

**Programming in Python**  
**Practical Assignment**  
**S.Y B.Sc (CS/IT) SEMSTER-4**

**[How to start working with Python IDE](#)**

Follow the instructions below to start a jupyter notebook in the Linux environment.

**Step 1:**

Run following command on Linux terminal:

1. source pyenv/bin/activate
2. jupyter lab

**Step 2: Start new Python 3 notebook from Jupyter and Rename notebook as per exercise**

**Assignment:1**

**AIM:Basic of Python Programming**

Sample code 1:

```
x = 1.10
y = 1.0
z = -35.59
print(type(x))
print(type(y))
print(type(z))
```

**sample code 2:**

```
x = 5
y = "John"
print(x)
```

```
print(y)
```

### **sample code 3:**

```
x = "Python "  
y = "is "  
z = "awesome"  
print(x + y + z)
```

### **sample code 4:**

```
x = float(1)  
y = float(2.8)  
z = float("3")  
w = float("4.2")  
print(x)  
print(y)  
print(z)  
print(w)
```

### **sample code 5:**

```
x = str("s1")  
y = str(2)  
z = str(3.0)  
print(x)  
print(y)  
print(z)
```

### **sample code 6:**

```
a = "Hello, World!"
```

```
print(a[1])
```

sample code 7:

```
x = 5
```

```
y = 2
```

```
print(x % y)
```

sample code 8:

```
# Program to check if a number is prime or not
```

```
num = 29
```

```
# To take input from the user
```

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

```
# define a flag variable
```

```
flag = False
```

```
if num == 0 or num == 1:
```

```
    print(num, "is not a prime number")
```

```
elif num > 1:
```

```
    # check for factors
```

```
    for i in range(2, num):
```

```
        if (num % i) == 0:
```

```
            # if factor is found, set flag to True
```

```
            flag = True
```

```
            # break out of loop
```

```
            break
```

```
# check if flag is True
if flag:
    print(num, "is not a prime number")
else:
    print(num, "is a prime number")
```

### **Self practice:**

1. Display personal information
2. Calculate Simple Interest
3. Write a python code to input a number and check whether number is ODD or EVEN
4. Write a python code which take three numbers and find the middle number from them.
5. Write a Python code which display multiplication table of 5.

### **Extra Practice:**

1. Write a python code which take input of three number and check the smallest number.
2. Write a python code which take three numbers and find the middle number from them.
3. Write a python code which input 3 subject marks and calculate the total, percentage and grade

## **Assignment:2**

### **AIM: String Python Programming**

**Q.1 to 3 Take following input and generate**

**1. Input: "welcome to the world of AI"**

**Output: "IA fo dlrow eht ot emoclew"**

**2. Input : snack = "Chocolate cookie."**

**Output 1: cookie Output 2: Vanila**

**3. Input: S1="welcome to the world of AI"**

**Output: wceohwloA**

**Q.4 Count and print the occurrence of word "AI" in following paragraph**

"AI, or artificial intelligence, is revolutionizing various industries.

AI technologies are becoming increasingly important in today's world.

The future of AI looks promising."

**Q:5 Replace the word "AI" with "IOT" in the above paragraph.**

**Q:6 Take string input as below and create a short form of list.**

**Input : S1="welcome to the world of AI"**

**Output : "WTTWOA"**

**Q:7 Split given string and generate following output**

**Input : S1="welcome to the world of AI"**

**Output : ['welcome', 'to', 'the', 'world', 'of', 'AI']**

**Q:8 Take string input as below and find the index value of a particular word "AI".**

**Input : S1="welcome to the world of AI"**

**Output: 24**

### **Extra Practice:**

**Q:9 Write a Python program to remove characters that have odd index values in a given string.**

**Input: S1='welcome to the world of AI'**

**OUTPUT:** wloet h ol fA

**Q:10 Write a Python program to count and display the vowels of a given String**

S1="welcome to the world of AI"

Vowels Character : ['e', 'o', 'o', 'A', 'I']

Vowels Count : 5

### **Assignment:3**

#### **AIM: List, tuple, Dictionary and sets**

**Implement code of python:**

```
list1 = ['physics', 'chemistry', 1997, 2000]
```

```
list2 = [1, 2, 3, 4, 5, 6, 7 ]
```

1. Display following items using List:

```
print "list1[0]: ", list1[0]
```

```
print "list2[1:5]: ", list2[1:5]
```

2. Example 2: update List items

```
print "Value available at index 2 : "
```

```
print list[2]

list[2] = 2001;

print "New value available at index 2 : "

print list[2]
```

### 3. Example 3:

```
list1, list2 = [123, 'xyz', 'zara'], [456, 'abc']

print "First list length : ", len(list1)

print "Second list length : ", len(list2)
```

### 4. Example 4:

```
list1 = ["a", "b", "c", "d"]
list2 = [25.50, True, -55, 1+2j]

print ("Item at 0th index in list1: ", list1[-1])
print ("Item at index 2 in list2: ", list2[-3])
print ("Items from index 1 to 2 in list1: ", list1[1:3])
print ("Items from index 0 to 1 in list2: ", list2[0:2])
```

### 5. Example 5

```
list3 = [1, 2, 3, 4, 5]
print ("Original list ", list3)
list3[2] = 10
print ("List after changing value at index 2: ", list3)
```

### 6.

#### Example 6:

```
list1 = ["a", "b", "c", "d"]
print ("Original list: ", list1)
list2 = ['X', 'Y', 'Z']
```

```
list1[1:3] = list2
print ("List after changing with sublist: ", list1)
```

#### 7. Example 7:

```
list1 = ["Rohan", "Physics", 21, 69.75]
print ("Original list ", list1)
```

```
list1.insert(2, 'Chemistry')
print ("List after appending: ", list1)
```

```
list1.insert(-1, 'Pass')
print ("List after appending: ", list1)
```

