

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

```
In [3]: df=pd.read_csv("forestfires.csv")
```

```
In [4]: df.head()
```

```
Out[4]:   X  Y  month  day  FFMC  DMC  DC  ISI  temp  RH  wind  rain  area
0  7  5    mar  fri  86.2  26.2  94.3  5.1  8.2  51  6.7  0.0  0.0
1  7  4    oct  tue  90.6  35.4  669.1  6.7 18.0  33  0.9  0.0  0.0
2  7  4    oct  sat  90.6  43.7  686.9  6.7 14.6  33  1.3  0.0  0.0
3  8  6    mar  fri  91.7  33.3  77.5  9.0  8.3  97  4.0  0.2  0.0
4  8  6    mar  sun  89.3  51.3  102.2  9.6 11.4  99  1.8  0.0  0.0
```

```
In [5]: df.info
```

```
Out[5]: <bound method DataFrame.info of
      X  Y  month  day  FFMC  DMC  DC  ISI  temp
RH  wind  rain  area
0   7  5    mar  fri  86.2  26.2  94.3  5.1  8.2  51  6.7  0.0  0.0
1   7  4    oct  tue  90.6  35.4  669.1  6.7 18.0  33  0.9  0.0  0.0
2   7  4    oct  sat  90.6  43.7  686.9  6.7 14.6  33  1.3  0.0  0.0
3   8  6    mar  fri  91.7  33.3  77.5  9.0  8.3  97  4.0  0.2  0.0
4   8  6    mar  sun  89.3  51.3  102.2  9.6 11.4  99  1.8  0.0  0.0
...
512  4  3    aug  sun  81.6  56.7  665.6  1.9 27.8  32  2.7  0.0  6.44
513  2  4    aug  sun  81.6  56.7  665.6  1.9 21.9  71  5.8  0.0  54.29
514  7  4    aug  sun  81.6  56.7  665.6  1.9 21.2  70  6.7  0.0  11.16
515  1  4    aug  sat  94.4 146.0  614.7 11.3 25.6  42  4.0  0.0  0.00
516  6  3    nov  tue  79.5  3.0  106.7  1.1 11.8  31  4.5  0.0  0.00
```

[517 rows x 13 columns]>

```
In [6]: df.describe()
```

```
Out[6]:    X        Y       FFMC       DMC       DC       ISI      temp       RH
count  517.000000  517.000000  517.000000  517.000000  517.000000  517.000000  517.000000  517.000000
mean   4.669246   4.299807   90.644681  110.872340  547.940039   9.021663  18.889168  44.288201
std    2.313778   1.229900   5.520111   64.046482  248.066192   4.559477  5.806625  16.317469
min    1.000000   2.000000  18.700000   1.100000   7.900000   0.000000  2.200000  15.000000
25%    3.000000   4.000000  90.200000  68.600000  437.700000   6.500000  15.500000  33.000000
50%    4.000000   4.000000  91.600000 108.300000  664.200000   8.400000  19.300000  42.000000
75%    7.000000   5.000000  92.900000 142.400000  713.900000  10.800000  22.800000  53.000000
max    9.000000   9.000000  96.200000 291.300000  860.600000  56.100000  33.300000 100.000000
```

In [7]: df.shape

Out[7]: (517, 13)

In [8]: df1=df[['X','Y','month','day']]  
df1

Out[8]:

	X	Y	month	day
<b>0</b>	7	5	mar	fri
<b>1</b>	7	4	oct	tue
<b>2</b>	7	4	oct	sat
<b>3</b>	8	6	mar	fri
<b>4</b>	8	6	mar	sun
...	...	...	...	...
<b>512</b>	4	3	aug	sun
<b>513</b>	2	4	aug	sun
<b>514</b>	7	4	aug	sun
<b>515</b>	1	4	aug	sat
<b>516</b>	6	3	nov	tue

517 rows × 4 columns

In [9]: df2=df[['FFMC','DMC','DC','temp']]  
df2

Out[9]:

	FFMC	DMC	DC	temp
<b>0</b>	86.2	26.2	94.3	8.2
<b>1</b>	90.6	35.4	669.1	18.0
<b>2</b>	90.6	43.7	686.9	14.6
<b>3</b>	91.7	33.3	77.5	8.3
<b>4</b>	89.3	51.3	102.2	11.4
...	...	...	...	...
<b>512</b>	81.6	56.7	665.6	27.8
<b>513</b>	81.6	56.7	665.6	21.9
<b>514</b>	81.6	56.7	665.6	21.2
<b>515</b>	94.4	146.0	614.7	25.6
<b>516</b>	79.5	3.0	106.7	11.8

517 rows × 4 columns

In [10]:

```
df3=df[['temp','wind','rain','area']]
df3
```

Out[10]:

	temp	wind	rain	area
0	8.2	6.7	0.0	0.00
1	18.0	0.9	0.0	0.00
2	14.6	1.3	0.0	0.00
3	8.3	4.0	0.2	0.00
4	11.4	1.8	0.0	0.00
...	...	...	...	...
512	27.8	2.7	0.0	6.44
513	21.9	5.8	0.0	54.29
514	21.2	6.7	0.0	11.16
515	25.6	4.0	0.0	0.00
516	11.8	4.5	0.0	0.00

517 rows × 4 columns

In [11]:

```
#merging subset
merging=pd.concat([df1,df2,df3])
merging
```

Out[11]:

	X	Y	month	day	FFMC	DMC	DC	temp	wind	rain	area
0	7.0	5.0	mar	fri	NaN	NaN	NaN	NaN	NaN	NaN	NaN
1	7.0	4.0	oct	tue	NaN	NaN	NaN	NaN	NaN	NaN	NaN
2	7.0	4.0	oct	sat	NaN	NaN	NaN	NaN	NaN	NaN	NaN
3	8.0	6.0	mar	fri	NaN	NaN	NaN	NaN	NaN	NaN	NaN
4	8.0	6.0	mar	sun	NaN	NaN	NaN	NaN	NaN	NaN	NaN
...	...	...	...	...	...	...	...	...	...	...	...
512	NaN	NaN	NaN	NaN	NaN	NaN	NaN	27.8	2.7	0.0	6.44
513	NaN	NaN	NaN	NaN	NaN	NaN	NaN	21.9	5.8	0.0	54.29
514	NaN	NaN	NaN	NaN	NaN	NaN	NaN	21.2	6.7	0.0	11.16
515	NaN	NaN	NaN	NaN	NaN	NaN	NaN	25.6	4.0	0.0	0.00
516	NaN	NaN	NaN	NaN	NaN	NaN	NaN	11.8	4.5	0.0	0.00

1551 rows × 11 columns

In [12]:

```
#sort data
```

```
sort_values=df.sort_values('X', ascending=True)
sort_values
```

Out[12]:

	X	Y	month	day	FFMC	DMC	DC	ISI	temp	RH	wind	rain	area
439	1	3	sep	fri	91.1	91.3	738.1	7.2	19.1	46	2.2	0.0	0.33
87	1	2	sep	thu	92.9	137.0	706.4	9.2	22.4	34	2.2	0.0	0.00
86	1	2	sep	thu	92.9	137.0	706.4	9.2	25.4	27	2.2	0.0	0.00
85	1	2	sep	thu	92.9	137.0	706.4	9.2	21.5	15	0.9	0.0	0.00
84	1	2	aug	thu	91.7	114.3	661.3	6.3	20.2	45	3.6	0.0	0.00
...	...	...	...	...	...	...	...	...	...	...	...	...	...
473	9	4	jun	sat	90.5	61.1	252.6	9.4	24.5	50	3.1	0.0	70.32
383	9	6	aug	thu	91.6	248.4	753.8	6.3	20.5	58	2.7	0.0	42.87
412	9	4	jul	mon	92.3	92.1	442.1	9.8	22.8	27	4.5	0.0	1.63
402	9	9	aug	fri	94.8	227.0	706.7	12.0	25.0	36	4.0	0.0	0.00
76	9	9	feb	fri	86.6	13.2	43.0	5.3	15.7	43	3.1	0.0	0.00

517 rows × 13 columns

In [13]:

```
#sort data

sort_values=df.sort_values('RH', ascending=True)
sort_values
```

Out[13]:

