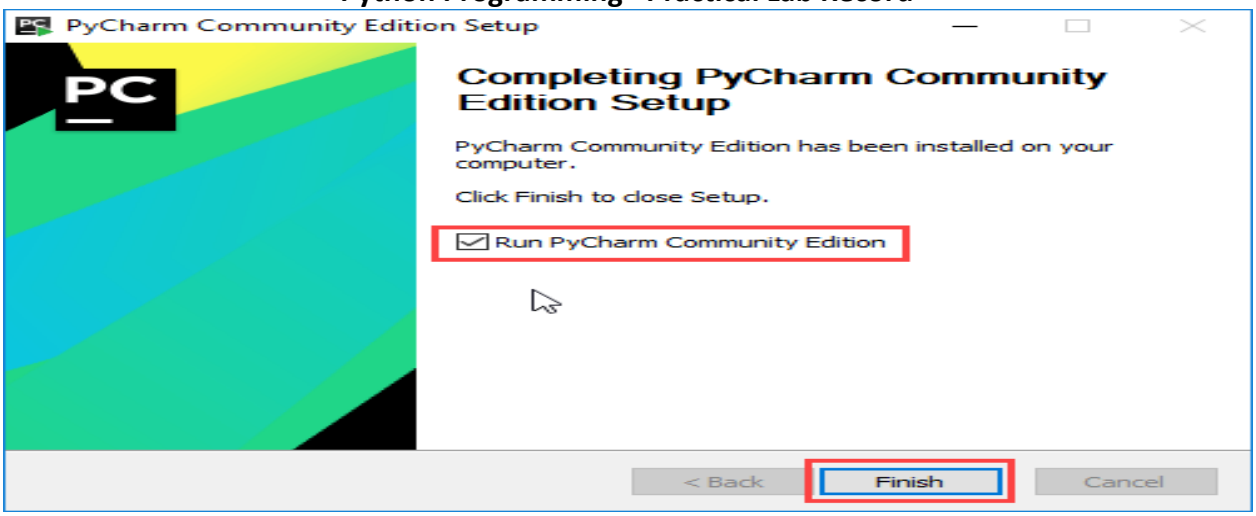
Step 5) Choose the start menu folder. Keep selected JetBrains and click on "Install".



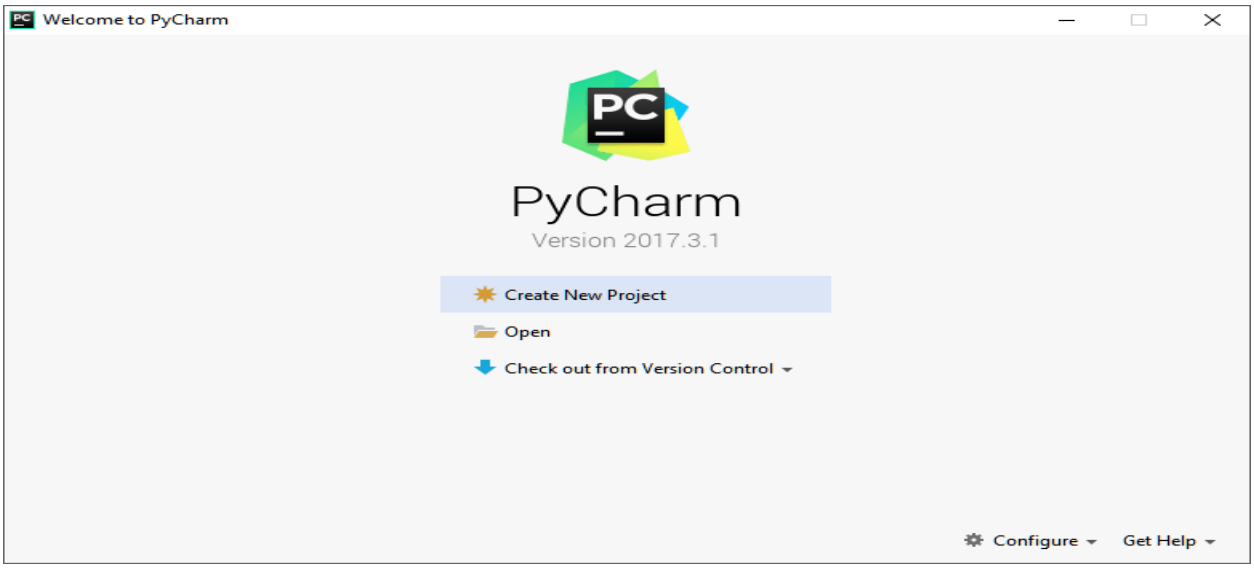
Step 6) Wait for the installation to finish.



