

```
In [2]: import pandas as pd
import numpy as np
```

```
In [3]: df1=pd.read_excel("FirstDecade.xlsx",usecols=['Date','Open','High','Low','Close'])
tcs_FirstDC=df1.to_numpy()
tcs_FirstDC
```

```
Out[3]: array([[Timestamp('2002-08-12 00:00:00'), 27.78542288474347,
28.70024426553483, 27.78542288474347, 28.48499298095703],
[Timestamp('2002-08-13 00:00:00'), 28.52086875697312,
28.9782794636968, 27.89305089125358, 28.09933280944824],
[Timestamp('2002-08-14 00:00:00'), 28.16211253034757,
28.16211253034757, 25.6329026031769, 26.16206550598145],
...,
[Timestamp('2010-12-28 00:00:00'), 448.7846543420418,
452.5992742187929, 448.33244741254, 450.8099365234375],
[Timestamp('2010-12-29 00:00:00'), 451.8522033325688,
456.9645433180547, 451.085371536744, 454.9785766601562],
[Timestamp('2010-12-30 00:00:00'), 453.2285208868343,
461.9981678682445, 453.2285208868343, 460.1891479492188]],
dtype=object)
```

```
In [4]: df2=pd.read_excel("SecondDecade.xlsx",usecols=['Date','Open','High','Low','Close'])
tcs_SecondDC=df2.to_numpy()
tcs_SecondDC
```

```
Out[4]: array([[Timestamp('2011-01-03 00:00:00'), 458.9306703004381,
462.8435561280004, 454.0346425056512, 455.4110412597656],
[Timestamp('2011-01-04 00:00:00'), 457.7116024738174,
458.5964302802989, 447.5655577575036, 450.1807250976562],
[Timestamp('2011-01-05 00:00:00'), 450.3771736616292,
458.4979329994586, 449.0007754011484, 455.7647705078125],
...,
[Timestamp('2020-12-28 00:00:00'), 2783.004833307803,
2820.972240865677, 2775.35396091383, 2801.55810546875],
[Timestamp('2020-12-29 00:00:00'), 2792.568580980208,
2823.172072278621, 2792.568580980208, 2802.6103515625],
[Timestamp('2020-12-30 00:00:00'), 2806.339675193525,
2819.059296223558, 2775.353737882446, 2782.335205078125]],
dtype=object)
```

```
In [5]: tcs_FirstDC.shape
```

```
Out[5]: (2106, 5)
```

```
In [6]: tcs_SecondDC.shape
```

```
Out[6]: (2462, 5)
```

```
In [7]: tcs_SecondDC=tcs_SecondDC[0:2106,:]
```

```
In [8]: tcs_SecondDC.shape
```

```
Out[8]: (2106, 5)
```

```
In [9]: #1.add 2 INR to closing price  
result=tcs_FirstDC[:,4:5]+2  
print(result)
```

```
[[30.48499298095703]  
 [30.09933280944824]  
 [28.16206550598145]  
 ...  
 [452.8099365234375]  
 [456.9785766601562]  
 [462.1891479492188]]
```

```
In [21]: # identify whether stock price is raised or drop on particular  
for i in range(tcs_FirstDC.shape[0]):  
    if tcs_FirstDC[i,4]-tcs_FirstDC[i,1]>0:  
        print(tcs_FirstDC[i,0],"-->","stock price increased")  
    else:  
        print(tcs_FirstDC[i,0],"-->","stock price decreased")
```

```
2003-04-21 00:00:00 --> stock price decreased  
2003-04-22 00:00:00 --> stock price decreased  
2003-04-23 00:00:00 --> stock price decreased  
2003-04-24 00:00:00 --> stock price decreased  
2003-04-25 00:00:00 --> stock price decreased  
2003-04-28 00:00:00 --> stock price decreased  
2003-04-29 00:00:00 --> stock price decreased  
2003-04-30 00:00:00 --> stock price decreased  
2003-05-01 00:00:00 --> stock price decreased  
2003-05-02 00:00:00 --> stock price decreased  
2003-05-05 00:00:00 --> stock price decreased  
2003-05-06 00:00:00 --> stock price decreased  
2003-05-07 00:00:00 --> stock price decreased  
2003-05-08 00:00:00 --> stock price decreased  
2003-05-09 00:00:00 --> stock price decreased  
2003-05-12 00:00:00 --> stock price decreased  
2003-05-13 00:00:00 --> stock price decreased  
2003-05-14 00:00:00 --> stock price decreased  
2003-05-15 00:00:00 --> stock price decreased  
2003-05-16 00:00:00 --> stock price decreased
```

```
In [10]: # 2.add open price from first decadde and open price from second decadde
result=np.add(tcs_FirstDC[:,1:2],tcs_SecondDC[:,1:2])
print(result)
```

```
[486.7160931851816]
[486.2324712307905]
[478.53928619197677]
...
[2359.703503898305]
[2362.77091262366]
[2410.977119432863]]
```

```
In [12]: result=np.bitwise_and(np.int64(tcs_FirstDC[:,4:5]),2)
result
```

```
Out[12]: array([[0],
               [0],
               [2],
               ...,
               [2],
               [2],
               [0]], dtype=int64)
```

```
In [13]: tcs_SecondDC
```

```
Out[13]: array([[Timestamp('2011-01-03 00:00:00'), 458.9306703004381,
                462.8435561280004, 454.0346425056512, 455.4110412597656],
               [Timestamp('2011-01-04 00:00:00'), 457.7116024738174,
                458.5964302802989, 447.5655577575036, 450.1807250976562],
               [Timestamp('2011-01-05 00:00:00'), 450.3771736616292,
                458.4979329994586, 449.0007754011484, 455.7647705078125],
               ...,
               [Timestamp('2019-07-19 00:00:00'), 1910.918849556263,
                1929.319608820166, 1897.578299089934, 1910.872802734375],
               [Timestamp('2019-07-22 00:00:00'), 1910.918709291091,
                1948.134197246915, 1903.374443470383, 1941.187866210938],
               [Timestamp('2019-07-23 00:00:00'), 1957.748598546029,
                1959.680768023928, 1934.287631604897, 1943.534057617188]],
               dtype=object)
```

```
In [14]: result=np.vstack((tcs_FirstDC,tcs_SecondDC))
print(result.shape)
result
```

(4212, 5)

```
Out[14]: array([[Timestamp('2002-08-12 00:00:00'), 27.78542288474347,
                28.70024426553483, 27.78542288474347, 28.48499298095703],
                [Timestamp('2002-08-13 00:00:00'), 28.52086875697312,
                28.9782794636968, 27.89305089125358, 28.09933280944824],
                [Timestamp('2002-08-14 00:00:00'), 28.16211253034757,
                28.16211253034757, 25.6329026031769, 26.16206550598145],
                ...,
                [Timestamp('2019-07-19 00:00:00'), 1910.918849556263,
                1929.319608820166, 1897.578299089934, 1910.872802734375],
                [Timestamp('2019-07-22 00:00:00'), 1910.918709291091,
                1948.134197246915, 1903.374443470383, 1941.187866210938],
                [Timestamp('2019-07-23 00:00:00'), 1957.748598546029,
                1959.680768023928, 1934.287631604897, 1943.534057617188]],
                dtype=object)
```

```
In [15]: result=np.hstack((tcs_FirstDC,tcs_SecondDC))
print(result.shape)
result[0]
```

(2106, 10)

```
Out[15]: array([Timestamp('2002-08-12 00:00:00'), 27.78542288474347,
                28.70024426553483, 27.78542288474347, 28.48499298095703,
                Timestamp('2011-01-03 00:00:00'), 458.9306703004381,
                462.8435561280004, 454.0346425056512, 455.4110412597656],
                dtype=object)
```

```
In [17]: result=np.empty_like(tcs_FirstDC)
print(tcs_FirstDC.shape)
print(result.shape)
```

(2106, 5)

(2106, 5)

```
In [18]: result
```

```
Out[18]: array([[None, None, None, None, None],
                [None, None, None, None, None],
                [None, None, None, None, None],
                ...,
                [None, None, None, None, None],
                [None, None, None, None, None],
                [None, None, None, None, None]], dtype=object)
```

```
In [19]: np.empty((4,4))
```

```
Out[19]: array([[6.23042070e-307, 4.67296746e-307, 1.69121096e-306,
                1.33511018e-306],
               [8.34441742e-308, 1.78022342e-306, 6.23058028e-307,
                9.79107872e-307],
               [6.89807188e-307, 7.56594375e-307, 6.23060065e-307,
                1.78021527e-306],
               [8.34454050e-308, 1.11261027e-306, 1.15706896e-306,
                1.33512173e-306]])
```

