

Importing Libraries

In [1]:

```
1 import numpy as np
2 import pandas as pd
3 import matplotlib.pyplot as plt
4 import seaborn as sns
```

Importing Datasets

In [2]:

```

1 df=pd.read_csv('NORTH INTERIOR KARNATAKA.csv')
2 df

```

Out[2]:

		index	SUBDIVISION	YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	Jan-Feb	Mar-May	Ju-S
0	3658		NORTH INTERIOR KARNATAKA	1902	0.0	0.0	0.3	22.5	34.4	111.3	83.2	78.1	146.7	118.8	35.7	85.1	716.1	0.0	57.1	41.1
1	3659		NORTH INTERIOR KARNATAKA	1903	3.5	0.0	0.1	6.9	53.4	102.8	209.4	146.4	189.3	166.4	34.3	16.0	928.5	3.5	60.3	64.1
2	3660		NORTH INTERIOR KARNATAKA	1904	0.2	0.3	8.5	11.0	46.3	120.6	91.6	48.5	165.1	86.5	0.0	0.0	578.6	0.5	65.8	42.1
3	3661		NORTH INTERIOR KARNATAKA	1905	0.0	6.0	2.6	16.0	51.2	99.6	60.1	139.2	42.2	85.0	4.4	0.0	506.2	6.0	69.8	34.1
4	3662		NORTH INTERIOR KARNATAKA	1906	21.3	0.0	0.2	2.6	30.0	142.0	120.3	182.1	116.0	86.2	24.3	58.9	783.8	21.3	32.7	56.1
...	
109	3767		NORTH INTERIOR KARNATAKA	2011	0.5	7.2	7.2	41.2	46.8	101.3	150.8	152.0	69.0	73.4	5.7	0.0	655.2	7.7	95.2	47.1
110	3768		NORTH INTERIOR KARNATAKA	2012	28.5	6.2	0.4	35.4	19.5	60.0	114.5	105.5	79.2	85.2	46.5	2.9	583.8	34.7	55.3	35.1
111	3769		NORTH INTERIOR KARNATAKA	2013	1.2	6.1	3.0	25.4	47.4	99.4	160.7	73.9	201.0	101.0	4.2	0.1	723.2	7.3	75.7	53.1
112	3770		NORTH INTERIOR KARNATAKA	2014	0.0	6.1	29.2	26.4	93.0	50.4	136.8	205.2	90.2	80.3	25.0	14.1	756.8	6.1	148.7	48.1
113	3771		NORTH INTERIOR KARNATAKA	2015	2.4	0.0	27.5	50.8	45.3	89.6	38.5	78.4	150.8	61.2	5.7	1.7	551.9	2.4	123.6	35.1

114 rows × 20 columns

Data Cleaning and Data Preprocessing

In [3]:

```

1 df=df.dropna()
2 df

```

Out[3]:

		index	SUBDIVISION	YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	Jan-Feb	Mar-May	Ju-S
0	3658		NORTH INTERIOR KARNATAKA	1902	0.0	0.0	0.3	22.5	34.4	111.3	83.2	78.1	146.7	118.8	35.7	85.1	716.1	0.0	57.1	41.1
1	3659		NORTH INTERIOR KARNATAKA	1903	3.5	0.0	0.1	6.9	53.4	102.8	209.4	146.4	189.3	166.4	34.3	16.0	928.5	3.5	60.3	64.1
2	3660		NORTH INTERIOR KARNATAKA	1904	0.2	0.3	8.5	11.0	46.3	120.6	91.6	48.5	165.1	86.5	0.0	0.0	578.6	0.5	65.8	42.1
3	3661		NORTH INTERIOR KARNATAKA	1905	0.0	6.0	2.6	16.0	51.2	99.6	60.1	139.2	42.2	85.0	4.4	0.0	506.2	6.0	69.8	34.1
4	3662		NORTH INTERIOR KARNATAKA	1906	21.3	0.0	0.2	2.6	30.0	142.0	120.3	182.1	116.0	86.2	24.3	58.9	783.8	21.3	32.7	56.1
...	
109	3767		NORTH INTERIOR KARNATAKA	2011	0.5	7.2	7.2	41.2	46.8	101.3	150.8	152.0	69.0	73.4	5.7	0.0	655.2	7.7	95.2	47.1
110	3768		NORTH INTERIOR KARNATAKA	2012	28.5	6.2	0.4	35.4	19.5	60.0	114.5	105.5	79.2	85.2	46.5	2.9	583.8	34.7	55.3	35.1
111	3769		NORTH INTERIOR KARNATAKA	2013	1.2	6.1	3.0	25.4	47.4	99.4	160.7	73.9	201.0	101.0	4.2	0.1	723.2	7.3	75.7	53.1
112	3770		NORTH INTERIOR KARNATAKA	2014	0.0	6.1	29.2	26.4	93.0	50.4	136.8	205.2	90.2	80.3	25.0	14.1	756.8	6.1	148.7	48.1
113	3771		NORTH INTERIOR KARNATAKA	2015	2.4	0.0	27.5	50.8	45.3	89.6	38.5	78.4	150.8	61.2	5.7	1.7	551.9	2.4	123.6	35.1

114 rows × 20 columns

```
In [4]: 1 df.columns
```

```
Out[4]: Index(['index', 'SUBDIVISION', 'YEAR', 'JAN', 'FEB', 'MAR', 'APR', 'MAY',
   'JUN', 'JUL', 'AUG', 'SEP', 'OCT', 'NOV', 'DEC', 'ANNUAL', 'Jan-Feb',
   'Mar-May', 'Jun-Sep', 'Oct-Dec'],
  dtype='object')
```

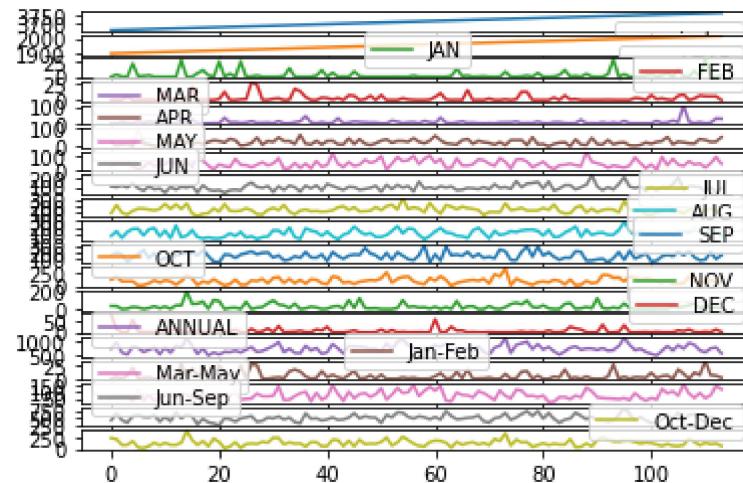
```
In [5]: 1 df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 114 entries, 0 to 113
Data columns (total 20 columns):
 #   Column      Non-Null Count  Dtype  
--- 
 0   index       114 non-null    int64  
 1   SUBDIVISION 114 non-null    object  
 2   YEAR        114 non-null    int64  
 3   JAN         114 non-null    float64 
 4   FEB         114 non-null    float64 
 5   MAR         114 non-null    float64 
 6   APR         114 non-null    float64 
 7   MAY         114 non-null    float64 
 8   JUN         114 non-null    float64 
 9   JUL         114 non-null    float64 
 10  AUG         114 non-null    float64 
 11  SEP         114 non-null    float64 
 12  OCT         114 non-null    float64 
 13  NOV         114 non-null    float64 
 14  DEC         114 non-null    float64 
 15  ANNUAL      114 non-null    float64 
 16  Jan-Feb     114 non-null    float64 
 17  Mar-May     114 non-null    float64 
 18  Jun-Sep     114 non-null    float64 
 19  Oct-Dec     114 non-null    float64 
dtypes: float64(17), int64(2), object(1)
memory usage: 18.7+ KB
```

Line Chart

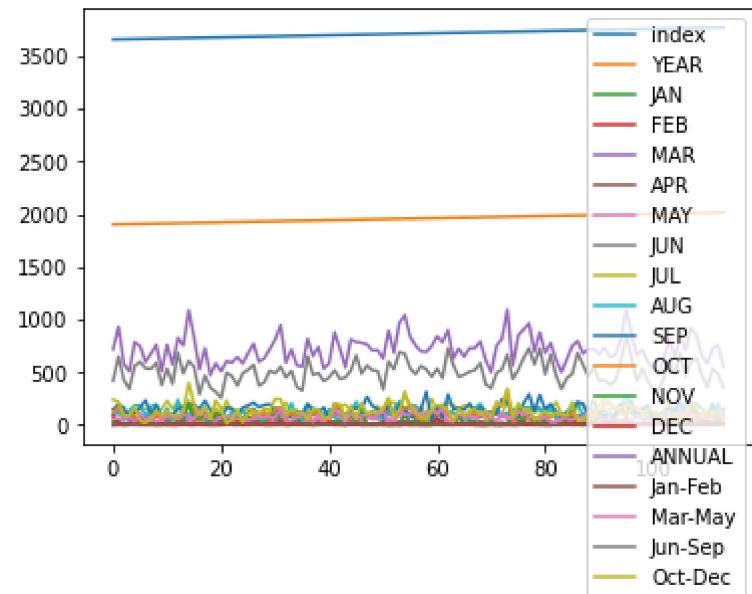
```
In [6]: 1 df.plot.line(subplots=True)
```

```
Out[6]: array([<AxesSubplot:>, <AxesSubplot:>, <AxesSubplot:>, <AxesSubplot:>,
   <AxesSubplot:>, <AxesSubplot:>, <AxesSubplot:>, <AxesSubplot:>,
   <AxesSubplot:>, <AxesSubplot:>, <AxesSubplot:>, <AxesSubplot:>,
   <AxesSubplot:>, <AxesSubplot:>, <AxesSubplot:>, <AxesSubplot:>,
   <AxesSubplot:>, <AxesSubplot:>], dtype=object)
```



In [7]: 1 df.plot.line()

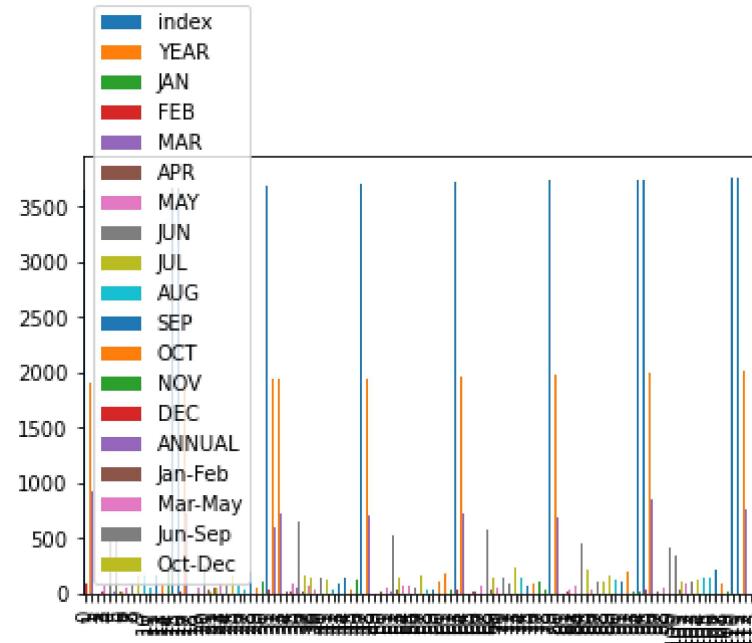
Out[7]: <AxesSubplot:>



Bar Chart

In [8]: 1 df.plot.bar()

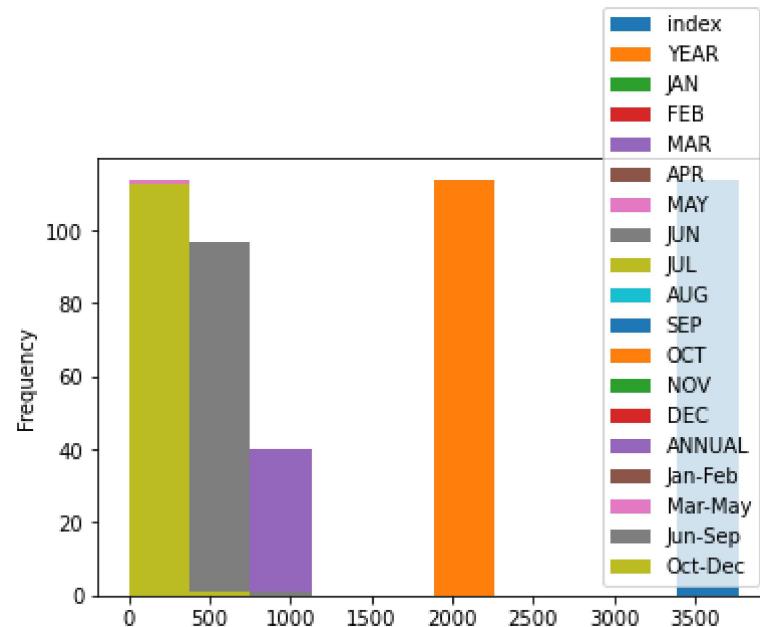
Out[8]: <AxesSubplot:>



Histogram

In [9]: 1 df.plot.hist()

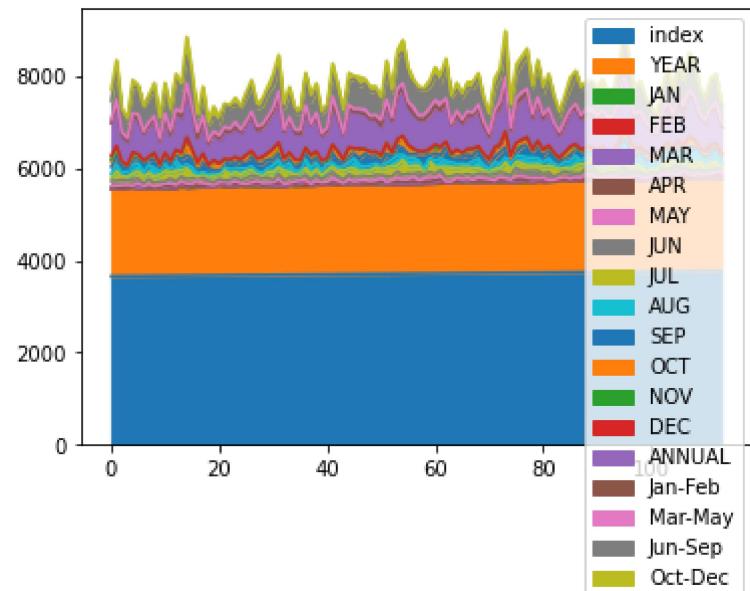
Out[9]: <AxesSubplot:ylabel='Frequency'>



Area Chart

```
In [10]: 1 df.plot.area()
```

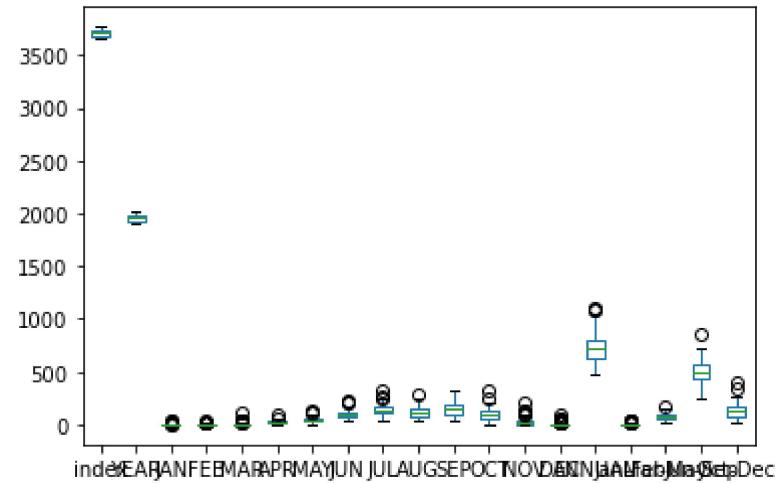
```
Out[10]: <AxesSubplot:>
```



Box Chart

```
In [11]: 1 df.plot.box()
```

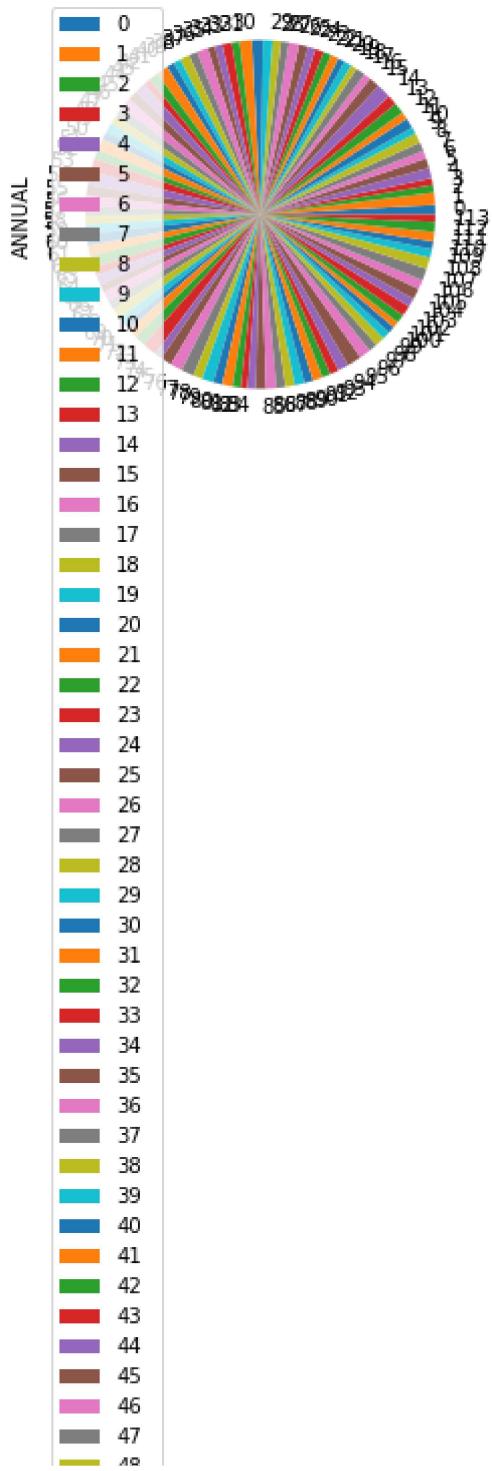
```
Out[11]: <AxesSubplot:>
```



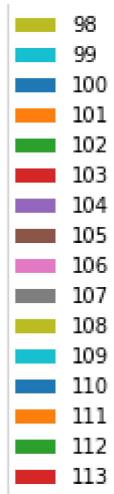
Pie Chart

```
In [12]: 1 df.plot.pie(y='ANNUAL')
```

```
Out[12]: <AxesSubplot:ylabel='ANNUAL'>
```

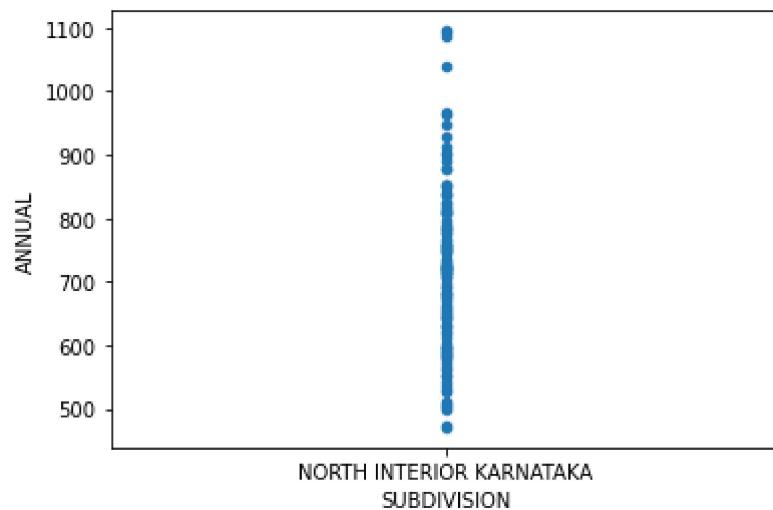
40
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65
66
67
68
69
70
71
72
73
74
75
76
77
78
79
80
81
82
83
84
85
86
87
88
89
90
91
92
93
94
95
96
97



Scatter Plot

```
In [13]: 1 df.plot.scatter(x='SUBDIVISION',y='ANNUAL')
```

```
Out[13]: <AxesSubplot:xlabel='SUBDIVISION', ylabel='ANNUAL'>
```



In [14]: 1 df.info()

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 114 entries, 0 to 113
Data columns (total 20 columns):
 #   Column      Non-Null Count  Dtype  
--- 
 0   index       114 non-null    int64  
 1   SUBDIVISION 114 non-null    object  
 2   YEAR        114 non-null    int64  
 3   JAN         114 non-null    float64 
 4   FEB         114 non-null    float64 
 5   MAR         114 non-null    float64 
 6   APR         114 non-null    float64 
 7   MAY         114 non-null    float64 
 8   JUN         114 non-null    float64 
 9   JUL         114 non-null    float64 
 10  AUG         114 non-null    float64 
 11  SEP         114 non-null    float64 
 12  OCT         114 non-null    float64 
 13  NOV         114 non-null    float64 
 14  DEC         114 non-null    float64 
 15  ANNUAL      114 non-null    float64 
 16  Jan-Feb     114 non-null    float64 
 17  Mar-May     114 non-null    float64 
 18  Jun-Sep     114 non-null    float64 
 19  Oct-Dec     114 non-null    float64 
dtypes: float64(17), int64(2), object(1)
memory usage: 18.7+ KB
```

```
In [15]: 1 df.describe()
```

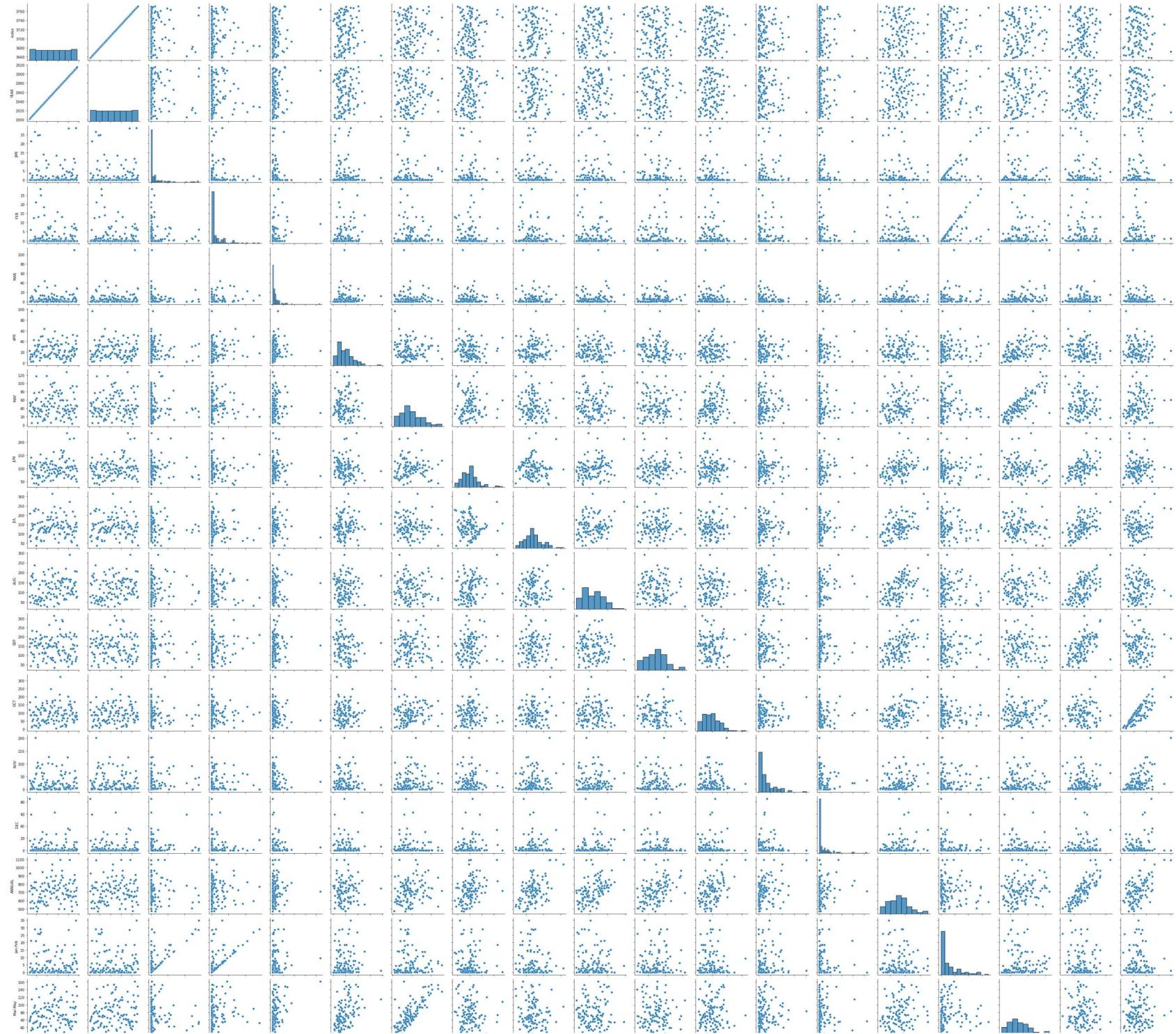
Out[15]:

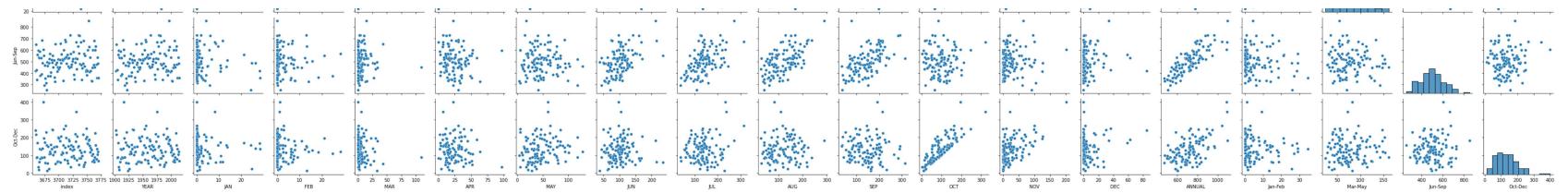
	index	YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG
count	114.000000	114.000000	114.000000	114.000000	114.000000	114.000000	114.000000	114.000000	114.000000	114.000000
mean	3714.500000	1958.500000	3.008772	3.035088	7.123684	23.924561	46.873684	100.821930	138.414035	119.497368
std	33.052988	33.052988	6.224851	5.360574	12.727298	15.236731	26.636674	34.160101	50.344501	53.743350
min	3658.000000	1902.000000	0.000000	0.000000	0.000000	0.200000	3.500000	38.200000	37.000000	28.000000
25%	3686.250000	1930.250000	0.000000	0.000000	0.500000	12.150000	29.050000	75.925000	108.500000	74.800000
50%	3714.500000	1958.500000	0.200000	0.300000	3.450000	22.300000	40.600000	99.750000	133.450000	119.100000
75%	3742.750000	1986.750000	2.400000	3.350000	7.600000	32.100000	62.500000	115.550000	161.975000	158.675000
max	3771.000000	2015.000000	28.500000	28.400000	109.200000	96.900000	127.300000	235.700000	314.100000	290.100000

EDA And Visualization

```
In [16]: 1 sns.pairplot(df)
```

```
Out[16]: <seaborn.axisgrid.PairGrid at 0x2a7a4a9fca0>
```

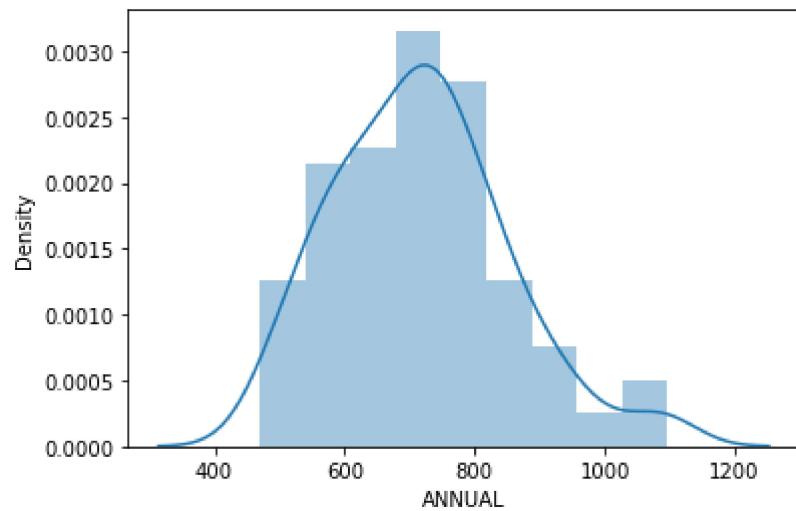





```
In [17]: 1 sns.distplot(df['ANNUAL'])
```

C:\ProgramData\Anaconda3\lib\site-packages\seaborn\distributions.py:2557: FutureWarning: `distplot` is a deprecated function and will be removed in a future version. Please adapt your code to use either `displot` (a figure-level function with similar flexibility) or `histplot` (an axes-level function for histograms).
warnings.warn(msg, FutureWarning)

```
Out[17]: <AxesSubplot:xlabel='ANNUAL', ylabel='Density'>
```



```
In [18]: 1 sns.heatmap(df.corr())
```

```
Out[18]: <AxesSubplot:>
```