Step 7) Once installation finished, you should receive a message screen that PyCharm is installed. If you want to go ahead and run it, click the "Run PyCharm Community Edition" box first and click "Finish".



Step 8) After you click on "Finish," the Following screen will appear.



Python Programming –Practical Lab Record

1. **Write a Program to input a Student Name, Semester, City name, and Pin code from keyboard and display the same on output screen.**

Algorithm:

Step1: Input a student name, semester, city name and pincode from the keyboard.

Step2: display the same information.

Program:

```
name=input("Enter your name:")

sem=int(input("Enter your semester:"))

city=input("Enter your city name:")

pincode=int(input("Enter a pincode of your city:"))

print("\n\n\n")

print("Student Name :",name)

print("Semester:",sem)

print("City:",city)

print("Pincode:",pincode)
```

:OUTPUT 1:

Python Programming –Practical Lab Record

:OUTPUT 2:

:OUTPUT 3:

2. Write a program to Evaluate expressions and displays formatted output.

Algorithm:

Step 1: Consider two variables a, b and store values.

Step 2: Calculate sum and difference of these values and store these result in variables called sum and sub respectively.

Step 3: Display the values of a, b, sum, sub using string format function.

(a) **string formatting using format() function**

```
a = 20
b = 10
sum = a + b
sub = a- b
print('The value of a is {} and b is {}'.format(a,b))
print('{2} is the sum of {0} and {1}'.format(a,b,sum))
print('{sub_value} is the subtraction of {value_a} and {value_b}'.format(value_a =
a ,value_b = b,sub_value = sub))
```

:OUTPUT 1:

3. If the ages of Ram, Shyam and Ajay are input through the keyboard, write a program to determine the youngest of the three.

Algorithm:

Step1: Take a input for ages if Ram,Shyam and Ajay.

Step2: If Ram age is greater than Shyam age and Ajay age , display "Ram is youngest".

Step3: Otherwise,If Shyam age is greater than Ram age and Ajay age , display "Shyam is youngest".

Step4: Otherwise display "Ajay is youngest".

Program:

```
ram=int(input("Enter a age of Ram:"))
shyam=int(input("Enter a age of Shyam:"))
ajay=int(input("Enter a age of Shyam:"))
if (ram>shyam)and ( ram>ajay):
        print("Ram is youngest.")
elif shyam>ram and shyam>ajay:
        print("Shyam is youngest.")
else:
    print("Ajay is youngest.")
```

Python Programming –Practical Lab Record

:OUTPUT 1:

:OUTPUT 2:

4. Since the introduction of the Gregorian calendar (in 1582), the following rule is used to determine the kind of year:

- **if the year number isn't divisible by four, it's a common year;**
- **otherwise, if the year number isn't divisible by 100, it's a leap year;**
- **otherwise, if the year number isn't divisible by 400, it's a common year; otherwise, it's a leap year.**

Algorithm:

Step1: Input a value of a year from the keyboard.

Step2: If year is smaller than 1582 ,display "Year is not in Gregorian calender".

Step3: Otherwise again checking for a condition.

Step4: If the year is not divisible by 4,display "common year".

Step5: Otherwise ,If the year is not divisible by 100,display "leap year".

Step6: Otherwise ,If the year is not divisible by 400,display "common year".

Step7 : Otherwise, display "leap year".

Program:

```
year=int(input("Enter the value of year:"))

if (year<1582):
  print("Year is not in Gregorian calender.")

else:

  if(year%4!=0):
     print("Common year.")

  elif (year%100!=0):
      print("Leap year.")

  elif(year%400!=0):
      print("Common year.")

  else:
      print("Leap year.")
```

Python Programming –Practical Lab Record

:OUTPUT 1:

:OUTPUT 2:

5. Write a program that asks for a word, phrase, or sentence. The program should then print whether the input is a palindrome.

Note: Use For Loop

Algorithm:

Step1: Input a word ,phrase or statement from the keyboard.

Step2: Find the reverse of a word using for loop.

Step3: Store that reverse string in another variable.

Step4: If the original string is equal to reverse string, display " The word is palindrome".

Step5: Otherwise ,display "The word is not a pakindrome".