```
In [21]: array1=np.arange(1,17,1)
         array1.reshape(4,4)
```

```
Out[21]: array([[ 1,  2,  3,  4],
               [ 5,  6,  7,  8],
               [ 9, 10, 11, 12],
               [13, 14, 15, 16]])
```

```
In [22]: print("std dev. of close price",np.std(tcs_FirstDC[:,4:5]))
```

```
std dev. of close price 96.21715236515651
```

```
In [23]: print("var dev. of close price",np.var(tcs_FirstDC[:,4:5]))
```

```
var dev. of close price 9257.740409259743
```

```
In [24]: print("mean dev. of close price",np.mean(tcs_FirstDC[:,4:5]))
```

```
mean dev. of close price 150.21374507824353
```

```
In [25]: print("median dev. of close price",np.median(tcs_FirstDC[:,4:5]))
```

```
median dev. of close price 147.49518585205075
```

```
In [26]: result=tcs_FirstDC.copy()
         result
```

```
Out[26]: array([[Timestamp('2002-08-12 00:00:00'), 27.78542288474347,
                28.70024426553483, 27.78542288474347, 28.48499298095703],
               [Timestamp('2002-08-13 00:00:00'), 28.52086875697312,
                28.9782794636968, 27.89305089125358, 28.09933280944824],
               [Timestamp('2002-08-14 00:00:00'), 28.16211253034757,
                28.16211253034757, 25.6329026031769, 26.16206550598145],
               ...,
               [Timestamp('2010-12-28 00:00:00'), 448.7846543420418,
                452.5992742187929, 448.33244741254, 450.8099365234375],
               [Timestamp('2010-12-29 00:00:00'), 451.8522033325688,
                456.9645433180547, 451.085371536744, 454.9785766601562],
               [Timestamp('2010-12-30 00:00:00'), 453.2285208868343,
                461.9981678682445, 453.2285208868343, 460.1891479492188]],
              dtype=object)
```

```
In [27]: tcs_FirstDC[0][1]=88888
tcs_FirstDC
```

```
Out[27]: array([[Timestamp('2002-08-12 00:00:00'), 88888, 28.70024426553483,
                27.78542288474347, 28.48499298095703],
                [Timestamp('2002-08-13 00:00:00'), 28.52086875697312,
                28.9782794636968, 27.89305089125358, 28.09933280944824],
                [Timestamp('2002-08-14 00:00:00'), 28.16211253034757,
                28.16211253034757, 25.6329026031769, 26.16206550598145],
                ...,
                [Timestamp('2010-12-28 00:00:00'), 448.7846543420418,
                452.5992742187929, 448.33244741254, 450.8099365234375],
                [Timestamp('2010-12-29 00:00:00'), 451.8522033325688,
                456.9645433180547, 451.085371536744, 454.9785766601562],
                [Timestamp('2010-12-30 00:00:00'), 453.2285208868343,
                461.9981678682445, 453.2285208868343, 460.1891479492188]],
                dtype=object)
```

```
In [28]: result
```

```
Out[28]: array([[Timestamp('2002-08-12 00:00:00'), 27.78542288474347,
                28.70024426553483, 27.78542288474347, 28.48499298095703],
                [Timestamp('2002-08-13 00:00:00'), 28.52086875697312,
                28.9782794636968, 27.89305089125358, 28.09933280944824],
                [Timestamp('2002-08-14 00:00:00'), 28.16211253034757,
                28.16211253034757, 25.6329026031769, 26.16206550598145],
                ...,
                [Timestamp('2010-12-28 00:00:00'), 448.7846543420418,
                452.5992742187929, 448.33244741254, 450.8099365234375],
                [Timestamp('2010-12-29 00:00:00'), 451.8522033325688,
                456.9645433180547, 451.085371536744, 454.9785766601562],
                [Timestamp('2010-12-30 00:00:00'), 453.2285208868343,
                461.9981678682445, 453.2285208868343, 460.1891479492188]],
                dtype=object)
```

```
In [ ]:
```