	X	Y	month	day	FFMC	DMC	DC	ISI	temp	RH	wind	rain	area
85	1	2	sep	thu	92.9	137.0	706.4	9.2	21.5	15	0.9	0.0	0.00
197	4	5	sep	thu	92.9	137.0	706.4	9.2	21.5	15	0.9	0.0	11.06
50	4	4	sep	thu	92.9	137.0	706.4	9.2	20.8	17	1.3	0.0	0.00
111	3	4	mar	fri	91.7	33.3	77.5	9.0	18.8	18	4.5	0.0	0.00
218	4	5	sep	wed	92.9	133.3	699.6	9.2	19.4	19	1.3	0.0	31.72
...	...	...	...	...	...	...	...	...	...	...	...	...	...
304	6	5	may	sat	85.1	28.0	113.8	3.5	11.3	94	4.9	0.0	0.00
211	7	4	aug	sat	93.5	139.4	594.2	20.3	5.1	96	5.8	0.0	26.00
3	8	6	mar	fri	91.7	33.3	77.5	9.0	8.3	97	4.0	0.2	0.00
4	8	6	mar	sun	89.3	51.3	102.2	9.6	11.4	99	1.8	0.0	0.00
379	4	5	jan	sun	18.7	1.1	171.4	0.0	5.2	100	0.9	0.0	0.00

517 rows × 13 columns

In [15]:

```
df.transpose()
```

Out[15]:

	0	1	2	3	4	5	6	7	8	9	...	507	508	509	510
<b>X</b>	7	7	7	8	8	8	8	8	8	7	...	2	1	5	6
<b>Y</b>	5	4	4	6	6	6	6	6	6	5	...	4	2	4	5
<b>month</b>	mar	oct	oct	mar	mar	aug	aug	aug	sep	sep	...	aug	aug	aug	aug
<b>day</b>	fri	tue	sat	fri	sun	sun	mon	mon	tue	sat	...	fri	fri	fri	fri
<b>FFMC</b>	86.2	90.6	90.6	91.7	89.3	92.3	92.3	91.5	91.0	92.5	...	91.0	91.0	91.0	91.0
<b>DMC</b>	26.2	35.4	43.7	33.3	51.3	85.3	88.9	145.4	129.5	88.0	...	166.9	166.9	166.9	166.9
<b>DC</b>	94.3	669.1	686.9	77.5	102.2	488.0	495.6	608.2	692.6	698.6	...	752.6	752.6	752.6	752.6
<b>ISI</b>	5.1	6.7	6.7	9.0	9.6	14.7	8.5	10.7	7.0	7.1	...	7.1	7.1	7.1	7.1
<b>temp</b>	8.2	18.0	14.6	8.3	11.4	22.2	24.1	8.0	13.1	22.8	...	25.9	25.9	21.1	18.2
<b>RH</b>	51	33	33	97	99	29	27	86	63	40	...	41	41	71	62
<b>wind</b>	6.7	0.9	1.3	4.0	1.8	5.4	3.1	2.2	5.4	4.0	...	3.6	3.6	7.6	5.4
<b>rain</b>	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	...	0.0	0.0	1.4	0.0
<b>area</b>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	...	0.0	0.0	2.17	0.43

13 rows × 517 columns


In [17]: 

```
#shaping data
shaping=df.shape
shaping
```

Out[17]: (517, 13)

In [20]: 

```
pivot_table=pd.pivot_table(df,index=['wind','area'],values='RH')
print(pivot_table)
```

```
RH
wind area
0.4 2.47 40.000
0.9 0.00 51.875
    2.29 47.000
    6.84 59.000
    7.40 42.000
...
    ...
8.9 0.61 51.000
9.4 2.53 26.000
    3.19 40.000
    4.62 53.000
    61.13 33.000
```

[286 rows × 1 columns]