Program:

```
letter=input("Enter a word,phrase or sentence:")
reverse=""
for i in letter:
    reverse=letter[::-1]
print("Reversed word,phrase or sentence is:",reverse)
if letter==reverse:
    print("The word,phrase or sentence is palindrome.")
else:
    print("The word,phrase or sentence is not palindrome.")
```

Python Programming –Practical Lab Record

:OUTPUT 1:

:OUTPUT 2:

6. Write a program to find the factorial value of any number entered through the keyboard.

Note: Use While Loop.

Algorithm:

Step1: Input a number from the keyboard.

Step2: Initialize the result to 1 and store it to one variable.

Step3: Start a loop and multiply the result by the number.

Step4: Reduce one from the number in each iteration.

Step5: End the loop once the number reaches 1

Step6: display the result value.

Program:

```
n=int(input("Enter a number:"))
temp=n
fact=1
while n!=0:
        fact*=n
        n-=1
print("Factorial of {0} is {1}.".format(temp,fact))
```

Python Programming –Practical Lab Record

:OUTPUT 1:

:OUTPUT 2:

7. Write a program to create two sets using set comprehension and perform following set operations:

(i) Union

(ii) Difference

(iii) Symmetric Difference

(iv) Intersection.

Algorithm:

Step1: Create a two sets.

Step2: Perform a union operation using | operator and display it's result.

Step3: Perform a difference operation using - operator and display it's result.

Step4: Perform a symmetric difference operation using ^ operator and display it's result.

Step5: Perform a intersection operation using & operator and display it's result.

Program:

```
set1={var**2 for var in range(1,11)}

set2={i for i in range(1,11) if i%2==0}

print("Elements of Set1 are :",set1 )
print("Elements of Set2 are :",set2 )

print("Union Operation",set1|set2)
print("Intersection Operation",set1&set2)
print("Difference Operation",set1-set2)
print("Symmetric Difference Operation",set1^set2)
```

Python Programming –Practical Lab Record

:OUTPUT 1:

8. Write a program to create a tuple and perform following operations

(i) Display the elements of tuple

(ii) Find an item using index method

(iii) Reverse all the elements

(iv) Display the elements from 3 rd position to 7th position

(v) Delete entire tuple

ALGORITHM:

Step 1: Start

Step 2: Declare and Initialize tuple1

Step 3: Display tuple1

Step 4: Find an item using index method.

Step 5: Reverse tuple1 elements and Display

Step 6: Display elements from 3rd to 7th position

Step 7: Delete tuple1

Step 8: Stop

PROGRAM:

```
tuple1=(1,2,3,4,7,8,9)
print("Elements of tuple are:\n")
for i in range(len(tuple1)):
    print(tuple1[i])
find=int(input("Enter element to search in tuple  "))
i=tuple1.index(find)
print("\n Element %d found at index %d in tuple \n"%(find,i))
print("Elements of tuple in reverse order \n ",tuple1[::-1])
print("Elements from 3 rd position to 8 th position",tupl1[3:8])
```

```
print("Deleting a tuple")

del tuple1

print("Elements of tuple are ",tuple1)
```

:OUTPUT 1:

9.Write a program to create a List of 10 odd numbers using List Comprehension and perform the following:

i) Display all the elements

(ii) Find the length of list

(iii) Adding new items to list using append(), insert()

(iv) Remove certain items using pop(), remove()

(v) Find the particular item using index()

ALGORITHM:

Step 1: Start

Step 2: Declare and initialize List1 using Comprehension

Step 3: Display List1

Step 4: Obtain the length of List1

Step 5: Add items using append(), insert() to List1

Step 6: Remove items using pop(), remove() from List1

Step 7: Find the particular item using index() and display

Step 8: Stop

PROGRAM:

```
list1=[i for i in range(20) if i%2!=0]


print("Elements of List are ")
for i in range(len(list1)):
    print(list1[i])
print("Length of list is  ", len(list1))
print("Adding new item using append method")
```

```
list1.append(99)

print("Adding new item using insert method")

list1.insert(1,2)

print("Elements are: ", list1)

print("Removing an item using pop method")

list1.pop(1)

print("Removing an item using remove method")

list1.remove(3)

print("Elements are: ", list1)

find=int(input("Enter the element to search"))

pos=list1.index(find)

print("%d element found at index %d"%(find,pos))
```

Python Programming –Practical Lab Record

:OUTPUT 1:

10.Write a program to create a List of 10 Even numbers using List Comprehension and perform the following:

(i) Sort List

(i) Reverse List

(iii) Find Max, Min, and Sum

(iv) Display the range of items using slicing operator

(v) Clear all elements

(vi) Delete the list

ALGORITHM:

Step 1: Start

Step 2: Declare and initialize List1 using Comprehension

Step 3: Display List1

Step 4: Sort List1

Step 5: Reverse List1

Step 6: Display max, min and sum of List1

Step 7: Display items in range

Step 8: Clear List1

Step 9: Delete List1

Step 10: Stop

PROGRAM

```
list1=[i for i in range(20) if i%2==0]

print("Elements of List are ")
for i in range(len(list1)):
    print(list1[i])
```

```
print("Elements of list before sort ",list1)
list1.sort()
print("Elements of list after sort ",list1)
list1.reverse()
print("Elements of list after reverse ",list1)

print("Maximum ",max(list1))
print("Minimum ",min(list1))
print("Sum of elements ",sum(list1))
print("Elements from 3 rd position to 7 position",list1[3:8])

print("Clearing list" )
list1.clear()
print("Elements of list are ",list1)
```

Python Programming –Practical Lab Record

:OUTPUT 1:

11. Consider Two strings S1 "Government Polytechnic" and S2 "Karwar, Uttarakannada" Create a program to create these 2 strings and perform the following:

(i) Find First character in S1

(ii) Find Last but one character in S2

(iii)Find length of both strings

(iv)Reverse S1

(v)Apply strip(),lower(),upper(),split(),replace(),find(),join(),max(),min() methods

ALGORITHM:

Step 1: Start

Step 2: Declare S1 and assign "Government polytechnic" to S1

Step 3: Declare S2 and assign "Karwar, Uttarakannad" to S2

Step 4: Display first character of S1

Step 5: Display last character of S2

Step 6: Obtain length of S1 and display

Step 7: Obtain length of S2 and display

Step 8: Declare variable reverse

Step 9: Use a for loop to iterate through S1

Step 10: Reverse S1 string and assign to reverse variable

Step 11: Display reverse

Step 12: Declare a string list , assign to str

Step 13: Use join() to join str , assign to str2

Step 14: Display str2

Step 15: Apply strip() and display

Step 16: Apply split() and display

Step 17: Apply lower() and display

Step 18: Apply upper() and display

Step 19: Apply find() and display

Step 20: Apply max() and display

Step 21: Apply min() and display

Step 22: Apply replace() and display

Step 23: Stop

Program

```
S1 = "Government Polytechnic"
S2 = "Karwar, Uttarakannada"
print("String1 is ", S1)
print("String2 is ", S2)
print("First character of S1: ",S1[0])
print("Last but one character of S2: ",S2[-2])
print("Length of String1 is:", len(S1))
print("Length of String2 is:",len(S2))

reverse =""
for i in S1:
        reverse = i + reverse
print("Reversed string of String1",reverse)
print("Demonstration of String Operations")
str = ["Strings", "In", "Python"]
str2=(" ").join(str)
print(str2)
print("Strip method",S1.strip())
print("Split method",S1.split())
print("Lowercase",S1.lower())
```

```
print("Uppercase",S1.upper())
print("Find Method:",S1.find("G"))
print("Max Method:",max(S1))
print("Min Method:",min(S1))
S = S1.replace("Government Polytechnic" , "Diploma college")
print(S)
```

Python Programming –Practical Lab Record

:OUTPUT 1:

12.Write a program to create two arrays (i) integer numbers array (ii) floating point numbers array and perform following operations:

(a) Insert new elements using insert()

(b) Remove Existing elements using pop(),remove()

(c) print elements from beginning to a range use [:Index].

(d) print elements from end use [:-Index]

(e) print elements from specific Index till the end use [Index:]

(f) print elements within a range, use [Start Index : End Index]

(g) print whole List with the use of slicing operation, use [:].

(h) print whole array in reverse order, use [::-1].

ALGORITHM:

Step 1: Start

Step 2: Import array module

Step 3: Declare array of integer numbers and assign to ary1

Step 4: Declare array of floating point numbers and assign to ary2

Step 5: Insert an item using insert() method

Step 6: Remove Existing elements using pop() , remove()

Step 7: Display elements from beginning to a range

Step 8: Display elements from end

Step 9: Display elements from specific Index to till the end

Step 10: Display elements within a range

Step 11: Display ary2

Step 12: Display ary2 in reverse order

Step 13: Stop

PROGRAM:

```
import array as arr
ary1 = arr.array('i' , [1,2,3,4,5,6,7,8,9])
ary2 = arr.array('d' , [1.1,2.5,6.7,3.5,2.8,9.1])

print("Elements of First array are :")
for i in range(len(ary1)):
        print(ary1[i])

print("Elements of Second array are :")
for i in range(len(ary2)):
        print(ary2[i])

print("Insertion")
ary1.insert(0 , 10)
print("Updated array is ",ary1)
print("Removal")
ary1.remove(10)
print("Updated array is ",ary1)
ary1.pop(8)
print("Updated array is ",ary1)
print("Slicing Oparation")
print(ary1[ : len(ary1)])
print(ary1[-1 : ])
print(ary1[2 : ])
```

Python Programming –Practical Lab Record

```
print(ary1[2 : 8])

print(ary2[ : ])

print(ary2[ : : -1])
```

:OUTPUT 1:

13. The Fibonacci sequence is a series of numbers where a number is the addition of the last two numbers, starting with 0, and 1.

The Fibonacci Sequence: 0, 1, 1, 2, 3, 5, 8, 13, 21, 34, 55...

Written as a rule, the expression is: $X_n = X_n\text{-}1 + X_n\text{-}2$

Write a program to find n Fibonacci sequence by

(a) By defining function

(b) By using recursion

ALGORITHM: (a) By defining function

Step 1: Start

Step 2: Declare function fib()

if n < 1 then return 0

if n < 3 then return 1

Declare and initialize variables val1 = val2 = 1

Declare and initialize variable sum = 0

Use for loop to iterate through range between 3 and n+1

Add val1 and val2, assign result to sum

Assign val1 to val2

Assign sum to val1

Return sum

Step 3: Input n value

Step 4: Use for loop to iterate in range of n value & Call function fib() and display values

Step 5: Stop

ALGORITHM: (b) By using recursion

Step 1: Start

Step 2: Declare function fib()

if n < 1 then return 0

if n < 3 then return 1

Return fib(n - 1) + fib(n - 2)

Step 3: Input n value

Step 4: Use for loop to iterate in range of n value Call function fib() and display values

Step 9: Stop

PROGRAM: (a) By defining function

```
def fib(n):
    if n < 1:
        return 0
    if n < 3:
        return 1
    val1  = val2 = 1
    sum = 0
    for i in range(3, n+1):
        sum = val1 + val2
        val2 = val1
        val1 = sum
    return sum

n = int(input("Enter the Fibonacci term: "))
for i in range(n):
    print(i, "-->", fib(i))
```

PROGRAM: (b) By using recursion

```
def fib(n):
    if n < 1:
        return 0
    if n < 3:
        return 1
    return fib(n-1) + fib(n-2)
n = int(input("Enter the Fibonacci term: "))
for i in range(n):
    print(i, "-->", fib(i))
```

:OUTPUT 1:

Python Programming –Practical Lab Record

:OUTPUT 2:

14. Write a program to demonstrate import module.

ALGORITHM:

STEP1: Create a python script cal.py

STEP2: Create a python file input.py and import specified function defined in cal.py file

STEP3: Create a python file sample.py and import all function defined in cal.py file

PROGRAM

cal.py

```
def summation(a,b):
    return a+b
def subtraction(a,b):
        return a-b;
def multiplication(a,b):
    return a*b;
def divide(a,b):
    return a/b;
```

input.py

```
from cal import summation ,divide
a = int(input("Enter the first number"))
b = int(input("Enter the second number"))
print("Sum = ",summation(a,b))
print("Division = ",divide(a,b))
```

sample.py

```
import  from cal
a = int(input("Enter the first number"))
```

```
b = int(input("Enter the second number"))

print("Sum = ",summation(a,b))

print("Product = ",multiplication(a,b))

print("Difference = ",subtract(a,b))
```

:OUTPUT 1:

15. Write a program to demonstrate math and random modules.

ALGORITHM:

STEP1: import math , random module

STEP2: write a code to demonstrate various inbuilt function of math and random module

PROGRAM

(a) math module

```
import math

print("Euler Value is :",math.e)

print("PI Value is :",math.pi)

print("Factorial :",math.factorial(5))

print("GCD :",math.gcd(5,57))

print("Square root :",math.sqrt(5))

print("Ceil Value :",math.ceil(5.35))

print("Floor Value :",math.floor(5.35))

print("Sin Theta Value:",math.sin(45))

print("Cos Theta Value:",math.cos(45))

print("Tan Theta Value:",math.tan(45))
```

(b) random module

```
import random
print("Random integers between 0 to 5:",random.randint(0,5))
print("Random Floating numbers between 0 to 1:",random.random())
list1= [1,4,True,800,"python",27,"hello"]
print("Random element from list is :",random.choice(list1))
```

Python Programming –Practical Lab Record

:OUTPUT 1:

:OUTPUT 2: