

# pandas

January 11, 2022

## 1 Pandas tutorial ( Day 11)

### 1.1 How to install library

pip install pandas

pip instal numpy

### 1.2 Importing Libraries

```
[ ]: #importing libraries
import pandas as pd
import numpy as np
```

```
[ ]: # object creation
s= pd.Series([1,2,np.nan ,5,7,8,9])
s
```

```
[ ]: 0    1.0
     1    2.0
     2    NaN
     3    5.0
     4    7.0
     5    8.0
     6    9.0
dtype: float64
```

```
[ ]: dates = pd.date_range("20220101", periods=9)
dates
```

```
[ ]: DatetimeIndex(['2022-01-01', '2022-01-02', '2022-01-03', '2022-01-04',
                  '2022-01-05', '2022-01-06', '2022-01-07', '2022-01-08',
                  '2022-01-09'],
                  dtype='datetime64[ns]', freq='D')
```

```
[ ]: dates = pd.date_range("20220101", periods=33)
dates
```

```
[ ]: DatetimeIndex(['2022-01-01', '2022-01-02', '2022-01-03', '2022-01-04',
                    '2022-01-05', '2022-01-06', '2022-01-07', '2022-01-08',
                    '2022-01-09', '2022-01-10', '2022-01-11', '2022-01-12',
                    '2022-01-13', '2022-01-14', '2022-01-15', '2022-01-16',
                    '2022-01-17', '2022-01-18', '2022-01-19', '2022-01-20',
                    '2022-01-21', '2022-01-22', '2022-01-23', '2022-01-24',
                    '2022-01-25', '2022-01-26', '2022-01-27', '2022-01-28',
                    '2022-01-29', '2022-01-30', '2022-01-31', '2022-02-01',
                    '2022-02-02'],
                    dtype='datetime64[ns]', freq='D')
```

```
[ ]: df= pd.DataFrame(np.random.randn(33,5), index= dates, columns= list("ABCDE"))
df
```

```
[ ]:
      A         B         C         D         E
2022-01-01 -0.126032 -0.199938 -0.288899  0.389413 -0.273131
2022-01-02 -0.085146 -1.212453 -1.380828  0.417691  0.782444
2022-01-03  0.164032  0.517432  0.585994  0.023702  0.363817
2022-01-04 -1.024023  0.079319  0.562072  0.157869  1.073070
2022-01-05  2.117883 -1.220357 -1.407096 -0.583775 -0.016587
2022-01-06  0.832723  1.151164 -0.307525 -0.028793  0.069695
2022-01-07 -0.304651  0.065318  1.809717  0.506734  0.702857
2022-01-08 -1.972085 -0.036357 -0.171530 -0.133243 -0.108570
2022-01-09  0.432924 -1.836288  0.466117  1.247693 -0.282017
2022-01-10 -0.169957 -0.361568 -1.287344 -0.748285 -0.347073
2022-01-11 -0.418178 -1.237385  1.173824 -0.947559 -0.146890
2022-01-12  0.550162  0.046416  0.755635 -0.994057 -0.832033
2022-01-13  1.272304 -1.161495  1.718792  1.623088 -2.137003
2022-01-14  1.382511  0.712078 -0.333969 -0.272936  0.177636
2022-01-15  1.178524  1.462303 -0.497917  0.441221 -1.140695
2022-01-16 -0.332209  2.820748  0.360238  0.120003 -1.140833
2022-01-17  2.179687 -1.660784  1.022057 -0.925613 -1.005609
2022-01-18  2.261681  0.170805 -3.247575  0.574118  0.449672
2022-01-19  1.130726 -2.063273 -0.922675 -1.087421  1.754682
2022-01-20  2.237124  0.241961 -0.548753 -0.614911 -1.324496
2022-01-21  1.829505  2.083049 -0.876144 -0.432180 -1.008887
2022-01-22 -0.495221  0.875533  1.192965  1.358641  3.064904
2022-01-23 -0.198214 -2.075892  0.887191  0.221786 -0.416216
2022-01-24 -0.428832 -0.146865 -0.516980 -1.979471  0.532454
2022-01-25 -1.047943  0.834688 -0.241208  0.673116  1.035140
2022-01-26 -0.427744  1.550146 -2.280609 -0.351001  2.043535
2022-01-27  0.568554  0.065070  0.106410 -1.210190  0.954157
2022-01-28 -0.525053  0.089512  2.491040 -0.947489  1.427276
2022-01-29 -0.506854  2.501386  0.796286  1.332061  1.083685
2022-01-30  2.111358  1.415935 -0.883126 -0.312846 -0.036638
2022-01-31  0.874926  0.681585 -0.958487 -0.403117 -0.838487
2022-02-01  1.924742  0.724442  0.427667  0.527684  0.528801
```

```
2022-02-02  0.186479  1.908751 -2.363941  0.642013  0.382990
```

```
[ ]: df2= pd.DataFrame(  
    {  
        "A" : 1.0,  
        "B": pd.Timestamp("20130102"),  
        "C": pd.Series(1, index= list(range(4)), dtype="float32"),  
        "D": np.array([3]*4, dtype= "int32"),  
        "E": pd.Categorical(["test","train","test","train"]),  
        "F": "foo"  
    }  
)
```

```
[ ]: df2
```

```
[ ]:      A          B    C  D      E    F  
0  1.0 2013-01-02  1.0  3   test  foo  
1  1.0 2013-01-02  1.0  3  train  foo  
2  1.0 2013-01-02  1.0  3   test  foo  
3  1.0 2013-01-02  1.0  3  train  foo
```

```
[ ]: df2.dtypes
```

```
[ ]: A          float64  
    B  datetime64[ns]  
    C          float32  
    D          int32  
    E          category  
    F          object  
dtype: object
```

```
[ ]: df2.head(2)
```

```
[ ]:      A          B    C  D      E    F  
0  1.0 2013-01-02  1.0  3   test  foo  
1  1.0 2013-01-02  1.0  3  train  foo
```

```
[ ]: df.tail(2)
```

```
[ ]:      A          B          C          D          E  
2022-02-01  1.924742  0.724442  0.427667  0.527684  0.528801  
2022-02-02  0.186479  1.908751 -2.363941  0.642013  0.382990
```

```
[ ]: df2.index
```

```
[ ]: Int64Index([0, 1, 2, 3], dtype='int64')
```

```
[ ]: dates1 = pd.date_range("20220101", periods=20)
      dates1
```

```
[ ]: DatetimeIndex(['2022-01-01', '2022-01-02', '2022-01-03', '2022-01-04',
                    '2022-01-05', '2022-01-06', '2022-01-07', '2022-01-08',
                    '2022-01-09', '2022-01-10', '2022-01-11', '2022-01-12',
                    '2022-01-13', '2022-01-14', '2022-01-15', '2022-01-16',
                    '2022-01-17', '2022-01-18', '2022-01-19', '2022-01-20'],
                    dtype='datetime64[ns]', freq='D')
```

```
[ ]: df1= pd.DataFrame(np.random.randn(20,5), index= dates1, columns= list("ABCDE"))
      df1
```

```
[ ]:
      A          B          C          D          E
2022-01-01 -0.541502  0.886441 -0.596612  0.958417  0.864139
2022-01-02  0.918294  0.856707 -0.232364  0.950132  0.211419
2022-01-03  0.833418  1.148444 -1.121900 -0.603222  1.036992
2022-01-04  2.186702  0.818687 -1.190276 -0.580596  0.174947
2022-01-05 -0.081641 -1.090158 -0.308767 -0.372396 -0.321147
2022-01-06 -1.083372  0.382338  0.756829  1.324458  0.765886
2022-01-07 -0.737423  2.169094 -0.513894  0.834916  0.798774
2022-01-08 -0.104126 -1.129152  0.275917  1.784006 -0.757977
2022-01-09  1.563553  0.156646 -0.005455  0.149462 -0.569594
2022-01-10 -0.164563 -0.945341  0.595697 -0.747611  0.368079
2022-01-11  0.151630  0.185801 -0.109403  0.568989 -0.550406
2022-01-12 -1.507866  0.985331  0.107831 -0.096001 -0.163802
2022-01-13 -1.132864  0.065728 -0.252707  1.132176 -0.054955
2022-01-14  0.027169  1.010623 -0.863628 -2.433764  1.518148
2022-01-15 -0.528457 -1.839193 -0.122310  1.835312 -0.616390
2022-01-16 -0.740931 -0.622565  0.068501 -0.036141 -1.138896
2022-01-17 -0.667649 -1.147841 -0.078040  0.319734  2.073970