#### 8. Example 8:

```
list1 = ["a", "b", "c", "d"]
print ("Original list: ", list1)
list1.append('e')
print ("List after appending: ", list1)
```

#### 9. Example 9:

```
list1 = ["Rohan", "Physics", 21, 69.75]
print ("Original list: ", list1)
```

```
list1.remove("Physics")
print ("List after removing: ", list1)
```

**Implement methods as below on list:**



- L.append() : Adds one item to the end of the list.
- L.extend() : Adds multiple items to the end of the list.
- L.pop(i) : Remove item 'i' from the list. Default:Last.
- L.reverse() : Reverse the order of items in list.
- L.insert(i,item): Inserts 'item' at position i.
- L.remove(item) : Finds 'item' in list and deletes it from the list.
- L.sort(): Sorts the list in- place i.e., changes the sequence in the list.

### **TUPLE data type:**

#### 1. Example 1

```
tup1 = ('physics', 'chemistry', 1997, 2000)
```

```
tup2 = (1, 2, 3, 4, 5, 6, 7 );
```

```
print ("tup1[0]: ", tup1[0])
```

```
print( "tup2[1:5]: ", tup2[1:5])
```

#### 2. Example 2

```
tup1 = (12, 34.56);
```

```
tup2 = ('abc', 'xyz');
```

```
# Following action is not valid for tuples
```

```
# tup1[0] = 100;
```

```
# So let's create a new tuple as follows
```

```
tup3 = tup1 + tup2;
```

```
print (tup3)
```

### 3. Example 3

```
tup = ('physics', 'chemistry', 1997, 2000);
```

```
print( tup)
```

```
del (tup)
```

```
print ("After deleting tup : ")
```

```
print( tup)
```

### **Self learn python code:**

Q:1 Write a Python program to sum all the items in a list.

Q:2 Write a Python program to remove duplicates from a list

Q:3 Write a Python program to print the numbers of a specified list after removing even numbers from it.

Q:4 Create an empty list in python and append English dictionary words to the list. Arrange list items In alphabetical order and find the position of specific words in the list.

Q:5 Convert two lists into a dictionary

Q:6 Write a python program to access only key of the dictionary

Q:7 Write a python program to access only the value of the dictionary.

Q:8 Merge two Python dictionaries into one

Q:9 Get the key of a minimum value from the following dictionary

Q:10 Write a Python program to find repeated items in a tuple

Q:11 Create a dictionary for book detail and sort books according to their price from low to high.

Q:12 Write a python program to create employee list with empid, emp name and salary and perform the following operations.

1. Sort employee list as per employee name.
2. Sort employee list in descending order according to their salary

Q:13 Write a Python program to remove an item from a tuple.

Q:14 Write a Python program to add member(s) to a set.

Q:15 Write a Python program to remove item(s) from a given set.

Q:16 Write a Python program to find the maximum and minimum values in a set.

Q-17 Write a Python script to add a key to a dictionary.

Sample Dictionary : {0: 10, 1: 20}

Expected Result : {0: 10, 1: 20, 2: 30}

Q-18 Write a Python script to concatenate the following dictionaries to create a new one.

Sample Dictionary :

dic1={1:10, 2:20}

dic2={3:30, 4:40}

dic3={5:50,6:60}

Expected Result : {1: 10, 2: 20, 3: 30, 4: 40, 5: 50, 6: 60}

Implementation of Dictionary:

1. Example 1---

```
subjectandcode={"Physics":42,"Chemistry":43, "Mathematics":41,
"Biology":44,"Computer
```

```
Science":83,"Informatics Practices":65,"English":101,"Hindi":2}
```

```
subjectandcode["Hindi"]
```

```
subjectandcode["Computer Science"]
```

2. Use of for loop:

```
for subject in subjectandcode:
```

```
    print(subject,":",subjectandcode[subject])
```

3. Use of keys( ) and values()

subjectandcode.keys()

subjectandcode.values()

4. Subject=list(subjectandcode.keys())

Subject

SubjectCode=list(subjectandcode.values())

SubjectCode

5. subjectandcode["Hindi"]=102

subjectandcode

6. subjectandcode["Sanskrit"]=122

subjectandcode

### **Example 2:**

Employee={"Name": "Bimlendu Kumar", "Department": "Computer Science", "Joining Year": 2007}

emp["Computer Science"]="Bimlendu Kumar"

emp

Emp1=dict(name="Prakash", Subject="Computer", School="HFC Barauni")

### **Example 3: use of following method**

(a) del <dictionary>[<key>]

(b) <dictionary>.pop(<key>)

### **Example 3-A:**

```
Subject={'Computer': '083', 'Informatics Practices': '065', 'English': '001',}
```

```
del Subject["English"]
```

```
Subject
```

### **Example 3-B:**

```
Subject.pop("Computer")
```

```
Subject
```

Example 4: check the value is on dictionary or not

```
emp={'age':25,"Salary":10000,"name":"sanjay"}
```

```
"age" in emp
```

```
"name" in emp
```

```
"basic" in emp
```

```
"basic" not in emp
```

## **Write a python code which check the value on dictionary using input any value**

```
dict1={0:"Zero",1:"One",2:"Two",3:"Three",4:"Four",5:"Five"}
```

### **Nested dictionary:**

Example 1:

```
visitor = {'Name':'Scott','Address':{'hno':'11A/B','City':'Kanpur','PinCode':'208004'}}
```

visitor['Name']

## **Assignment:4**

### **AIM: functions**

1. Write a Python function to find the maximum of three numbers.

2. Write a Python program to reverse a string.

Sample String : "1234abcd"

Expected Output : "dcba4321"

3. Write a Python function to calculate the factorial of a number (a non-negative integer). The function accepts the number as an argument.

