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.
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]
4. Write a Pandas program to compare the elements of the two Pandas Series.
   Sample Series: [2, 4, 6, 8, 10], [1, 3, 5, 7, 10]

5. Write a Pandas program to convert a dictionary to a Pandas series.

```
Sample Series:
Original dictionary:
{'a': 100, 'b': 200, 'c': 300, 'd': 400, 'e': 800}

Converted series:
a    100
b    200
c    300
d    400
e    800
dtype: int64
```

6. Write a Pandas program to convert a NumPy array to a Pandas series.

```
Sample Series:
  NumPy array:
[10 20 30 40 50]
Converted Pandas series:
0    10
1    20
2    30
3    40
4    50
dtype: int64
```

7. Write a Pandas program to change the data type of given a column or a Series.

```
Sample Series:
    Original Data Series:
0       100
```

```
1       200
2    python
3    300.12
4       400
dtype: object
Change the said data type to numeric:
0    100.00
1    200.00
2       NaN
3    300.12
4    400.00
dtype: float64
```

8. Write a Pandas program to convert the first column of a DataFrame as a Series.

```
Sample Output:
Original DataFrame
   col1  col2  col3
0     1     4     7
1     2     5     5
2     3     6     8
3     4     9    12
4     7     5     1
5    11     0    11

1st column as a Series:
0     1
1     2
2     3
3     4
4     7
5    11
Name: col1, dtype: int64
<class 'pandas.core.series.Series'>
```

9. Write a Pandas program to convert a given Series to an array.

```
Sample Output:
Original Data Series:
0       100
1       200
2    python
3    300.12
4       400
dtype: object
Series to an array
```

```
['100' '200' 'python' '300.12' '400']
<class 'numpy.ndarray'>
```

10. Write a Pandas program to convert Series of lists to one Series.

```
Sample Output:
Original Series of list
0    [Red, Green, White]
1            [Red, Black]
2                [Yellow]
dtype: object
One Series
0       Red
1     Green
2     White
3       Red
4     Black
5    Yellow
dtype: object
```

11. 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
```

12. Write a Pandas program to add some data to an existing Series.

```
Sample Output:
Original Data Series:
0       100
1       200
2    python
3    300.12
4       400
dtype: object

Data Series after adding some data:
0       100
1       200
2    python
3    300.12
4       400
5       500
```

```
6       php
dtype: object
```

13. Write a Pandas program to create a subset of a given series based on value and condition.

```
Sample Output:
Original Data Series:
0      0
1      1
2      2

....

9      9
10    10
dtype: int64

Subset of the above Data Series:
0    0
1    1
2    2
3    3
4    4
5    5
dtype: int64
```

14. Write a Pandas program to change the order of index of a given series.

```
Sample Output:
Original Data Series:
A    1
B    2
C    3
D    4
E    5
dtype: int64
Data Series after changing the order of index:
B    2
A    1
C    3
D    4
E    5
dtype: int64
```

15. Write a Pandas program to create the mean and standard deviation of the data of a given Series.

```
Sample Output:
Original Data Series:
0     1
1     2
2     3
```

```
....
7     8
8     9
9     5
10    3
dtype: int64
Mean of the said Data Series:
4.818181818181818
Standard deviation of the said Data Series:
2.522624895547565
```

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

Items of a given series not present in another given series:
0     1
2     3
4     5
5     6
6     8
7    10
dtype: int64
```

18. Write a Pandas program to compute the minimum, 25th percentile, median, 75th, and maximum of a given series.

```
Sample Output:
Original Series:
0      3.000938
1     11.370722
2     14.612143

....

17    14.118931
18     8.247458
19     5.526727
dtype: float64

Minimum, 25th percentile, median, 75th, and maximum of a given series:
[ 3.00093811  8.09463867 10.23353705 12.21537733 14.61214321]
```

19. Write a Pandas program to calculate the frequency counts of each unique value of a given series.

```
Sample Output:
Original Series:
0     1
1     7
2     1
3     6

...


37    0
38    4
39    8
dtype: object
Frequency of each unique value of the said series.
0    9
2    7
9    6
....
3    2
4    1
5    1
```

```
dtype: int64
```

20. Write a Pandas program to display most frequent value in a given series and replace everything else as 'Other' in the series.

```
Sample Output:
Original Series:
0     3
1     1
2     1
3     3
...
12    2
13    3
14    3
dtype: int64
Top 2 Freq: 2    6
3    5
1    4
dtype: int64
0     Other
1     Other
2     Other
3     Other
...
11        2
12        2
13    Other
14    Other
dtype: object
```

21. Write a Pandas program to find the positions of numbers that are multiples of 5 of a given series.

Sample Output:

Original Series:

0 1

1 9

2 8

3 6

4 9

5 7

6 1

7 1

8 1

dtype: int64

Positions of numbers that are multiples of 5:[]

22. Write a Pandas program to extract items at given positions of a given series.

```
Sample Output:
Original Series:
0     2
1     3
2     9
3     0
4     2
5     3
...

19    0
20    2
21    3
dtype: object

Extract items at given positions of the said series:
0     2
2     9
6     8
11    0
21    3
dtype: object
```

23. Write a Pandas program to get the positions of items of a given series in another given series.

```
Sample Output:
Original Series:
0     1
1     2
2     3
3     4
4     5
5     6
6     7
7     8
8     9
9    10
dtype: int64
0     1
1     3
2     5
3     7
4    10
dtype: int64
Positions of items of series2 in series1:
[0, 2, 4, 6, 9]
```

24. Write a Pandas program convert the first and last character of each word to upper case in each word of a given series.

```
Sample Output:
Original Series:
0       php
1    python
2      java
3        c#
dtype: object

First and last character of each word to upper case:
0       PhP
1    PythoN
2      JavA
3        C#
dtype: object
```

25. Write a Pandas program to calculate the number of characters in each word in a given series.

```
Sample Output:
Original Series:
0       Php
1    Python
2      Java
3        C#
dtype: object

Number of characters in each word in the said series:
0    3
1    6
2    4
3    2
dtype: int64
```

26. Write a Pandas program to compute difference of differences between consecutive numbers of a given series.

```
Sample Output:
Original Series:
0     1
1     3
2     5
3     8
4    10
5    11
6    15
dtype: int64

Difference of differences between consecutive numbers of the said series:
[nan, 2.0, 2.0, 3.0, 2.0, 1.0, 4.0]
[nan, nan, 0.0, 1.0, -1.0, -1.0, 3.0]
```

27. Write a Pandas program to convert a series of date strings to a timeseries.

```
Sample Output:
Original Series:
0         01 Jan 2015
1          10-02-2016
2            20180307
3          2014/05/06
4          2016-04-12
5    2019-04-06T11:20
dtype: object

Series of date strings to a timeseries:
0   2015-01-01 00:00:00
1   2016-10-02 00:00:00
2   2018-03-07 00:00:00
3   2014-05-06 00:00:00
4   2016-04-12 00:00:00
5   2019-04-06 11:20:00
dtype: datetime64[ns]
```

28. Write a Pandas program to get the day of month, day of year, week number and day of week from a given series of date strings.

```
Sample Output:
Original Series:
0         01 Jan 2015
1          10-02-2016
2            20180307
3          2014/05/06
4          2016-04-12
5    2019-04-06T11:20
dtype: object
Day of month:
[1, 2, 7, 6, 12, 6]
Day of year:
[1, 276, 66, 126, 103, 96]
Week number:
[1, 39, 10, 19, 15, 14]
Day of week:
['Thursday', 'Sunday', 'Wednesday', 'Tuesday', 'Tuesday', 'Saturday']
```

29. Write a Pandas program to convert year-month string to dates adding a specified day of the month.

```
Sample Output:
Original Series:
0    Jan 2015
1    Feb 2016
2    Mar 2017
3    Apr 2018
4    May 2019
```

```
dtype: object

New dates:
0   2015-01-11
1   2016-02-11
2   2017-03-11
3   2018-04-11
4   2019-05-11
dtype: datetime64[ns]
```

30. Write a Pandas program to filter words from a given series that contain atleast two vowels.

```
Sample Output:
Original Series:
0       Red
1     Green
2    Orange
3      Pink
4    Yellow
5     White
dtype: object

Filtered words:
1     Green
2    Orange
4    Yellow
5     White
dtype: object
```

31. Write a Pandas program to compute the Euclidean distance between two given series.
Euclidean distance
From Wikipedia,
In mathematics, the Euclidean distance or Euclidean metric is the "ordinary" straight-line distance between two points in Euclidean space. With this distance, Euclidean space becomes a metric space. The associated norm is called the Euclidean norm.

```
Sample Output:
Original series:
0     1
1     2
2     3
3     4
4     5
5     6
6     7
7     8
8     9
9    10
dtype: int64
0    11
```

```
1      8
2      7
3      5
4      6
5      5
6      3
7      4
8      7
9      1
dtype: int64

Euclidean distance between two said series:
16.492422502470642
```

32. Write a Pandas program to find the positions of the values neighboured by smaller values on both sides in a given series.

```
Sample Output:
Original series:
0    1
1    8
2    7
3    5
4    6
5    5
6    3
7    4
8    7
9    1
dtype: int64

Positions of the values surrounded by smaller values on both sides:
[1 4 8]
```

33. Write a Pandas program to replace missing white spaces in a given string with the least frequent character.

```
Sample Output:
Original series:
abc def abcdef icd
c    3
d    3
     3
b    2
e    2
a    2
f    2
i    1
dtype: int64
abcidefiabcdefiicd
```

34. Write a Pandas program to compute the autocorrelations of a given numeric series.
From Wikipedia:
Autocorrelation, also known as serial correlation, is the correlation of a signal with a delayed copy of itself as a function of delay. Informally, it is the similarity between observations as a function of the time lag between them.

```
Sample Output:
Original series:
0     13.207262
1      4.098685
2     -1.435534
3     13.626760
...
13    -2.346193
14    17.873884
dtype: float64

Autocorrelations of the said series:
[-0.38, 0.1, -0.43, 0.03, 0.35, -0.2, 0.04, -0.59, 0.34, 0.11]
```

35. Write a Pandas program to create a TimeSeries to display all the Sundays of given year.

```
Sample Output:
All Sundays of 2019:
0    2020-01-05
1    2020-01-12
2    2020-01-19
3    2020-01-26
4    2020-02-02
5    2020-02-09
.....
48   2020-12-06
49   2020-12-13
50   2020-12-20
51   2020-12-27
dtype: datetime64[ns]
```

36. Write a Pandas program to convert given series into a dataframe with its index as another column on the dataframe.

```
Sample Output:
  index  0
0     A  0
1     B  1
2     C  2
3     D  3
4     E  4
```

37. Write a Pandas program to stack two given series vertically and horizontally.

```
Sample Output:
Original Series:
0    0
1    1
2    2
....
7    7
8    8
9    9
dtype: int64
0    p
1    q
2    r
....
7    w
8    x
9    y
dtype: object

Stack two given series vertically and horizontally:
   0  1
0  0  p
1  1  q
2  2  r
.....
8  8  x
9  9  y
```

38. Write a Pandas program to check the equality of two given series.

```
Sample Output:
Original Series:
0    1
1    8
2    7
...
7    4
8    7
9    1
dtype: int64
0    1
1    8
2    7
3    5
.....
8    7
9    1
dtype: int64
Check 2 series are equal or not?
0    True
1    True
2    True
....
7    True
8    True
9    True
```

```
dtype: bool
```

39. Write a Pandas program to find the index of the first occurrence of the smallest and largest value of a given series.

```
Sample Output:
Original Series:
0     1
1     3
2     7
.....
7     1
8     9
9     0
dtype: int64
Index of the first occurrence of the smallest and largest value of the said
series:
9
4
```

40. Write a Pandas program to check inequality over the index axis of a given dataframe and a given series.

```
Sample Output:
Original DataFrame:
      W     X   Y   Z
0  68.0  78.0  84  86
1  75.0  75.0  94  97
2  86.0   NaN  89  96
3  80.0  80.0  86  72
4   NaN  86.0  86  83

Original Series:
0    68.0
1    75.0
2    86.0
3    80.0
4     NaN
dtype: float64

Check for inequality of the said series & dataframe:
       W      X     Y     Z
0  False   True  True  True
1  False  False  True  True
2  False   True  True  True
3  False  False  True  True
4   True   True  True  True
```