2022-01-18  1.873010 -0.532156  0.961979  0.242676  1.761194
2022-01-19  0.537869  0.659790 -0.536750  0.209704  0.107753
2022-01-20  1.198935 -1.456129  0.470587 -0.502338  1.306199
```

```
[ ]: df1.to_numpy()
```

```
[ ]: array([[ -0.54150188,  0.88644114, -0.5966125 ,  0.95841674,  0.86413938],
            [ 0.91829409,  0.8567072 , -0.23236426,  0.95013188,  0.211419 ],
            [ 0.83341815,  1.14844397, -1.12189995, -0.60322237,  1.03699214],
            [ 2.18670195,  0.81868677, -1.19027625, -0.5805963 ,  0.17494746],
            [-0.08164147, -1.09015783, -0.30876685, -0.37239601, -0.32114727],
            [-1.08337208,  0.38233815,  0.75682923,  1.32445764,  0.76588618],
            [-0.73742339,  2.16909427, -0.51389369,  0.83491611,  0.79877358],
            [-0.10412568, -1.12915154,  0.27591746,  1.78400608, -0.75797747],
            [ 1.56355311,  0.15664616, -0.00545478,  0.14946216, -0.56959416],
            [-0.16456309, -0.94534058,  0.5956967 , -0.74761093,  0.36807891],
```

```
[ 0.15162976,  0.1858014 , -0.10940315,  0.56898857, -0.55040572],
[-1.50786564,  0.98533091,  0.10783093, -0.09600139, -0.16380159],
[-1.13286401,  0.06572818, -0.25270712,  1.13217633, -0.05495522],
[ 0.02716928,  1.01062339, -0.86362821, -2.4337639 ,  1.51814797],
[-0.52845667, -1.83919349, -0.12231025,  1.83531215, -0.61638999],
[-0.7409306 , -0.6225649 ,  0.06850134, -0.0361405 , -1.13889578],
[-0.66764939, -1.14784126, -0.07803992,  0.31973433,  2.07396988],
[ 1.8730104 , -0.53215607,  0.96197915,  0.24267644,  1.76119376],
[ 0.5378692 ,  0.65978971, -0.53675037,  0.20970409,  0.10775281],
[ 1.19893466, -1.45612947,  0.47058668, -0.50233789,  1.30619932]]])
```

```
[ ]: df2.to_numpy()
```

```
[ ]: array([[1.0, Timestamp('2013-01-02 00:00:00'), 1.0, 3, 'test', 'foo'],
           [1.0, Timestamp('2013-01-02 00:00:00'), 1.0, 3, 'train', 'foo'],
           [1.0, Timestamp('2013-01-02 00:00:00'), 1.0, 3, 'test', 'foo'],
           [1.0, Timestamp('2013-01-02 00:00:00'), 1.0, 3, 'train', 'foo']],
        dtype=object)
```

```
[ ]: #details of data
      df1.describe()
```

```
[ ]:
      count    20.000000    20.000000    20.000000    20.000000    20.000000
      mean     0.100009    0.028155   -0.134738    0.246896    0.340717
      std      1.044010    1.068287    0.579451    1.000582    0.899513
      min     -1.507866   -1.839193   -1.190276   -2.433764   -1.138896
      25%     -0.685093   -0.981545   -0.519608   -0.404881   -0.378462
      50%     -0.092884    0.171224   -0.115857    0.226190    0.193183
      75%      0.854637    0.864141    0.149853    0.952203    0.907353
      max      2.186702    2.169094    0.961979    1.835312    2.073970
```

```
[ ]: #to transpose the data
      df2.T
```

```
[ ]:
      0          1          2  \
A      1.0          1.0          1.0
B  2013-01-02 00:00:00  2013-01-02 00:00:00  2013-01-02 00:00:00
C      1.0          1.0          1.0
D      3            3            3
E      test        train        test
F      foo         foo         foo

      3
A      1.0
B  2013-01-02 00:00:00
C      1.0
```

```
D          3
E          train
F          foo
```

```
[ ]: # Sorting
df1.sort_index(axis=0, ascending=False)
```

```
[ ]:
      A          B          C          D          E
2022-01-20  1.198935 -1.456129  0.470587 -0.502338  1.306199
2022-01-19  0.537869  0.659790 -0.536750  0.209704  0.107753
2022-01-18  1.873010 -0.532156  0.961979  0.242676  1.761194
2022-01-17 -0.667649 -1.147841 -0.078040  0.319734  2.073970
2022-01-16 -0.740931 -0.622565  0.068501 -0.036141 -1.138896
2022-01-15 -0.528457 -1.839193 -0.122310  1.835312 -0.616390
2022-01-14  0.027169  1.010623 -0.863628 -2.433764  1.518148
2022-01-13 -1.132864  0.065728 -0.252707  1.132176 -0.054955
2022-01-12 -1.507866  0.985331  0.107831 -0.096001 -0.163802
2022-01-11  0.151630  0.185801 -0.109403  0.568989 -0.550406
2022-01-10 -0.164563 -0.945341  0.595697 -0.747611  0.368079
2022-01-09  1.563553  0.156646 -0.005455  0.149462 -0.569594
2022-01-08 -0.104126 -1.129152  0.275917  1.784006 -0.757977
2022-01-07 -0.737423  2.169094 -0.513894  0.834916  0.798774
2022-01-06 -1.083372  0.382338  0.756829  1.324458  0.765886
2022-01-05 -0.081641 -1.090158 -0.308767 -0.372396 -0.321147
2022-01-04  2.186702  0.818687 -1.190276 -0.580596  0.174947
2022-01-03  0.833418  1.148444 -1.121900 -0.603222  1.036992
2022-01-02  0.918294  0.856707 -0.232364  0.950132  0.211419
2022-01-01 -0.541502  0.886441 -0.596612  0.958417  0.864139
```

```
[ ]: df.sort_values(by="B")
```

```
[ ]:
      A          B          C          D          E
2022-01-23 -0.198214 -2.075892  0.887191  0.221786 -0.416216
2022-01-19  1.130726 -2.063273 -0.922675 -1.087421  1.754682
2022-01-09  0.432924 -1.836288  0.466117  1.247693 -0.282017
2022-01-17  2.179687 -1.660784  1.022057 -0.925613 -1.005609
2022-01-11 -0.418178 -1.237385  1.173824 -0.947559 -0.146890
2022-01-05  2.117883 -1.220357 -1.407096 -0.583775 -0.016587
2022-01-02 -0.085146 -1.212453 -1.380828  0.417691  0.782444
2022-01-13  1.272304 -1.161495  1.718792  1.623088 -2.137003
2022-01-10 -0.169957 -0.361568 -1.287344 -0.748285 -0.347073
2022-01-01 -0.126032 -0.199938 -0.288899  0.389413 -0.273131
2022-01-24 -0.428832 -0.146865 -0.516980 -1.979471  0.532454
2022-01-08 -1.972085 -0.036357 -0.171530 -0.133243 -0.108570
2022-01-12  0.550162  0.046416  0.755635 -0.994057 -0.832033
2022-01-27  0.568554  0.065070  0.106410 -1.210190  0.954157
2022-01-07 -0.304651  0.065318  1.809717  0.506734  0.702857
```

```

2022-01-04 -1.024023  0.079319  0.562072  0.157869  1.073070
2022-01-28 -0.525053  0.089512  2.491040 -0.947489  1.427276
2022-01-18  2.261681  0.170805 -3.247575  0.574118  0.449672
2022-01-20  2.237124  0.241961 -0.548753 -0.614911 -1.324496
2022-01-03  0.164032  0.517432  0.585994  0.023702  0.363817
2022-01-31  0.874926  0.681585 -0.958487 -0.403117 -0.838487
2022-01-14  1.382511  0.712078 -0.333969 -0.272936  0.177636
2022-02-01  1.924742  0.724442  0.427667  0.527684  0.528801
2022-01-25 -1.047943  0.834688 -0.241208  0.673116  1.035140
2022-01-22 -0.495221  0.875533  1.192965  1.358641  3.064904
2022-01-06  0.832723  1.151164 -0.307525 -0.028793  0.069695
2022-01-30  2.111358  1.415935 -0.883126 -0.312846 -0.036638
2022-01-15  1.178524  1.462303 -0.497917  0.441221 -1.140695
2022-01-26 -0.427744  1.550146 -2.280609 -0.351001  2.043535
2022-02-02  0.186479  1.908751 -2.363941  0.642013  0.382990
2022-01-21  1.829505  2.083049 -0.876144 -0.432180 -1.008887
2022-01-29 -0.506854  2.501386  0.796286  1.332061  1.083685
2022-01-16 -0.332209  2.820748  0.360238  0.120003 -1.140833

```

```
[ ]: df.sort_values(by="B",ascending=False)
```

```

[ ]:
      A      B      C      D      E
2022-01-16 -0.332209  2.820748  0.360238  0.120003 -1.140833
2022-01-29 -0.506854  2.501386  0.796286  1.332061  1.083685
2022-01-21  1.829505  2.083049 -0.876144 -0.432180 -1.008887
2022-02-02  0.186479  1.908751 -2.363941  0.642013  0.382990
2022-01-26 -0.427744  1.550146 -2.280609 -0.351001  2.043535
2022-01-15  1.178524  1.462303 -0.497917  0.441221 -1.140695
2022-01-30  2.111358  1.415935 -0.883126 -0.312846 -0.036638
2022-01-06  0.832723  1.151164 -0.307525 -0.028793  0.069695
2022-01-22 -0.495221  0.875533  1.192965  1.358641  3.064904
2022-01-25 -1.047943  0.834688 -0.241208  0.673116  1.035140
2022-02-01  1.924742  0.724442  0.427667  0.527684  0.528801
2022-01-14  1.382511  0.712078 -0.333969 -0.272936  0.177636
2022-01-31  0.874926  0.681585 -0.958487 -0.403117 -0.838487
2022-01-03  0.164032  0.517432  0.585994  0.023702  0.363817
2022-01-20  2.237124  0.241961 -0.548753 -0.614911 -1.324496
2022-01-18  2.261681  0.170805 -3.247575  0.574118  0.449672
2022-01-28 -0.525053  0.089512  2.491040 -0.947489  1.427276
2022-01-04 -1.024023  0.079319  0.562072  0.157869  1.073070
2022-01-07 -0.304651  0.065318  1.809717  0.506734  0.702857
2022-01-27  0.568554  0.065070  0.106410 -1.210190  0.954157
2022-01-12  0.550162  0.046416  0.755635 -0.994057 -0.832033
2022-01-08 -1.972085 -0.036357 -0.171530 -0.133243 -0.108570
2022-01-24 -0.428832 -0.146865 -0.516980 -1.979471  0.532454
2022-01-01 -0.126032 -0.199938 -0.288899  0.389413 -0.273131
2022-01-10 -0.169957 -0.361568 -1.287344 -0.748285 -0.347073

```

```

2022-01-13  1.272304 -1.161495  1.718792  1.623088 -2.137003
2022-01-02 -0.085146 -1.212453 -1.380828  0.417691  0.782444
2022-01-05  2.117883 -1.220357 -1.407096 -0.583775 -0.016587
2022-01-11 -0.418178 -1.237385  1.173824 -0.947559 -0.146890
2022-01-17  2.179687 -1.660784  1.022057 -0.925613 -1.005609
2022-01-09  0.432924 -1.836288  0.466117  1.247693 -0.282017
2022-01-19  1.130726 -2.063273 -0.922675 -1.087421  1.754682
2022-01-23 -0.198214 -2.075892  0.887191  0.221786 -0.416216

```

```
[ ]: df1["A"]
```

```

[ ]: 2022-01-01    -0.541502
      2022-01-02     0.918294
      2022-01-03     0.833418
      2022-01-04     2.186702
      2022-01-05    -0.081641
      2022-01-06    -1.083372
      2022-01-07    -0.737423
      2022-01-08    -0.104126
      2022-01-09     1.563553
      2022-01-10    -0.164563
      2022-01-11     0.151630
      2022-01-12    -1.507866
      2022-01-13    -1.132864
      2022-01-14     0.027169
      2022-01-15    -0.528457
      2022-01-16    -0.740931
      2022-01-17    -0.667649
      2022-01-18     1.873010
      2022-01-19     0.537869
      2022-01-20     1.198935
      Freq: D, Name: A, dtype: float64

```

```
[ ]: #filtration data with coloum wise or indexwise
      df1["B"]
```

```

[ ]: 2022-01-01    0.886441
      2022-01-02    0.856707
      2022-01-03    1.148444
      2022-01-04    0.818687
      2022-01-05   -1.090158
      2022-01-06    0.382338
      2022-01-07    2.169094
      2022-01-08   -1.129152
      2022-01-09    0.156646
      2022-01-10   -0.945341
      2022-01-11    0.185801

```



```

2022-01-12    0.985331
2022-01-13    0.065728
2022-01-14    1.010623
2022-01-15   -1.839193
2022-01-16   -0.622565
2022-01-17   -1.147841
2022-01-18   -0.532156
2022-01-19    0.659790
2022-01-20   -1.456129
Freq: D, Name: B, dtype: float64

```

```

[ ]: # TO select data row wise
df[0:]

```

```

[ ]:
           A           B           C           D           E
2022-01-01 -0.126032 -0.199938 -0.288899  0.389413 -0.273131

```

```

[ ]: df[0:2]

```

```

[ ]:
           A           B           C           D           E
2022-01-01 -0.126032 -0.199938 -0.288899  0.389413 -0.273131
2022-01-02 -0.085146 -1.212453 -1.380828  0.417691  0.782444

```

```

[ ]: df[0:10]

```

```

[ ]:
           A           B           C           D           E
2022-01-01 -0.126032 -0.199938 -0.288899  0.389413 -0.273131
2022-01-02 -0.085146 -1.212453 -1.380828  0.417691  0.782444
2022-01-03  0.164032  0.517432  0.585994  0.023702  0.363817
2022-01-04 -1.024023  0.079319  0.562072  0.157869  1.073070
2022-01-05  2.117883 -1.220357 -1.407096 -0.583775 -0.016587
2022-01-06  0.832723  1.151164 -0.307525 -0.028793  0.069695
2022-01-07 -0.304651  0.065318  1.809717  0.506734  0.702857
2022-01-08 -1.972085 -0.036357 -0.171530 -0.133243 -0.108570
2022-01-09  0.432924 -1.836288  0.466117  1.247693 -0.282017
2022-01-10 -0.169957 -0.361568 -1.287344 -0.748285 -0.347073

```

```

[ ]: df[1:10]

```

```

[ ]:
           A           B           C           D           E
2022-01-02 -0.085146 -1.212453 -1.380828  0.417691  0.782444
2022-01-03  0.164032  0.517432  0.585994  0.023702  0.363817
2022-01-04 -1.024023  0.079319  0.562072  0.157869  1.073070
2022-01-05  2.117883 -1.220357 -1.407096 -0.583775 -0.016587
2022-01-06  0.832723  1.151164 -0.307525 -0.028793  0.069695
2022-01-07 -0.304651  0.065318  1.809717  0.506734  0.702857
2022-01-08 -1.972085 -0.036357 -0.171530 -0.133243 -0.108570
2022-01-09  0.432924 -1.836288  0.466117  1.247693 -0.282017

```

```
2022-01-10 -0.169957 -0.361568 -1.287344 -0.748285 -0.347073
```

```
[ ]: df1.head()
```

```
[ ]:
      A      B      C      D      E
2022-01-01 -0.541502  0.886441 -0.596612  0.958417  0.864139
2022-01-02  0.918294  0.856707 -0.232364  0.950132  0.211419
2022-01-03  0.833418  1.148444 -1.121900 -0.603222  1.036992
2022-01-04  2.186702  0.818687 -1.190276 -0.580596  0.174947
2022-01-05 -0.081641 -1.090158 -0.308767 -0.372396 -0.321147
```

```
[ ]: df1[0:1]
```

```
[ ]:
      A      B      C      D      E
2022-01-01 -0.541502  0.886441 -0.596612  0.958417  0.864139
```

```
[ ]: # showing the only 16th row and its values
      df.loc[dates[15]]
```

```
[ ]: A    -0.332209
      B     2.820748
      C     0.360238
      D     0.120003
      E    -1.140833
      Name: 2022-01-16 00:00:00, dtype: float64
```

```
[ ]: #multiple axis lables
      df.loc[:, ["A","B"]]
```

```
[ ]: df.loc["20220109":"20220113",["A","B", "C"]]
```

```
[ ]:
      A      B      C
2022-01-09  0.432924 -1.836288  0.466117
2022-01-10 -0.169957 -0.361568 -1.287344
2022-01-11 -0.418178 -1.237385  1.173824
2022-01-12  0.550162  0.046416  0.755635
2022-01-13  1.272304 -1.161495  1.718792
```

```
[ ]: df.loc["20220109",["A","B", "C"]]
```

```
[ ]: A    0.432924
      B   -1.836288
      C    0.466117
      Name: 2022-01-09 00:00:00, dtype: float64
```

```
[ ]: #Scalar value
      df.at[dates[0], "A"]
```

```
[ ]: -0.1260324561047208
```

```
[ ]: df.iloc[3]
```

```
[ ]: A    -1.024023  
     B     0.079319  
     C     0.562072  
     D     0.157869  
     E     1.073070  
     Name: 2022-01-04 00:00:00, dtype: float64
```

```
[ ]: df.iloc[3:10]
```

```
[ ]:           A         B         C         D         E  
2022-01-04 -1.024023  0.079319  0.562072  0.157869  1.073070  
2022-01-05  2.117883 -1.220357 -1.407096 -0.583775 -0.016587  
2022-01-06  0.832723  1.151164 -0.307525 -0.028793  0.069695  
2022-01-07 -0.304651  0.065318  1.809717  0.506734  0.702857  
2022-01-08 -1.972085 -0.036357 -0.171530 -0.133243 -0.108570  
2022-01-09  0.432924 -1.836288  0.466117  1.247693 -0.282017  
2022-01-10 -0.169957 -0.361568 -1.287344 -0.748285 -0.347073
```

```
[ ]: #      rows col  
     df.iloc[0:5, 0:2]
```

```
[ ]:           A         B  
2022-01-01 -0.126032 -0.199938  
2022-01-02 -0.085146 -1.212453  
2022-01-03  0.164032  0.517432  
2022-01-04 -1.024023  0.079319  
2022-01-05  2.117883 -1.220357
```

```
[ ]: df.iloc[:, 0:2]
```

```
[ ]:           A         B  
2022-01-01 -0.126032 -0.199938  
2022-01-02 -0.085146 -1.212453  
2022-01-03  0.164032  0.517432  
2022-01-04 -1.024023  0.079319  
2022-01-05  2.117883 -1.220357  
2022-01-06  0.832723  1.151164  
2022-01-07 -0.304651  0.065318  
2022-01-08 -1.972085 -0.036357  
2022-01-09  0.432924 -1.836288  
2022-01-10 -0.169957 -0.361568  
2022-01-11 -0.418178 -1.237385  
2022-01-12  0.550162  0.046416  
2022-01-13  1.272304 -1.161495
```

```

2022-01-14  1.382511  0.712078
2022-01-15  1.178524  1.462303
2022-01-16 -0.332209  2.820748
2022-01-17  2.179687 -1.660784
2022-01-18  2.261681  0.170805
2022-01-19  1.130726 -2.063273
2022-01-20  2.237124  0.241961
2022-01-21  1.829505  2.083049
2022-01-22 -0.495221  0.875533
2022-01-23 -0.198214 -2.075892
2022-01-24 -0.428832 -0.146865
2022-01-25 -1.047943  0.834688
2022-01-26 -0.427744  1.550146
2022-01-27  0.568554  0.065070
2022-01-28 -0.525053  0.089512
2022-01-29 -0.506854  2.501386
2022-01-30  2.111358  1.415935
2022-01-31  0.874926  0.681585
2022-02-01  1.924742  0.724442
2022-02-02  0.186479  1.908751

```

```
[ ]: df[df["A"]> 0]
```

```

[ ]:
      A      B      C      D      E
2022-01-03  0.164032  0.517432  0.585994  0.023702  0.363817
2022-01-05  2.117883 -1.220357 -1.407096 -0.583775 -0.016587
2022-01-06  0.832723  1.151164 -0.307525 -0.028793  0.069695
2022-01-09  0.432924 -1.836288  0.466117  1.247693 -0.282017
2022-01-12  0.550162  0.046416  0.755635 -0.994057 -0.832033
2022-01-13  1.272304 -1.161495  1.718792  1.623088 -2.137003
2022-01-14  1.382511  0.712078 -0.333969 -0.272936  0.177636
2022-01-15  1.178524  1.462303 -0.497917  0.441221 -1.140695
2022-01-17  2.179687 -1.660784  1.022057 -0.925613 -1.005609
2022-01-18  2.261681  0.170805 -3.247575  0.574118  0.449672
2022-01-19  1.130726 -2.063273 -0.922675 -1.087421  1.754682
2022-01-20  2.237124  0.241961 -0.548753 -0.614911 -1.324496
2022-01-21  1.829505  2.083049 -0.876144 -0.432180 -1.008887
2022-01-27  0.568554  0.065070  0.106410 -1.210190  0.954157
2022-01-30  2.111358  1.415935 -0.883126 -0.312846 -0.036638
2022-01-31  0.874926  0.681585 -0.958487 -0.403117 -0.838487
2022-02-01  1.924742  0.724442  0.427667  0.527684  0.528801
2022-02-02  0.186479  1.908751 -2.363941  0.642013  0.382990

```

```
[ ]: df[df["A"]> 0]
```

```

[ ]:
      A      B      C      D      E
2022-01-03  0.164032  0.517432  0.585994  0.023702  0.363817

```

```

2022-01-05  2.117883 -1.220357 -1.407096 -0.583775 -0.016587
2022-01-06  0.832723  1.151164 -0.307525 -0.028793  0.069695
2022-01-09  0.432924 -1.836288  0.466117  1.247693 -0.282017
2022-01-12  0.550162  0.046416  0.755635 -0.994057 -0.832033
2022-01-13  1.272304 -1.161495  1.718792  1.623088 -2.137003
2022-01-14  1.382511  0.712078 -0.333969 -0.272936  0.177636
2022-01-15  1.178524  1.462303 -0.497917  0.441221 -1.140695
2022-01-17  2.179687 -1.660784  1.022057 -0.925613 -1.005609
2022-01-18  2.261681  0.170805 -3.247575  0.574118  0.449672
2022-01-19  1.130726 -2.063273 -0.922675 -1.087421  1.754682
2022-01-20  2.237124  0.241961 -0.548753 -0.614911 -1.324496
2022-01-21  1.829505  2.083049 -0.876144 -0.432180 -1.008887
2022-01-27  0.568554  0.065070  0.106410 -1.210190  0.954157
2022-01-30  2.111358  1.415935 -0.883126 -0.312846 -0.036638
2022-01-31  0.874926  0.681585 -0.958487 -0.403117 -0.838487
2022-02-01  1.924742  0.724442  0.427667  0.527684  0.528801
2022-02-02  0.186479  1.908751 -2.363941  0.642013  0.382990

```

## 2 Assignment NO 1

```

[ ]: # assignment :Getting non zero values in more then one column
df[ df.iloc[:, 0:5]> 0]

```

```

[ ]:
      A      B      C      D      E
2022-01-01  NaN  NaN  NaN  0.389413  NaN
2022-01-02  NaN  NaN  NaN  0.417691  0.782444
2022-01-03  0.164032  0.517432  0.585994  0.023702  0.363817
2022-01-04  NaN  0.079319  0.562072  0.157869  1.073070
2022-01-05  2.117883  NaN  NaN  NaN  NaN
2022-01-06  0.832723  1.151164  NaN  NaN  0.069695
2022-01-07  NaN  0.065318  1.809717  0.506734  0.702857
2022-01-08  NaN  NaN  NaN  NaN  NaN
2022-01-09  0.432924  NaN  0.466117  1.247693  NaN
2022-01-10  NaN  NaN  NaN  NaN  NaN
2022-01-11  NaN  NaN  1.173824  NaN  NaN
2022-01-12  0.550162  0.046416  0.755635  NaN  NaN
2022-01-13  1.272304  NaN  1.718792  1.623088  NaN
2022-01-14  1.382511  0.712078  NaN  NaN  0.177636
2022-01-15  1.178524  1.462303  NaN  0.441221  NaN
2022-01-16  NaN  2.820748  0.360238  0.120003  NaN
2022-01-17  2.179687  NaN  1.022057  NaN  NaN
2022-01-18  2.261681  0.170805  NaN  0.574118  0.449672
2022-01-19  1.130726  NaN  NaN  NaN  1.754682
2022-01-20  2.237124  0.241961  NaN  NaN  NaN
2022-01-21  1.829505  2.083049  NaN  NaN  NaN
2022-01-22  NaN  0.875533  1.192965  1.358641  3.064904

```

2022-01-23	NaN	NaN	0.887191	0.221786	NaN
2022-01-24	NaN	NaN	NaN	NaN	0.532454
2022-01-25	NaN	0.834688	NaN	0.673116	1.035140
2022-01-26	NaN	1.550146	NaN	NaN	2.043535
2022-01-27	0.568554	0.065070	0.106410	NaN	0.954157
2022-01-28	NaN	0.089512	2.491040	NaN	1.427276
2022-01-29	NaN	2.501386	0.796286	1.332061	1.083685
2022-01-30	2.111358	1.415935	NaN	NaN	NaN
2022-01-31	0.874926	0.681585	NaN	NaN	NaN
2022-02-01	1.924742	0.724442	0.427667	0.527684	0.528801
2022-02-02	0.186479	1.908751	NaN	0.642013	0.382990

```
[ ]: df[df["A"]> 0]
```

```
[ ]:
```

	A	B	C	D	E
2022-01-03	0.164032	0.517432	0.585994	0.023702	0.363817
2022-01-05	2.117883	-1.220357	-1.407096	-0.583775	-0.016587
2022-01-06	0.832723	1.151164	-0.307525	-0.028793	0.069695
2022-01-09	0.432924	-1.836288	0.466117	1.247693	-0.282017
2022-01-12	0.550162	0.046416	0.755635	-0.994057	-0.832033
2022-01-13	1.272304	-1.161495	1.718792	1.623088	-2.137003
2022-01-14	1.382511	0.712078	-0.333969	-0.272936	0.177636
2022-01-15	1.178524	1.462303	-0.497917	0.441221	-1.140695
2022-01-17	2.179687	-1.660784	1.022057	-0.925613	-1.005609
2022-01-18	2.261681	0.170805	-3.247575	0.574118	0.449672
2022-01-19	1.130726	-2.063273	-0.922675	-1.087421	1.754682
2022-01-20	2.237124	0.241961	-0.548753	-0.614911	-1.324496
2022-01-21	1.829505	2.083049	-0.876144	-0.432180	-1.008887
2022-01-27	0.568554	0.065070	0.106410	-1.210190	0.954157
2022-01-30	2.111358	1.415935	-0.883126	-0.312846	-0.036638
2022-01-31	0.874926	0.681585	-0.958487	-0.403117	-0.838487
2022-02-01	1.924742	0.724442	0.427667	0.527684	0.528801
2022-02-02	0.186479	1.908751	-2.363941	0.642013	0.382990

```
[ ]: df[df>0]
```

```
[ ]:
```

	A	B	C	D	E
2022-01-01	NaN	NaN	NaN	0.389413	NaN
2022-01-02	NaN	NaN	NaN	0.417691	0.782444
2022-01-03	0.164032	0.517432	0.585994	0.023702	0.363817
2022-01-04	NaN	0.079319	0.562072	0.157869	1.073070
2022-01-05	2.117883	NaN	NaN	NaN	NaN
2022-01-06	0.832723	1.151164	NaN	NaN	0.069695
2022-01-07	NaN	0.065318	1.809717	0.506734	0.702857
2022-01-08	NaN	NaN	NaN	NaN	NaN
2022-01-09	0.432924	NaN	0.466117	1.247693	NaN
2022-01-10	NaN	NaN	NaN	NaN	NaN

2022-01-11	NaN	NaN	1.173824	NaN	NaN
2022-01-12	0.550162	0.046416	0.755635	NaN	NaN
2022-01-13	1.272304	NaN	1.718792	1.623088	NaN
2022-01-14	1.382511	0.712078	NaN	NaN	0.177636
2022-01-15	1.178524	1.462303	NaN	0.441221	NaN
2022-01-16	NaN	2.820748	0.360238	0.120003	NaN
2022-01-17	2.179687	NaN	1.022057	NaN	NaN
2022-01-18	2.261681	0.170805	NaN	0.574118	0.449672
2022-01-19	1.130726	NaN	NaN	NaN	1.754682
2022-01-20	2.237124	0.241961	NaN	NaN	NaN
2022-01-21	1.829505	2.083049	NaN	NaN	NaN
2022-01-22	NaN	0.875533	1.192965	1.358641	3.064904
2022-01-23	NaN	NaN	0.887191	0.221786	NaN
2022-01-24	NaN	NaN	NaN	NaN	0.532454
2022-01-25	NaN	0.834688	NaN	0.673116	1.035140
2022-01-26	NaN	1.550146	NaN	NaN	2.043535
2022-01-27	0.568554	0.065070	0.106410	NaN	0.954157
2022-01-28	NaN	0.089512	2.491040	NaN	1.427276
2022-01-29	NaN	2.501386	0.796286	1.332061	1.083685
2022-01-30	2.111358	1.415935	NaN	NaN	NaN
2022-01-31	0.874926	0.681585	NaN	NaN	NaN
2022-02-01	1.924742	0.724442	0.427667	0.527684	0.528801
2022-02-02	0.186479	1.908751	NaN	0.642013	0.382990

```
[ ]: df[ df.iloc[0:3]< 0 ]
```

```
[ ]:
```

	A	B	C	D	E
2022-01-01	-0.126032	-0.199938	-0.288899	NaN	-0.273131
2022-01-02	-0.085146	-1.212453	-1.380828	NaN	NaN
2022-01-03	NaN	NaN	NaN	NaN	NaN
2022-01-04	NaN	NaN	NaN	NaN	NaN
2022-01-05	NaN	NaN	NaN	NaN	NaN
2022-01-06	NaN	NaN	NaN	NaN	NaN
2022-01-07	NaN	NaN	NaN	NaN	NaN
2022-01-08	NaN	NaN	NaN	NaN	NaN
2022-01-09	NaN	NaN	NaN	NaN	NaN
2022-01-10	NaN	NaN	NaN	NaN	NaN
2022-01-11	NaN	NaN	NaN	NaN	NaN
2022-01-12	NaN	NaN	NaN	NaN	NaN
2022-01-13	NaN	NaN	NaN	NaN	NaN
2022-01-14	NaN	NaN	NaN	NaN	NaN
2022-01-15	NaN	NaN	NaN	NaN	NaN
2022-01-16	NaN	NaN	NaN	NaN	NaN
2022-01-17	NaN	NaN	NaN	NaN	NaN
2022-01-18	NaN	NaN	NaN	NaN	NaN
2022-01-19	NaN	NaN	NaN	NaN	NaN
2022-01-20	NaN	NaN	NaN	NaN	NaN

2022-01-21	NaN	NaN	NaN	NaN	NaN
2022-01-22	NaN	NaN	NaN	NaN	NaN
2022-01-23	NaN	NaN	NaN	NaN	NaN
2022-01-24	NaN	NaN	NaN	NaN	NaN
2022-01-25	NaN	NaN	NaN	NaN	NaN
2022-01-26	NaN	NaN	NaN	NaN	NaN
2022-01-27	NaN	NaN	NaN	NaN	NaN
2022-01-28	NaN	NaN	NaN	NaN	NaN
2022-01-29	NaN	NaN	NaN	NaN	NaN
2022-01-30	NaN	NaN	NaN	NaN	NaN
2022-01-31	NaN	NaN	NaN	NaN	NaN
2022-02-01	NaN	NaN	NaN	NaN	NaN
2022-02-02	NaN	NaN	NaN	NaN	NaN

```
[ ]: # IS IN Method
df3 = df.copy()
```

```
[ ]: #Adding a column
df3["BABA"]=
↳ [1,2,3,4,5,6,7,8,9,10,1,2,3,4,5,6,7,8,9,10,1,2,3]
df3
```

```
[ ]:
```

	A	B	C	D	E	BABA
2022-01-01	-0.126032	-0.199938	-0.288899	0.389413	-0.273131	1
2022-01-02	-0.085146	-1.212453	-1.380828	0.417691	0.782444	2
2022-01-03	0.164032	0.517432	0.585994	0.023702	0.363817	3
2022-01-04	-1.024023	0.079319	0.562072	0.157869	1.073070	4
2022-01-05	2.117883	-1.220357	-1.407096	-0.583775	-0.016587	5
2022-01-06	0.832723	1.151164	-0.307525	-0.028793	0.069695	6
2022-01-07	-0.304651	0.065318	1.809717	0.506734	0.702857	7
2022-01-08	-1.972085	-0.036357	-0.171530	-0.133243	-0.108570	8
2022-01-09	0.432924	-1.836288	0.466117	1.247693	-0.282017	9
2022-01-10	-0.169957	-0.361568	-1.287344	-0.748285	-0.347073	10
2022-01-11	-0.418178	-1.237385	1.173824	-0.947559	-0.146890	1
2022-01-12	0.550162	0.046416	0.755635	-0.994057	-0.832033	2
2022-01-13	1.272304	-1.161495	1.718792	1.623088	-2.137003	3
2022-01-14	1.382511	0.712078	-0.333969	-0.272936	0.177636	4
2022-01-15	1.178524	1.462303	-0.497917	0.441221	-1.140695	5
2022-01-16	-0.332209	2.820748	0.360238	0.120003	-1.140833	6
2022-01-17	2.179687	-1.660784	1.022057	-0.925613	-1.005609	7
2022-01-18	2.261681	0.170805	-3.247575	0.574118	0.449672	8
2022-01-19	1.130726	-2.063273	-0.922675	-1.087421	1.754682	9
2022-01-20	2.237124	0.241961	-0.548753	-0.614911	-1.324496	10
2022-01-21	1.829505	2.083049	-0.876144	-0.432180	-1.008887	1
2022-01-22	-0.495221	0.875533	1.192965	1.358641	3.064904	2
2022-01-23	-0.198214	-2.075892	0.887191	0.221786	-0.416216	3
2022-01-24	-0.428832	-0.146865	-0.516980	-1.979471	0.532454	4



2022-01-25	-1.047943	0.834688	-0.241208	0.673116	1.035140	5
2022-01-26	-0.427744	1.550146	-2.280609	-0.351001	2.043535	6
2022-01-27	0.568554	0.065070	0.106410	-1.210190	0.954157	7
2022-01-28	-0.525053	0.089512	2.491040	-0.947489	1.427276	8
2022-01-29	-0.506854	2.501386	0.796286	1.332061	1.083685	9
2022-01-30	2.111358	1.415935	-0.883126	-0.312846	-0.036638	10
2022-01-31	0.874926	0.681585	-0.958487	-0.403117	-0.838487	1
2022-02-01	1.924742	0.724442	0.427667	0.527684	0.528801	2
2022-02-02	0.186479	1.908751	-2.363941	0.642013	0.382990	3

```
[ ]: #Adding a new column having same value of previous column
df3["Mean"] =df3["A"]
df3.head()
```

```
[ ]:
      A      B      C      D      E  BABA      Mean
2022-01-01 -0.126032 -0.199938 -0.288899  0.389413 -0.273131    1 -0.126032
2022-01-02 -0.085146 -1.212453 -1.380828  0.417691  0.782444    2 -0.085146
2022-01-03  0.164032  0.517432  0.585994  0.023702  0.363817    3  0.164032
2022-01-04 -1.024023  0.079319  0.562072  0.157869  1.073070    4 -1.024023
2022-01-05  2.117883 -1.220357 -1.407096 -0.583775 -0.016587    5  2.117883
```

### 3 Assignment NO. 2

```
[ ]: #Adding a column having mean of previous values
# #Assignment no 2
df3["Mean"] =df3.mean(axis= 1)
df3.head()
```

```
[ ]:
      A      B      C      D      E  BABA      Mean
2022-01-01 -0.126032 -0.199938 -0.288899  0.389413 -0.273131    1  0.083569
2022-01-02 -0.085146 -1.212453 -1.380828  0.417691  0.782444    2  0.086951
2022-01-03  0.164032  0.517432  0.585994  0.023702  0.363817    3  0.775829
2022-01-04 -1.024023  0.079319  0.562072  0.157869  1.073070    4  0.808051
2022-01-05  2.117883 -1.220357 -1.407096 -0.583775 -0.016587    5  0.648345
```

```
[ ]:
```

```
[ ]:
```