In [21]: 

```
#reading data
```

```
reshaping_arr=np.array([1,2,3,4,5,6])
reshaping_arr.reshape(3,2)
```

```
Out[21]: array([[1, 2],
   [3, 4],
   [5, 6]])
```

```
In [22]: df.isnull().sum()
```

```
Out[22]: X      0
Y      0
month  0
day    0
FFMC   0
DMC    0
DC     0
ISI    0
temp   0
RH     0
wind   0
rain   0
area   0
dtype: int64
```

```
In [23]: df.dropna()
```

```
Out[23]:   X  Y  month  day  FFMC  DMC  DC  ISI  temp  RH  wind  rain  area
0  7  5    mar  fri  86.2  26.2  94.3  5.1  8.2  51  6.7  0.0  0.00
1  7  4    oct  tue  90.6  35.4  669.1  6.7  18.0  33  0.9  0.0  0.00
2  7  4    oct  sat  90.6  43.7  686.9  6.7  14.6  33  1.3  0.0  0.00
3  8  6    mar  fri  91.7  33.3  77.5  9.0  8.3  97  4.0  0.2  0.00
4  8  6    mar  sun  89.3  51.3  102.2  9.6  11.4  99  1.8  0.0  0.00
...
512 4  3    aug  sun  81.6  56.7  665.6  1.9  27.8  32  2.7  0.0  6.44
513 2  4    aug  sun  81.6  56.7  665.6  1.9  21.9  71  5.8  0.0  54.29
514 7  4    aug  sun  81.6  56.7  665.6  1.9  21.2  70  6.7  0.0  11.16
515 1  4    aug  sat  94.4  146.0  614.7  11.3  25.6  42  4.0  0.0  0.00
516 6  3    nov  tue  79.5  3.0  106.7  1.1  11.8  31  4.5  0.0  0.00
```

517 rows × 13 columns

```
In [24]: df1=df.loc[1:100,['month','day','temp']]
```

```
In [25]: df1
```

Out[25]:

	month	day	temp
1	oct	tue	18.0
2	oct	sat	14.6
3	mar	fri	8.3
4	mar	sun	11.4
5	aug	sun	22.2
...	...	...	...
96	feb	sat	12.7
97	mar	sat	17.4
98	aug	sun	11.6
99	aug	sun	19.8
100	aug	sun	19.8

100 rows × 3 columns

In [27]: df2=df.loc[1:100,['wind','area','rain']]

In [28]: df2

Out[28]:

	wind	area	rain
1	0.9	0.0	0.0
2	1.3	0.0	0.0
3	4.0	0.0	0.2
4	1.8	0.0	0.0
5	5.4	0.0	0.0
...	...	...	...
96	1.8	0.0	0.0
97	5.4	0.0	0.0
98	4.5	0.0	0.0
99	5.4	0.0	0.0
100	5.4	0.0	0.0

100 rows × 3 columns

In [31]: df2=df.iloc[[1,3,4,5,6,7,8,9,34,35,50,77,66,88]]

In [32]: df2

Out[32]:

X	Y	month	day	FFMC	DMC	DC	ISI	temp	RH	wind	rain	area
1	7	4	oct	tue	90.6	35.4	669.1	6.7	18.0	33	0.9	0.0
3	8	6	mar	fri	91.7	33.3	77.5	9.0	8.3	97	4.0	0.2
4	8	6	mar	sun	89.3	51.3	102.2	9.6	11.4	99	1.8	0.0
5	8	6	aug	sun	92.3	85.3	488.0	14.7	22.2	29	5.4	0.0
6	8	6	aug	mon	92.3	88.9	495.6	8.5	24.1	27	3.1	0.0
7	8	6	aug	mon	91.5	145.4	608.2	10.7	8.0	86	2.2	0.0
8	8	6	sep	tue	91.0	129.5	692.6	7.0	13.1	63	5.4	0.0
9	7	5	sep	sat	92.5	88.0	698.6	7.1	22.8	40	4.0	0.0
34	6	3	sep	mon	91.8	78.5	724.3	9.2	21.2	32	2.7	0.0
35	6	3	sep	tue	90.3	80.7	730.2	6.3	18.2	62	4.5	0.0
50	4	4	sep	thu	92.9	137.0	706.4	9.2	20.8	17	1.3	0.0
77	1	3	mar	mon	87.6	52.2	103.8	5.0	8.3	72	3.1	0.0
66	2	2	sep	fri	92.4	117.9	668.0	12.2	23.0	37	4.5	0.0
88	1	2	sep	sun	93.5	149.3	728.6	8.1	25.3	36	3.6	0.0