4. Write a Python function to check whether a number falls within a given range.

5. Write a Python function that accepts a string and counts the number of upper and lower case letters.

Sample String : 'The quick Brown Fox'

Expected Output :

No. of Uppercase characters : 3

No. of Lower case Characters : 12

6. Write a Python function that takes a list and returns a new list with distinct elements from the first list.

Sample List : [1,2,3,3,3,3,4,5]

Unique List : [1, 2, 3, 4, 5]

7. Write a Python function that takes a number as a parameter and checks whether the number is prime or not.

Note : A prime number (or a prime) is a natural number greater than 1 and that has no positive divisors other than 1 and itself.

8. Python function to check if a number is palindrome or not.
9. Write a Python function to multiply all the numbers in a list1=[34,6,1,3]
10. Write a Python function to sum all the numbers in a list2=[3,5,6,7,8,1,0]
11. Write a python function to find the year is Leap year or not.
12. Write a python function to check inputted string is palindrome or not.
13. Write a python function to take two numbers to swap numbers.
14. Write a python to find sum of digits of inputted numbers.
15. Write a python function which display multiplication table of inputted numbers.

## **Practice Work-1**

**For Q.1 to 3 Take following input and generate given output.**

Q.1 Input : s = 'King Arthur'

Output: 'ruhtrA gniK'

Q.2 Input : snack = "Chocolate cookie."

Output 1: cookie Output 2: Vanila Cookie

Q.3 Input str = "Welcome to the world of Python"

Output : WcehwloPh

**Q.4 Count and print the occurrence of word "Apple" in following paragraph.**

Apple Inc. is an American multinational technology company headquartered in Cupertino, California, that designs, develops, and sells consumer electronics, computer software, and online services. It is considered one of the Big Four of technology along

with Amazon, Google, and Facebook. The company's hardware products include the iPhone smartphone, the iPad tablet computer, the Mac personal computer, the iPod portable media player, the Apple Watch smartwatch, the Apple TV digital media player, the Apple AirPods wireless earbuds and the HomePod smart speaker. Apple's software includes the macOS, iOS, iPadOS, watchOS and tvOS operating systems, the iTunes media player, the Safari web browser, and the iLife and iWork creativity and productivity suites, as well as professional applications like Final Cut Pro, Logic Pro, and Xcode. Its online services include the iTunes Store, the iOS App Store, Mac App Store, Apple Music, Apple TV+, iMessage, and iCloud. Other services include Apple Store, Genius Bar, AppleCare, Apple Pay, Apple Pay Cash, and Apple Card. Apple was founded by Steve Jobs, Steve Wozniak, and Ronald Wayne in April 1976 to develop and sell Wozniak's Apple I personal computer, though Wayne sold his share back within 12 days. It was incorporated as Apple Computer, Inc.

**Q.5 Replace word “Apple” with “Google” in above paragraph find position of word “TV”.**

**Q.6 Write a program to parse an email id to print from which email server it was sent**

**and when.**

Info : “ From priti.rad@gmail.com Sun Oct 16 20:29:16 2016”

Output: The email has been sent through gmail.com

It was sent on Sun Oct 16 20:29:16 2016

**Q.7 Take string input as below and create short form of list.**

S = “ Violet Indigo Blue Green Yelllow Orange Red”

Output: VIBGYOR

**Q.8 Switch the case in given string and generate following output.**

var = 'TechBeamers'

Output : tECHbEAMERS

**Q.9 Split given string and generate following output.**

var = "This is a good example"



Output 1: ['This', 'is', 'a', 'good', 'example']

Output 2: ['This', 'is', 'a', 'good example']

#### **Q.10 Split given paragraph in to four parts and count length of each statement.**

“A paragraph is a series of sentences that are organized and coherent, and are all related to a single topic. Almost every piece of writing you do that is longer than a few sentences should be organized into paragraphs.”

## **Practice work-2**

**Aim : To learn string and list operations in python.**

### **Basic:**

Q.1 Write a Python program to count words in a sentence and arrange words in descending

order.

Q.2 Write a Python program to sum all the items in a list

Q.3 Create an empty list in python and append English dictionary words to list. Arrange list

items In alphabetical order and find position of specific words in list.

### **Moderate:**

Q.4 Take input of any short text and check words of message that either they are standard

dictionary words or not. Use another for English dictionary words.

Example: Hi..How are u

Output :

Dictionary Words: How , are

Non Dictionary Words: Hi, u

Q.5 Write a Python program to check if a given string is python Keyword or not.

(Can be implemented with list and keyword library both)

**Advanced :**

Q.6 Take input of any number and generate all possible binary strings.

Example : Input no: 2

Output:

Binary Strings : 00 10 10 11

## Practice work-3

**Aim: To learn list and dictionary traversing in python.**

**Basic:**

Q.1 : Write a Python program to count words in a sentence.

Q.2: Write a Python program to find sum of marks of different subject from python dictionary object.

**Moderate:**

Q.3 : Write a Python program to find uncommon words from two Strings.

Given two sentences as strings A and B. The task is to return a list of all uncommon words. A word is uncommon if it appears exactly once in any one of the sentences, and does not appear in the other sentence.

Input : A = "Geeks for Geeks"

B = "Learning from Geeks for Geeks"

Output : ['Learning', 'from']

Input : A = "apple banana mango"

B = "banana fruits mango"

Output : ['apple', 'fruits']

Q.4 : Write a Python program to find Frequency of substring in given string.

**Advanced:**

Q.5 : Sort words of sentence in ascending order Given a sentence, sort it alphabetically in

ascending order.

Input : to learn programming refer geeksforgeeks

Output : geeksforgeeks learn programming refer to

## Practice work-4

Q.1 Write a python program to display elements of list in reverse order.

Q.2 Write a python program to find biggest and smallest elements from list.

Q.3 Write a python program to create employee list with empid, emp name and salary and perform following operations.

Sort employee list as per employee name.

Sort employee list in descending order according to their salaries.

**Moderate:**

Q.4 Create dictionary for book detail and sort books according to their price from low to high.

Q.5 Create a dictionary for city wise temperature details and display city with highest, lowest and average temperature.

Q.6 Create dictionary with student marks details and find total marks, percentage and class from dictionary object.

**Advanced:**

Q.7: Create dictionary to store year wise population of city and sort data for identifying

growth or decay pattern.

## Assignment-5

### Aim: text file handling in python

1. Write a function in python to read the content from a text file "poem.txt" line by line and display the same on screen.

2. Write a function in python to count the number of lines from a text file "story.txt" which is not starting with an alphabet "T".

Example: If the file "story.txt" contains the following lines: A boy is playing there.

There is a playground.

An aeroplane is in the sky.

The sky is pink.

Alphabets and numbers are allowed in the password.

The function should display the output as 3

3. Write a function in Python to count and display the total number of words in a text file.

4. Write a function in Python to read lines from a text file "notes.txt". Your function should find and display the occurrence of the word "the".

For example: If the content of the file is:

"India is the fastest-growing economy. India is looking for more investments around the globe. The whole world is looking at India as a great market. Most of the Indians can foresee the heights that India is capable of reaching."

The output should be 5.

5. Write a function display\_words() in python to read lines from a text file "story.txt", and display those words, which are less than 4 characters.

6. Write a function in Python to count the words "this" and "these" present in a text file "article.txt". [Note that the words "this" and "these" are complete words]

7. Write a function in Python to count words in a text file those are ending with alphabet "e".

8. Write a function in Python to count uppercase character in a text file.

9. A text file named "matter.txt" contains some text, which needs to be displayed such that every next character is separated by a symbol "#". Write a function definition for hash\_display() in Python that would display the entire content of the file matter.txt in the desired format.

Example :

If the file matter.txt has the following content stored in it :

THE WORLD IS ROUND

The function hash\_display() should display the following content :

T#H#E# #W#O#R#L#D# #I#S# #R#O#U#N#D#

10. Aditi has used a text editing software to type some text. After saving the article as WORDS.TXT, she realised that she has wrongly typed alphabet J in place of alphabet I everywhere in the article.

Write a function definition for JTOI() in Python that would display the corrected version of entire content of the file WORDS.TXT with all the alphabets "J" to be displayed as an alphabet "I" on screen.

Note: Assuming that WORD.TXT does not contain any J alphabet otherwise.

Example:

If Aditi has stored the following content in the file WORDS.TXT:

WELL, THJS JS A WORD BY JTSELF. YOU COULD STRETCH THJS TO BE A SENTENCE

The function JTOI() should display the following content:

WELL, THIS IS A WORD BY ITSELF. YOU COULD STRETCH THIS TO BE A SENTENCE

## Assignment-6

**Aim: Numpy library -array handling**

**self learn exercise:**

1. Python Program to find sum of array
2. Python Program to find largest element in an one dimensional array.
3. Python code to extract all numbers between a given range from a numpy array

Hint:

# Question: Get all items between 5 and 10 from a.

# Input: a = np.array([2, 6, 1, 9, 10, 3, 27])

# Output: (array([6, 9, 10]),)

4. Write a function rotate(arr[], d, n) that rotates arr[] of size n by d elements. In this article, we will explore the Reversal Algorithm for array rotation and implement it in [Python](#).

Example

Input: arr[] = [1, 2, 3, 4, 5, 6, 7]

d = 2

Output: arr[] = [3, 4, 5, 6, 7, 1, 2]

5. Python Program to Split the array and add the first part to the end.
6. Write a Python program for a given multiple numbers and a number n, the task is to print the remainder after multiplying all the numbers divided by n.

**Example Explanation:**

Input: arr[] = { 100, 10, 5, 25, 35, 14 },

n = 11

Output: 9

Explanation:  $100 \times 10 \times 5 \times 25 \times 35 \times 14 = 61250000 \% 11 = 9$

Input : arr[] = { 100, 10 },

n = 5

Output : 0

Explanation:  $100 \times 10 = 1000 \% 5 = 0$

7. Python Code for given 2 numpy arrays as matrices, output the result of multiplying the 2 matrices (as a numpy array)
8. Python Program for matrix transpose
9. Write a python code to swap the column of matrix

Original array

```
array([[0, 1, 2],  
       [3, 4, 5],  
       [6, 7, 8]])
```

Modified array

```
array([[1, 0, 2],  
       [4, 3, 5],  
       [7, 6, 8]])
```

Solution:

```
arr = np.arange(9).reshape(3,3)  
  
print('Original array')  
  
arr
```

# Solution

```
print("\nModified array")  
  
arr[:, [1,0,2]]
```

## 10. Python program to add two Matrices

11. Python program to multiply two matrices
12. Python program for Matrix Product
13. Adding and Subtracting Matrices in Python
14. Transpose a matrix in Single line in Python
15. Python | Matrix creation of  $n \times n$

**advanced:**

1. Write a NumPy program to find common values between two arrays.

Expected Output:

Array1: [ 0 10 20 40 60]

Array2: [10, 30, 40]

Common values between two arrays:

[10 40]

2. Write a NumPy program to get the unique elements of an array.

Expected Output:

Original array:

[10 10 20 20 30 30]

Unique elements of the above array:

[10 20 30]

Original array:

[[1 1]

[2 3]]

Unique elements of the above array:

[1 2 3]

3. Write a NumPy program to find the set difference between two arrays. The set difference will return sorted, distinct values in array1 that are not in array2.

Expected Output:



Array1: [ 0 10 20 40 60 80]

Array2: [10, 30, 40, 50, 70, 90]

Set difference between two arrays:

[ 0 20 60 80]

4. Write a NumPy program to find the set exclusive-or of two arrays. Set exclusive-or will return sorted, distinct values in only one (not both) of the input arrays.

Array1: [ 0 10 20 40 60 80]

Array2: [10, 30, 40, 50, 70]

Unique values that are in only one (not both) of the input arrays:

[ 0 20 30 50 60 70 80]

5. Write a NumPy program to find the union of two arrays. Union will return a unique, sorted array of values in each of the two input arrays.

Array1: [ 0 10 20 40 60 80]

Array2: [10, 30, 40, 50, 70]

Unique sorted array of values that are in either of the two input arrays:

[ 0 10 20 30 40 50 60 70 80]

6. Write a NumPy program to find the indices of the maximum and minimum values along the given axis of an array.

Original array: [1 2 3 4 5 6]

Maximum Values: 5

Minimum Values: 0

7. Write a NumPy program to change an array's dimension.

Expected Output:

6 rows and 0 columns

(6,)

(3, 3) -> 3 rows and 3 columns

[[1 2 3]

[4 5 6]

[7 8 9]]

Change array shape to (3, 3) -> 3 rows and 3 columns

```
[[1 2 3]
 [4 5 6]
 [7 8 9]]
```

8. Write a NumPy program to create another shape from an array without changing its data.

Reshape 3x2:

```
[[1 2]
 [3 4]
 [5 6]]
```

Reshape 2x3:

```
[[1 2 3]
 [4 5 6]]
```

9.. Write a NumPy program to create a new array of 3\*5, filled with 2.

Expected Output:

```
[[2 2 2 2 2]
 [2 2 2 2 2]
 [2 2 2 2 2]
 [2 2 2 2 2]
 [2 2 2 2 2]
 [2 2 2 2 2]]
```

10. Write a NumPy program to find the 4th element of a specified array.

Expected Output:

```
[[ 2 4 6]
 [ 6 8 10]]
```

Forth e1ement of the array:

6

## Assignment-7

# Aim: Pandas -Series and Data element

## Series:

1. Write a Pandas program to create and display a one-dimensional array-like object containing an array of data using Pandas module.
2. Write a Pandas program to convert a Panda module Series to Python list and it's type. [Hint : Use of `tolist()` method]
3. Write a Pandas program to add, subtract, multiple and divide two Pandas Series.

Sample Series: [2, 4, 6, 8, 10], [1, 3, 5, 7, 9]

Hint: `ds = ds1 + ds2`

`ds = ds1 - ds2`

`ds = ds1 * ds2`

`ds = ds1 / ds2`

4. Write a Pandas program to sort a given Series.

Sample Output:

Original Data Series:

0 100

1 200

2 python

```
3 300.12
```

```
4 400
```

```
dtype: object
```

```
0 100
```

```
1 200
```

```
3 300.12
```

```
4 400
```

```
2 python
```

```
dtype: object
```

## Dataframe:

10. Write a Pandas program to select the rows the score is between 15 and 20 (inclusive).

Sample Python dictionary data and list labels:

```
exam_data = {'name': ['Anastasia', 'Dima', 'Katherine', 'James', 'Emily',  
'Michael', 'Matthew', 'Laura', 'Kevin', 'Jonas'],  
'score': [12.5, 9, 16.5, np.nan, 9, 20, 14.5, np.nan, 8, 19],  
'attempts': [1, 3, 2, 3, 2, 3, 1, 1, 2, 1],  
'qualify': ['yes', 'no', 'yes', 'no', 'no', 'yes', 'yes', 'no', 'no', 'yes']}  
labels = ['a', 'b', 'c', 'd', 'e', 'f', 'g', 'h', 'i', 'j']
```

Expected Output:

```
Rows where score between 15 and 20 (inclusive):
```

```
attempts  name qualify  score
```

c	2	Katherine	yes	16.5
f	3	Michael	yes	20.0
j	1	Jonas	yes	19.0

11. Write a Pandas program to select the rows where number of attempts in the examination is less than 2 and score greater than 15.

Sample Python dictionary data and list labels:

```
exam_data = {'name': ['Anastasia', 'Dima', 'Katherine', 'James', 'Emily',
'Michael', 'Matthew', 'Laura', 'Kevin', 'Jonas'],
'score': [12.5, 9, 16.5, np.nan, 9, 20, 14.5, np.nan, 8, 19],
'attempts': [1, 3, 2, 3, 2, 3, 1, 1, 2, 1],
'qualify': ['yes', 'no', 'yes', 'no', 'no', 'yes', 'yes', 'no', 'no', 'yes']}
labels = ['a', 'b', 'c', 'd', 'e', 'f', 'g', 'h', 'i', 'j']
```

Expected Output:

Number of attempts in the examination is less than 2 and score greater than 15 :

	name	score	attempts	qualify
j	Jonas	19.0	1	yes

12. Write a Pandas program to change the score in row 'd' to 11.5.

Sample Python dictionary data and list labels:

```
exam_data = {'name': ['Anastasia', 'Dima', 'Katherine', 'James', 'Emily',
'Michael', 'Matthew', 'Laura', 'Kevin', 'Jonas'],
'score': [12.5, 9, 16.5, np.nan, 9, 20, 14.5, np.nan, 8, 19],
'attempts': [1, 3, 2, 3, 2, 3, 1, 1, 2, 1],
```

```
'qualify': ['yes', 'no', 'yes', 'no', 'no', 'yes', 'yes', 'no', 'no', 'yes']}  
labels = ['a', 'b', 'c', 'd', 'e', 'f', 'g', 'h', 'i', 'j']
```

Expected Output:

Change the score in row 'd' to 11.5:

	attempts	name	qualify	score
a	1	Anastasia	yes	12.5
b	3	Dima	no	9.0
c	2	Katherine	yes	16.5
...				
i	2	Kevin	no	8.0
j	1	Jonas	yes	19.0

13. Write a Pandas program to calculate the sum of the examination attempts by the students.

Sample Python dictionary data and list labels:

```
exam_data = {'name': ['Anastasia', 'Dima', 'Katherine', 'James', 'Emily',  
'Michael', 'Matthew', 'Laura', 'Kevin', 'Jonas'],  
'score': [12.5, 9, 16.5, np.nan, 9, 20, 14.5, np.nan, 8, 19],  
'attempts': [1, 3, 2, 3, 2, 3, 1, 1, 2, 1],  
'qualify': ['yes', 'no', 'yes', 'no', 'no', 'yes', 'yes', 'no', 'no', 'yes']}  
labels = ['a', 'b', 'c', 'd', 'e', 'f', 'g', 'h', 'i', 'j']
```

Expected Output:

Sum of the examination attempts by the students:

19

**14. Write a Pandas program to calculate the mean of all students' scores.**

**Data is stored in a dataframe.**

**Sample Python dictionary data and list labels:**

```
exam_data = {'name': ['Anastasia', 'Dima', 'Katherine', 'James', 'Emily',  
'Michael', 'Matthew', 'Laura', 'Kevin', 'Jonas'],  
'score': [12.5, 9, 16.5, np.nan, 9, 20, 14.5, np.nan, 8, 19],  
'attempts': [1, 3, 2, 3, 2, 3, 1, 1, 2, 1],  
'qualify': ['yes', 'no', 'yes', 'no', 'no', 'yes', 'yes', 'no', 'no', 'yes']}  
labels = ['a', 'b', 'c', 'd', 'e', 'f', 'g', 'h', 'i', 'j']
```

Expected Output:

Mean score for each different student in data frame:

13.5625

**15. Write a Pandas program to append a new row 'k' to data frame with given values for each column. Now delete the new row and return the original DataFrame.**

**Sample Python dictionary data and list labels:**

```
exam_data = {'name': ['Anastasia', 'Dima', 'Katherine', 'James', 'Emily',  
'Michael', 'Matthew', 'Laura', 'Kevin', 'Jonas'],  
'score': [12.5, 9, 16.5, np.nan, 9, 20, 14.5, np.nan, 8, 19],
```

'attempts': [1, 3, 2, 3, 2, 3, 1, 1, 2, 1],

'qualify': ['yes', 'no', 'yes', 'no', 'no', 'yes', 'yes', 'no', 'no', 'yes']}]}

labels = ['a', 'b', 'c', 'd', 'e', 'f', 'g', 'h', 'i', 'j']

Values for each column will be:

name : "Suresh", score: 15.5, attempts: 1, qualify: "yes", label: "k"

Expected Output:

Append a new row:

Print all records after insert a new record:

	attempts	name	qualify	score
--	----------	------	---------	-------

a	1	Anastasia	yes	12.5
---	---	-----------	-----	------

b	3	Dima	no	9.0
---	---	------	----	-----

.....

j	1	Jonas	yes	19.0
---	---	-------	-----	------

k	1	Suresh	yes	15.5
---	---	--------	-----	------

Delete the new row and display the original rows:

	attempts	name	qualify	score
--	----------	------	---------	-------

a	1	Anastasia	yes	12.5
---	---	-----------	-----	------

b	3	Dima	no	9.0
---	---	------	----	-----

.....

i	2	Kevin	no	8.0
---	---	-------	----	-----

j	1	Jonas	yes	19.0
---	---	-------	-----	------



**16. Write a Pandas program to get the items of a given series not present in another given series.**

**Sample Output:**

**Original Series:**

**sr1:**

**0     1**

**1     2**

**2     3**

**3     4**

**4     5**

**dtype: int64**

**sr2:**

**0     2**

**1     4**

**2     6**

**3     8**

**4     10**

**dtype: int64**

**Items of sr1 not present in sr2:**

```
0    1
2    3
4    5
dtype: int64
```

**17.** Write a Pandas program to get the items which are not common of two given series.

Sample Output:

Original Series:

sr1:

```
0    1
1    2
2    3
3    4
4    5
```

dtype: int64

sr2:

```
0    2
1    4
2    6
3    8
4   10
```

dtype: int64

### Advanced:

1. Write a Pandas program to display the default index and set a column as an Index in a given dataframe.

### Test Data:

0	s001	V	Alberto Franco	15/05/2002	35	street1	t1
1	s002	V	Gino Mcneill	17/05/2002	32	street2	t2
2	s003	VI	Ryan Parkes	16/02/1999	33	street3	t3
3	s001	VI	Eesha Hinton	25/09/1998	30	street1	t4
4	s002	V	Gino Mcneill	11/05/2002	31	street2	t5
5	s004	VI	David Parkes	15/09/1997	32	street4	t6

Code:

```
import pandas as pd
```

```
df = pd.DataFrame({  
    'school_code': ['s001','s002','s003','s001','s002','s004'],  
    'class': ['V', 'V', 'VI', 'VI', 'V', 'VI'],  
    'name': ['Alberto Franco','Gino Mcneill','Ryan Parkes', 'Eesha Hinton', 'Gino  
Mcneill', 'David Parkes'],  
    'date_Of_Birth':  
['15/05/2002','17/05/2002','16/02/1999','25/09/1998','11/05/2002','15/09/1997'],  
    'weight': [35, 32, 33, 30, 31, 32],  
    'address': ['street1', 'street2', 'street3', 'street1', 'street2', 'street4'],  
    't_id':['t1', 't2', 't3', 't4', 't5', 't6']})  
  
print("Default Index:")
```

```

print(df.head(10))

print("\nschool_code as new Index:")

df1 = df.set_index('school_code')

print(df1)

print("\nt_id as new Index:")

df2 = df.set_index('t_id')

print(df2)

```

Q-2: Write a Pandas program to create a multi Index frame using two columns and using an Index and a column.

**Test Data:**

0	s001	V	Alberto Franco	15/05/2002	35	street1	t1
1	s002	V	Gino Mcneill	17/05/2002	32	street2	t2
2	s003	VI	Ryan Parkes	16/02/1999	33	street3	t3
3	s001	VI	Eesha Hinton	25/09/1998	30	street1	t4
4	s002	V	Gino Mcneill	11/05/2002	31	street2	t5
5	s004	VI	David Parkes	15/09/1997	32	street4	t6

3. Write a Pandas program to display the default index and set a column as an Index in a given dataframe and then reset the index.

**Test Data:**

0	s001	V	Alberto Franco	15/05/2002	35	street1	t1
---	------	---	----------------	------------	----	---------	----

1	s002	V	Gino Mcneill	17/05/2002	32	street2	t2
2	s003	VI	Ryan Parkes	16/02/1999	33	street3	t3
3	s001	VI	Eesha Hinton	25/09/1998	30	street1	t4
4	s002	V	Gino Mcneill	11/05/2002	31	street2	t5
5	s004	VI	David Parkes	15/09/1997	32	street4	t6

**4.** Write a Pandas program to create an index labels by using 64-bit integers, using floating-point numbers in a given dataframe.

**Test Data:**

0	s001	V	Alberto Franco	15/05/2002	35	street1	t1
1	s002	V	Gino Mcneill	17/05/2002	32	street2	t2
2	s003	VI	Ryan Parkes	16/02/1999	33	street3	t3
3	s001	VI	Eesha Hinton	25/09/1998	30	street1	t4
4	s002	V	Gino Mcneill	11/05/2002	31	street2	t5
5	s004	VI	David Parkes	15/09/1997	32	street4	t6

**5.** Write a Pandas program to create a DataFrame using intervals as an index.

## Assignment-8

### Aim: Matplotlib library exercise

#### 1. EXAMPLE :

```

from matplotlib import pyplot as plt

from matplotlib import style

style.use('ggplot')

x = [5,8,10]

y = [12,16,6]

x2 = [6,9,11]

y2 = [6,15,7]

plt.plot(x,y,'g',label='line one', linewidth=5)

plt.plot(x2,y2,'c',label='line two',linewidth=5)

plt.title('Epic Info')

plt.ylabel('Y axis')

plt.xlabel('X axis')

plt.legend()

plt.grid(True,color='k')

plt.show()

```

## 2. Example :

```

from matplotlib import pyplot as plt

plt.bar([0.25,1.25,2.25,3.25,4.25],[50,40,70,80,20],
label="BMW",width=.5)
plt.bar([.75,1.75,2.75,3.75,4.75],[80,20,20,50,60],
label="Audi", color='r',width=.5)
plt.legend()
plt.xlabel('Days')
plt.ylabel('Distance (kms)')
plt.title('Information')

```

```
plt.show()
```

### **3. Example:**

```
import matplotlib.pyplot as plt
population_age =
[22,55,62,45,21,22,34,42,42,4,2,102,95,85,55,110,120,70,65,55,111,115,80,7
5,65,54,44,43,42,48]
bins = [0,10,20,30,40,50,60,70,80,90,100]
plt.hist(population_age, bins, histtype='bar', rwidth=0.8)
plt.xlabel('age groups')
plt.ylabel('Number of people')
plt.title('Histogram')
plt.show()
```

### **4. Example:**

```
import matplotlib.pyplot as plt
x = [1,1.5,2,2.5,3,3.5,3.6]
y = [7.5,8,8.5,9,9.5,10,10.5]

x1=[8,8.5,9,9.5,10,10.5,11]
y1=[3,3.5,3.7,4,4.5,5,5.2]

plt.scatter(x,y, label='high income low saving',color='r')
plt.scatter(x1,y1,label='low income high savings',color='b')
plt.xlabel('saving*100')
plt.ylabel('income*1000')
plt.title('Scatter Plot')
plt.legend()
plt.show()
```

### **5. Example:**

```
import matplotlib.pyplot as plt

days = [1,2,3,4,5]

sleeping = [7,8,6,11,7]
eating = [2,3,4,3,2]
working = [7,8,7,2,2]
playing = [8,5,7,8,13]
```

```
slices = [7,2,2,13]
activities = ['sleeping','eating','working','playing']
cols = ['c','m','r','b']
```

```
plt.pie(slices,
        labels=activities,
        colors=cols,
        startangle=90,
        shadow=True,
        explode=(0,0.1,0,0),
        autopct='%1.1f%%')
```

```
plt.title('Pie Plot')
plt.show()
```

6. Example of dataframe

```
# importing package
import matplotlib.pyplot as plt
import numpy as np
import pandas as pd

# create data
df = pd.DataFrame([[ 'A', 10, 20, 10, 26], [ 'B', 20, 25, 15, 21], [ 'C', 12,
15, 19, 6], [ 'D', 10, 18, 11, 19]], columns=[ 'Team', 'Round 1', 'Round 2',
'Round 3', 'Round 4'])
# view data
print(df)

# plot data in stack manner of bar type
df.plot(x='Team', kind='bar', stacked=True,title='Stacked Bar Graph by
dataframe')
plt.show()
```

## Helpful Tips:

### Creating Scatter Plots

With Pyplot, you can use the `scatter()` function to draw a scatter plot.



The `scatter()` function plots one dot for each observation. It needs two arrays of the same length, one for the values of the x-axis, and one for values on the y-axis

```
import matplotlib.pyplot as plt
import numpy as np

x = np.array([5,7,8,7,2,17,2,9,4,11,12,9,6])
y = np.array([99,86,87,88,111,86,103,87,94,78,77,85,86])

plt.scatter(x, y)
plt.show()
```

## Creating Bars

With Pyplot, you can use the `bar()` function to draw bar graphs:

```
import matplotlib.pyplot as plt
import numpy as np

x = np.array(["A", "B", "C", "D"])
y = np.array([3, 8, 1, 10])

plt.bar(x,y,width = 0.1)
plt.show()
```

### Horizontal bar:

```
import matplotlib.pyplot as plt
import numpy as np

x = np.array(["A", "B", "C", "D"])
y = np.array([3, 8, 1, 10])

plt.barh(x, y,color = "hotpink")
plt.show()
```

## Histogram

A histogram is a graph showing *frequency* distributions.

It is a graph showing the number of observations within each given interval.

```
import matplotlib.pyplot as plt
```

```
import numpy as np

x = np.random.normal(170, 10, 250)

plt.hist(x)
plt.show()
```

## Creating Pie Charts

With Pyplot, you can use the `pie()` function to draw pie charts:

### Example

A simple pie chart:

```
import matplotlib.pyplot as plt
import numpy as np

y = np.array([35, 25, 25, 15])

plt.pie(y)
plt.show()
```

USE following link for more:

<https://www.datacamp.com/tutorial/matplotlib-tutorial-python>

## Self exercise:

1. Draw a line in a diagram from position (0,0) to position (6,250)
2. Draw a line in a diagram from position (1, 3) to position (8, 10) with different line style.  
[Hint: Use a dashed line:

```
plt.plot(ypoints, linestyle = 'dashed') ]
```

3. Draw two points in the diagram, one at position (1, 3) and one in position (8, 10)
4. Draw a line in a diagram from position (1, 3) to (2, 8) then to (6, 1) and finally to position (8, 10) Use different symbol for points.

Marker	Description
'o'	Circle
'*'	Star
'.'	Point
','	Pixel
'x'	X
'X'	X (filled)
'+'	Plus
'p'	Plus (filled)
's'	Square
'D'	Diamond
'd'	Diamond (thin)
'p'	Pentagon
'H'	Hexagon
'h'	Hexagon
'v'	Triangle Down
'^'	Triangle Up
'<'	Triangle Left

## Assignment 9

1. Find mean, median, mode and standard deviation values from a tuple of 20 decimal values of stock market prices.
2. Create a python function to create cosine values of a given square matrix.
3. Create a dictionary of words and their synonyms. Search word and its synonym from dictionary. Add new words to the dictionary with its meaning.

4. Take input of text file and find word count for each unique word.
5. Take input of word file and remove given stop-words from the content as given in the list.
6. Create a random numpy array of and find out its shape and dimension using numpy functions.
7. Write a Python script to print a dictionary where the keys are numbers between 1 and 15 (both included) and the values are square of keys.
8. Write a Python program to combine two dictionary adding values for common keys. Write a Python program to find the highest 3 values in a dictionary
9. Write a Python program to create and display all combinations of letters, selecting each letter from a different key in a dictionary.

Sample data : {'1':['a','b'],  
'2':['c','d']}

Output:

Ac

Ad

Bc

Bd

Create a dictionary for state, capitals and rank for living. Sort data to find top 5 higher ranking states to live.

## Assignment:10

### Aim:Pandas Library using CSV file

1. Write a python code to show the first 5 rows of the dataframe.  
(Hint:Use a Head() function)
2. Write a python code to show a last 5 rows of the dataframe (Hint : Use a Tail() function )
3. Write a python code to shows the total no. of rows and no. of column of the data frame(Hint: Use a shape method)
4. write a python code to find the index of the dataframe. (Hint: Use a Index method)
5. write a python code to display only the column name. (Hint: Use Column method)
6. write a python code to show the data-type of each column. (Hint: Use dtype method)
7. Write a python code to show basic information about the dataframe.  
(Hint: Use a info() function)
8. Write a python code to show a total no. of values in each column. (Hint: Use a count() function)
9. Write a python code to show all the unique values of each column.  
(Hint: Use dataframe['column\_name'].unique())
10. Find all the unique “wind speed” values in the data. (Hint : Use dataframe['Column\_Name'].nunique())
11. Find the number of times when the weather is exactly clear. (Hint: Use dataframe.groupby('Column\_name').get\_group('column\_name'))
12. Find a number of times when the “wind speed” was exactly 4 km/h.  
(Hint: dataframe[dataframe['Column\_name'] == 4])
13. Find out all the null values in the data. (Hint: Use dataframe.isnull().sum())

**14. Find all the instances of when “wind speed is above 24” and “visibility is 25” (Hint: dataframe[(dataframe['column\_name'] > 24) & (df['column\_name'] == 25)])**

**15. find the mean value of each column against each “weather condition”. (Hint: dataframe.groupby('column\_name').mean())**

**16. Find the min and max value of each column against each “weather condition”(Hint: df.groupby('Weather').max())**

# Assignment:11

## Aim: TKINTER

1. Write a Python GUI program to import the Tkinter package and create a window and set its title.
2. Write a Python GUI program to import the Tkinter package and create a window. Set its title and add a label to the window.
3. Write a Python GUI program to create a label and change the label font style (font name, bold, size) using the tkinter module.
4. Write a Python GUI program to create a window and set the default window size using the tkinter module.
5. Write a Python GUI program to create a window and disable resizing the window using the tkinter module.
6. Write a Python GUI program that adds labels and buttons to the Tkinter window.
7. Write a Python program that implements event handling for button clicks using Tkinter.
8. Write a Python program that creates a basic menu bar with menu items using Tkinter.