In [33]:

```
df_integration=pd.concat([df1,df2])
df_integration
```

Out[33]:

	month	day	temp	X	Y	FFMC	DMC	DC	ISI	RH	wind	rain	area
1	oct	tue	18.0	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
2	oct	sat	14.6	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
3	mar	fri	8.3	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
4	mar	sun	11.4	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
5	aug	sun	22.2	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
...	...	...	...	...	...	...	...	...	...	...	...	...	...
35	sep	tue	18.2	6.0	3.0	90.3	80.7	730.2	6.3	62.0	4.5	0.0	0.0
50	sep	thu	20.8	4.0	4.0	92.9	137.0	706.4	9.2	17.0	1.3	0.0	0.0
77	mar	mon	8.3	1.0	3.0	87.6	52.2	103.8	5.0	72.0	3.1	0.0	0.0
66	sep	fri	23.0	2.0	2.0	92.4	117.9	668.0	12.2	37.0	4.5	0.0	0.0
88	sep	sun	25.3	1.0	2.0	93.5	149.3	728.6	8.1	36.0	3.6	0.0	0.0

114 rows × 13 columns

In [34]:

```
df_integration.transpose()
```

## Forest\_Fire

Out[34]:

	1	2	3	4	5	6	7	8	9	10	...	6	7	8	9	3
<b>month</b>	oct	oct	mar	mar	aug	aug	aug	sep	sep	sep	...	aug	aug	sep	sep	se
<b>day</b>	tue	sat	fri	sun	sun	mon	mon	tue	sat	sat	...	mon	mon	tue	sat	mc
<b>temp</b>	18.0	14.6	8.3	11.4	22.2	24.1	8.0	13.1	22.8	17.8	...	24.1	8.0	13.1	22.8	21
<b>X</b>	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	...	8.0	8.0	8.0	7.0	6
<b>Y</b>	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	...	6.0	6.0	6.0	5.0	3
<b>FFMC</b>	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	...	92.3	91.5	91.0	92.5	91
<b>DMC</b>	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	...	88.9	145.4	129.5	88.0	78
<b>DC</b>	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	...	495.6	608.2	692.6	698.6	724
<b>ISI</b>	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	...	8.5	10.7	7.0	7.1	9
<b>RH</b>	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	...	27.0	86.0	63.0	40.0	32
<b>wind</b>	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	...	3.1	2.2	5.4	4.0	2
<b>rain</b>	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	...	0.0	0.0	0.0	0.0	0
<b>area</b>	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	...	0.0	0.0	0.0	0.0	0

13 rows × 114 columns



In [37]: df.drop(columns="FFMC")

Out[37]:

	X	Y	month	day	DMC	DC	ISI	temp	RH	wind	rain	area
<b>0</b>	7	5	mar	fri	26.2	94.3	5.1	8.2	51	6.7	0.0	0.00
<b>1</b>	7	4	oct	tue	35.4	669.1	6.7	18.0	33	0.9	0.0	0.00
<b>2</b>	7	4	oct	sat	43.7	686.9	6.7	14.6	33	1.3	0.0	0.00
<b>3</b>	8	6	mar	fri	33.3	77.5	9.0	8.3	97	4.0	0.2	0.00
<b>4</b>	8	6	mar	sun	51.3	102.2	9.6	11.4	99	1.8	0.0	0.00
...	...	...	...	...	...	...	...	...	...	...	...	...
<b>512</b>	4	3	aug	sun	56.7	665.6	1.9	27.8	32	2.7	0.0	6.44
<b>513</b>	2	4	aug	sun	56.7	665.6	1.9	21.9	71	5.8	0.0	54.29
<b>514</b>	7	4	aug	sun	56.7	665.6	1.9	21.2	70	6.7	0.0	11.16
<b>515</b>	1	4	aug	sat	146.0	614.7	11.3	25.6	42	4.0	0.0	0.00
<b>516</b>	6	3	nov	tue	3.0	106.7	1.1	11.8	31	4.5	0.0	0.00

517 rows × 12 columns

In [41]: df\_merged=pd.concat([df1,df2])  
df\_merged

	month	day	temp	X	Y	FFMC	DMC	DC	ISI	RH	wind	rain	area
1	oct	tue	18.0	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
2	oct	sat	14.6	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
3	mar	fri	8.3	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
4	mar	sun	11.4	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
5	aug	sun	22.2	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
...	...	...	...	...	...	...	...	...	...	...	...	...	...
35	sep	tue	18.2	6.0	3.0	90.3	80.7	730.2	6.3	62.0	4.5	0.0	0.0
50	sep	thu	20.8	4.0	4.0	92.9	137.0	706.4	9.2	17.0	1.3	0.0	0.0
77	mar	mon	8.3	1.0	3.0	87.6	52.2	103.8	5.0	72.0	3.1	0.0	0.0
66	sep	fri	23.0	2.0	2.0	92.4	117.9	668.0	12.2	37.0	4.5	0.0	0.0
88	sep	sun	25.3	1.0	2.0	93.5	149.3	728.6	8.1	36.0	3.6	0.0	0.0

114 rows × 13 columns

```
In [63]: from sklearn.model_selection import train_test_split
from sklearn import linear_model , metrics
x=df[["X"]]
y=df[["temp"]]
```

```
In [64]: x_train,x_test,y_train,y_test=train_test_split(x,y,test_size=0.2,random_state=1)
```

```
In [65]: len(x_train)
```

Out[65]: 413

```
In [66]: len(x_test)
```

Out[66]: 104

```
In [67]: df.shape
```

Out[67]: (517, 13)

```
In [68]: reg=linear_model.LinearRegression()
```

```
In [69]: print(x_train)
```

```
X  
135 3  
218 4  
119 3  
463 6  
42 4  
.. ..  
129 2  
144 2  
72 5  
235 8  
37 7
```

[413 rows x 1 columns]

```
In [70]: model=reg.fit(x_train,y_train)
```

```
In [71]: r_sq=reg.score(x_train,y_train)
```

```
In [72]: print("Determination coeff",r_sq)
```

Determination coeff 0.0040996940667922255

```
In [73]: print("intercept",model.intercept_)
```

intercept [19.58351711]

```
In [75]: print("slope",model.coef_)
```

slope [[-0.16678537]]

```
In [76]: y_predict=model.predict(x_test)
```

```
In [77]: print('predicted response:',y_predict,sep='\n')
```

predicted response:

```
[ [19.24994636]
[18.58280487]
[18.91637562]
[19.08316099]
[18.41601949]
[18.41601949]
[18.41601949]
[18.58280487]
[18.24923412]
[18.58280487]
[18.24923412]
[18.58280487]
[19.08316099]
[19.24994636]
[18.74959024]
[19.24994636]
[18.58280487]
[18.91637562]
[18.91637562]
[19.24994636]
[18.41601949]
[19.24994636]
[18.74959024]
[19.08316099]
[18.58280487]
[19.41673174]
[18.58280487]
[18.91637562]
[18.91637562]
[19.24994636]
[19.24994636]
[19.41673174]
[19.24994636]
[19.24994636]
[18.58280487]
[19.41673174]
[18.91637562]
[18.41601949]
[19.24994636]
[18.74959024]
[19.08316099]
[18.24923412]
[18.91637562]
[19.08316099]
[18.24923412]
[19.24994636]
[18.91637562]
[18.58280487]
[19.41673174]
[19.24994636]
[18.24923412]
[18.24923412]
[18.24923412]
[18.08244874]
[18.41601949]
[19.24994636]
[19.24994636]
[18.24923412]
[18.24923412]
```

```
[18.91637562]
[19.08316099]
[18.58280487]
[18.41601949]
[18.41601949]
[18.24923412]
[19.08316099]
[19.08316099]
[19.24994636]
[18.58280487]
[18.24923412]
[18.24923412]
[19.24994636]
[18.24923412]
[18.58280487]
[19.24994636]
[18.41601949]
[18.41601949]
[18.58280487]
[19.08316099]
[19.08316099]
[18.91637562]
[18.91637562]
[19.41673174]
[18.91637562]
[18.91637562]
[18.41601949]
[19.08316099]
[18.58280487]
[18.58280487]
[18.08244874]
[18.24923412]
[18.41601949]
[18.74959024]
[19.41673174]
[18.91637562]
[18.58280487]
[18.24923412]
[18.58280487]
[18.24923412]
[19.24994636]
[18.41601949]
[18.58280487]
[18.24923412]
[18.41601949]]
```

In [ ]: