

## 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('GUJARAT REGION.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
0	2277		GUJARAT REGION	1901	4.2	0.0	0.6	1.6	7.0	60.3	240.2	205.4	18.1	16.6	0.0	0.3	554.3	4.2	9.2	524
1	2278		GUJARAT REGION	1902	3.9	0.0	0.0	0.6	1.0	32.8	229.8	299.0	281.2	2.3	1.5	11.9	863.9	3.9	1.5	842
2	2279		GUJARAT REGION	1903	0.3	0.1	1.4	0.0	12.3	30.1	452.9	202.0	183.2	5.4	0.0	0.0	887.6	0.3	13.6	868
3	2280		GUJARAT REGION	1904	0.8	10.6	16.8	0.2	3.9	48.3	194.8	71.8	138.0	6.1	0.1	1.2	492.6	11.3	20.9	453
4	2281		GUJARAT REGION	1905	0.1	0.7	1.1	0.3	0.0	20.1	668.3	37.9	81.3	1.4	0.2	0.1	811.5	0.8	1.3	807
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
110	2387		GUJARAT REGION	2011	0.0	0.2	0.0	0.0	0.0	16.3	259.2	451.7	162.5	0.4	0.0	0.0	890.5	0.2	0.0	889
111	2388		GUJARAT REGION	2012	0.1	0.0	0.0	0.0	0.0	34.4	178.2	230.3	263.8	7.1	0.0	0.0	714.0	0.1	0.0	706
112	2389		GUJARAT REGION	2013	0.0	0.9	0.1	4.6	0.0	155.7	405.4	211.1	287.3	53.2	0.1	0.0	1118.6	0.9	4.7	1059
113	2390		GUJARAT REGION	2014	5.7	0.1	0.2	1.0	1.3	11.6	307.5	138.6	235.1	3.3	1.3	0.0	705.7	5.8	2.5	692
114	2391		GUJARAT REGION	2015	1.8	0.0	6.1	5.5	0.9	120.7	354.7	37.4	93.4	2.2	0.3	0.0	622.9	1.8	12.5	606

115 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 Se
0	2277		GUJARAT REGION	1901	4.2	0.0	0.6	1.6	7.0	60.3	240.2	205.4	18.1	16.6	0.0	0.3	554.3	4.2	9.2	524
1	2278		GUJARAT REGION	1902	3.9	0.0	0.0	0.6	1.0	32.8	229.8	299.0	281.2	2.3	1.5	11.9	863.9	3.9	1.5	842
2	2279		GUJARAT REGION	1903	0.3	0.1	1.4	0.0	12.3	30.1	452.9	202.0	183.2	5.4	0.0	0.0	887.6	0.3	13.6	868
3	2280		GUJARAT REGION	1904	0.8	10.6	16.8	0.2	3.9	48.3	194.8	71.8	138.0	6.1	0.1	1.2	492.6	11.3	20.9	453
4	2281		GUJARAT REGION	1905	0.1	0.7	1.1	0.3	0.0	20.1	668.3	37.9	81.3	1.4	0.2	0.1	811.5	0.8	1.3	807
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
110	2387		GUJARAT REGION	2011	0.0	0.2	0.0	0.0	0.0	16.3	259.2	451.7	162.5	0.4	0.0	0.0	890.5	0.2	0.0	889
111	2388		GUJARAT REGION	2012	0.1	0.0	0.0	0.0	0.0	34.4	178.2	230.3	263.8	7.1	0.0	0.0	714.0	0.1	0.0	706
112	2389		GUJARAT REGION	2013	0.0	0.9	0.1	4.6	0.0	155.7	405.4	211.1	287.3	53.2	0.1	0.0	1118.6	0.9	4.7	1059
113	2390		GUJARAT REGION	2014	5.7	0.1	0.2	1.0	1.3	11.6	307.5	138.6	235.1	3.3	1.3	0.0	705.7	5.8	2.5	692
114	2391		GUJARAT REGION	2015	1.8	0.0	6.1	5.5	0.9	120.7	354.7	37.4	93.4	2.2	0.3	0.0	622.9	1.8	12.5	606

115 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')
```

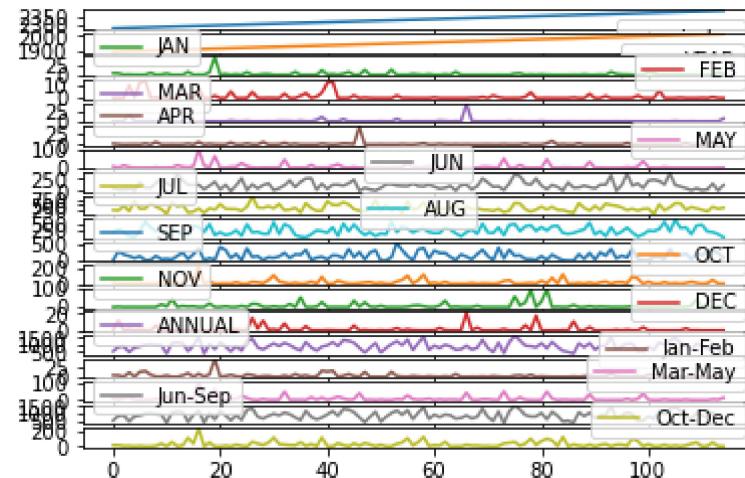
In [5]: 1 df.info()

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 115 entries, 0 to 114
Data columns (total 20 columns):
 #   Column      Non-Null Count  Dtype  
--- 
 0   index       115 non-null    int64  
 1   SUBDIVISION 115 non-null    object  
 2   YEAR        115 non-null    int64  
 3   JAN         115 non-null    float64 
 4   FEB         115 non-null    float64 
 5   MAR         115 non-null    float64 
 6   APR         115 non-null    float64 
 7   MAY         115 non-null    float64 
 8   JUN         115 non-null    float64 
 9   JUL         115 non-null    float64 
 10  AUG         115 non-null    float64 
 11  SEP         115 non-null    float64 
 12  OCT         115 non-null    float64 
 13  NOV         115 non-null    float64 
 14  DEC         115 non-null    float64 
 15  ANNUAL      115 non-null    float64 
 16  Jan-Feb     115 non-null    float64 
 17  Mar-May     115 non-null    float64 
 18  Jun-Sep     115 non-null    float64 
 19  Oct-Dec     115 non-null    float64 
dtypes: float64(17), int64(2), object(1)
memory usage: 18.9+ KB
```

## Line Chart

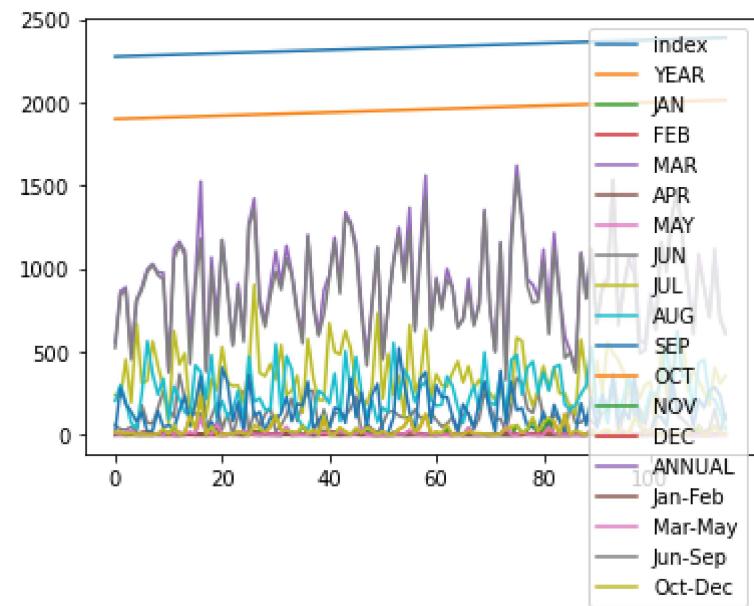
```
In [6]: 1 df.plot.line(subplots=True)
```

```
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()

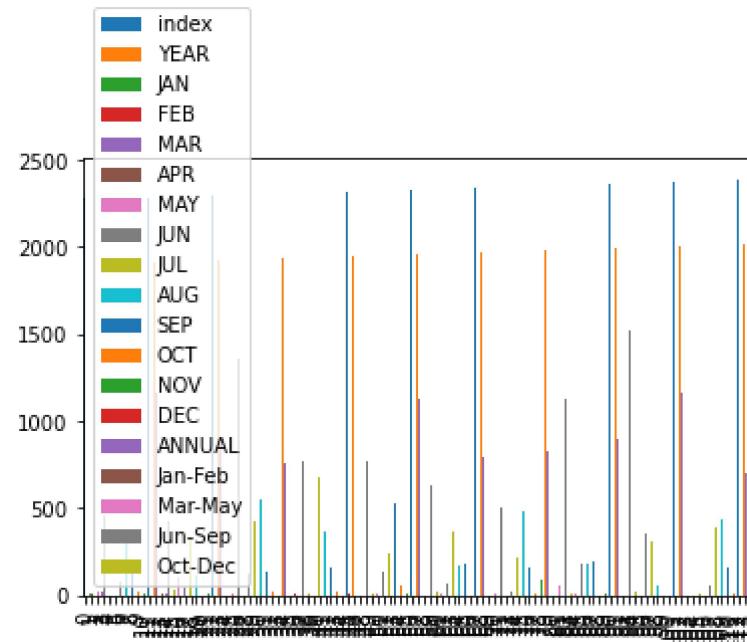
Out[7]: <AxesSubplot:>



## Bar Chart

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

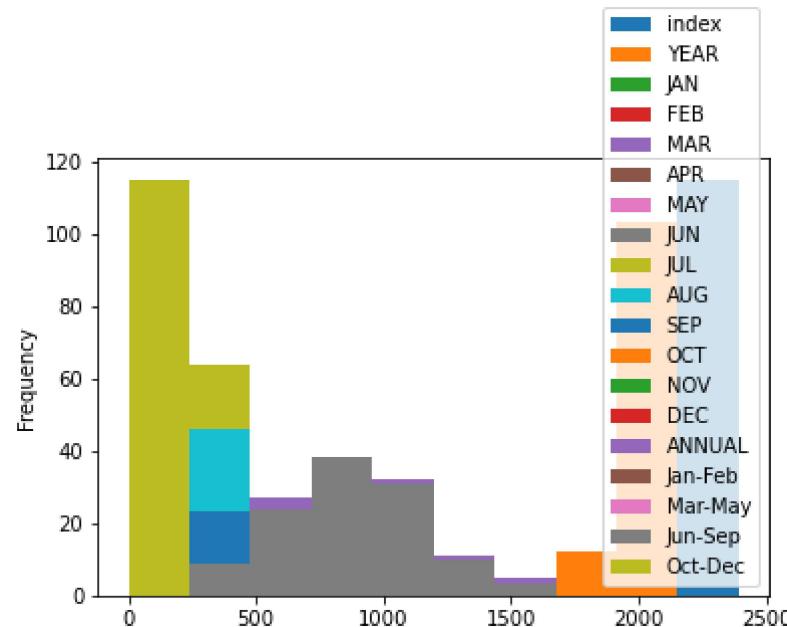
Out[8]: <AxesSubplot:>



## Histogram

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

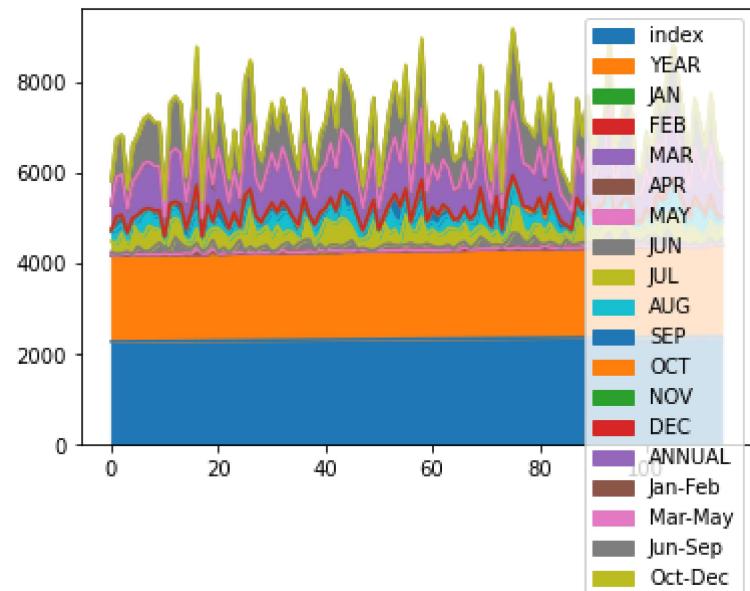
Out[9]: <AxesSubplot:ylabel='Frequency'>



## Area Chart

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

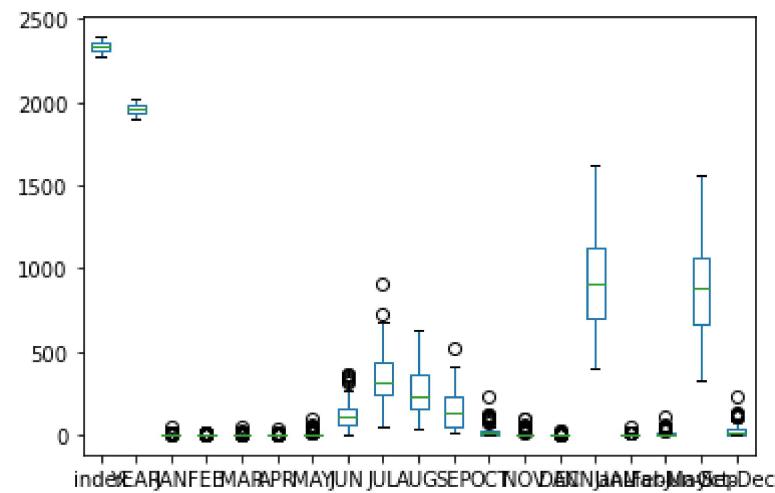
Out[10]: <AxesSubplot:>



## Box Chart

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

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



## Pie Chart

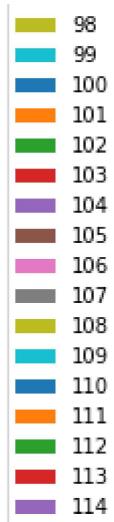
```
In [12]: 1 df.plot.pie(y='ANNUAL')
```

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





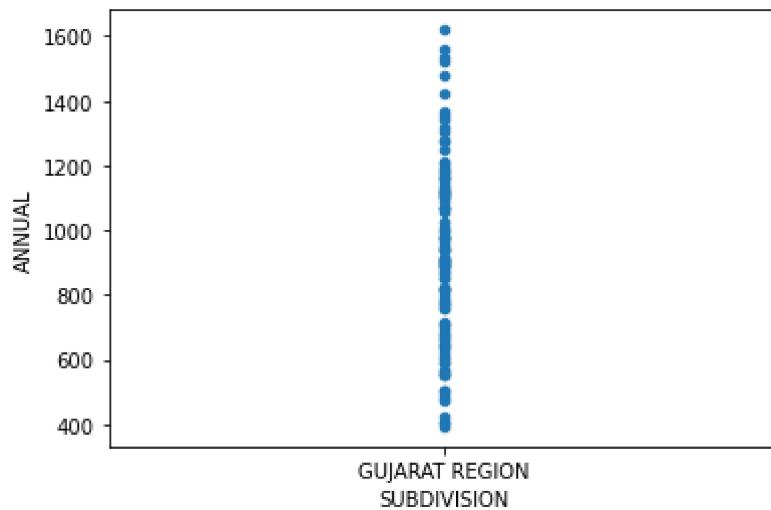
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## Scatter Plot

```
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: 115 entries, 0 to 114
Data columns (total 20 columns):
 #   Column      Non-Null Count  Dtype  
--- 
 0   index       115 non-null    int64  
 1   SUBDIVISION 115 non-null    object  
 2   YEAR        115 non-null    int64  
 3   JAN         115 non-null    float64 
 4   FEB         115 non-null    float64 
 5   MAR         115 non-null    float64 
 6   APR         115 non-null    float64 
 7   MAY         115 non-null    float64 
 8   JUN         115 non-null    float64 
 9   JUL         115 non-null    float64 
 10  AUG         115 non-null    float64 
 11  SEP         115 non-null    float64 
 12  OCT         115 non-null    float64 
 13  NOV         115 non-null    float64 
 14  DEC         115 non-null    float64 
 15  ANNUAL      115 non-null    float64 
 16  Jan-Feb     115 non-null    float64 
 17  Mar-May     115 non-null    float64 
 18  Jun-Sep     115 non-null    float64 
 19  Oct-Dec     115 non-null    float64 
dtypes: float64(17), int64(2), object(1)
memory usage: 18.9+ KB
```

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

Out[15]:

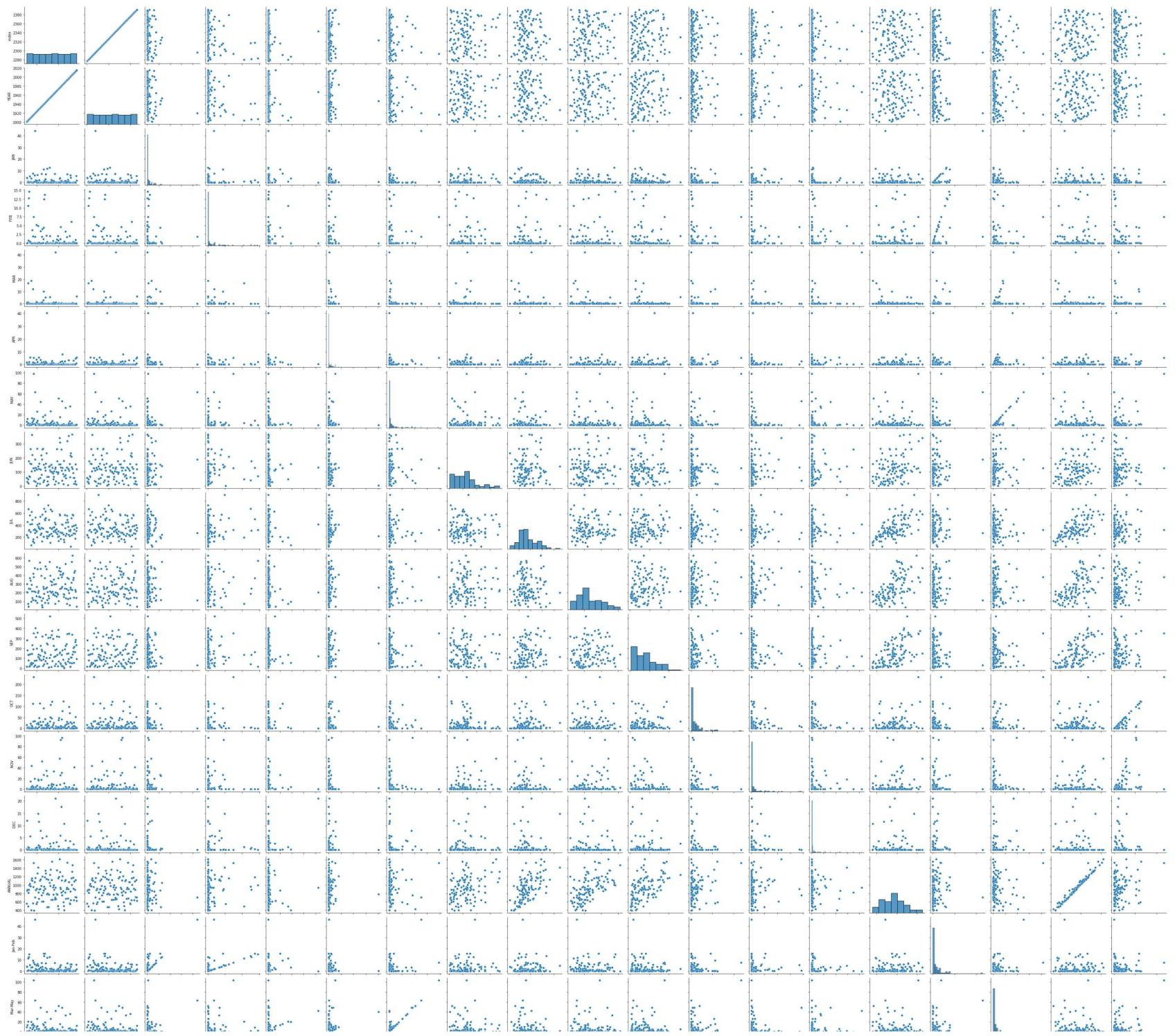
	index	YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG
count	115.000000	115.000000	115.000000	115.000000	115.000000	115.000000	115.000000	115.000000	115.000000	115.000000
mean	2334.000000	1958.000000	1.786087	1.191304	1.220870	1.116522	5.809565	121.284348	348.920870	259.193043
std	33.341666	33.341666	4.762590	2.870710	4.784102	3.980389	13.981353	84.287119	155.057669	139.006755
min	2277.000000	1901.000000	0.000000	0.000000	0.000000	0.000000	0.000000	2.600000	45.800000	32.000000
25%	2305.500000	1929.500000	0.000000	0.000000	0.000000	0.000000	0.100000	58.750000	241.600000	151.800000
50%	2334.000000	1958.000000	0.100000	0.000000	0.000000	0.100000	0.900000	112.500000	316.400000	230.300000
75%	2362.500000	1986.500000	1.500000	0.650000	0.250000	0.750000	4.100000	155.850000	433.400000	365.250000
max	2391.000000	2015.000000	44.100000	14.600000	42.100000	40.400000	98.300000	367.300000	903.300000	624.800000

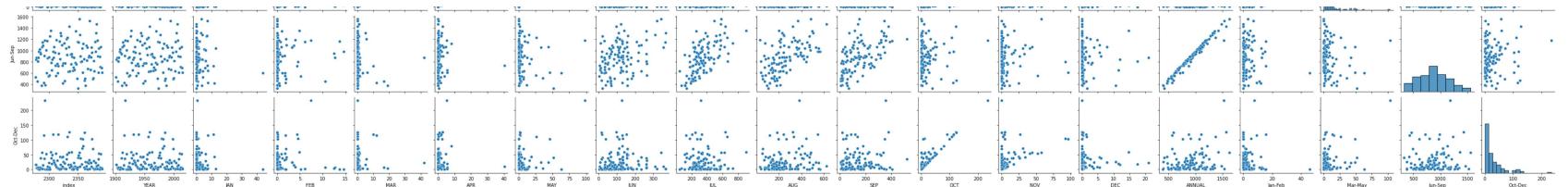
## EDA And Visualization

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

```
Out[16]: <seaborn.axisgrid.PairGrid at 0x1f16caf9e20>
```



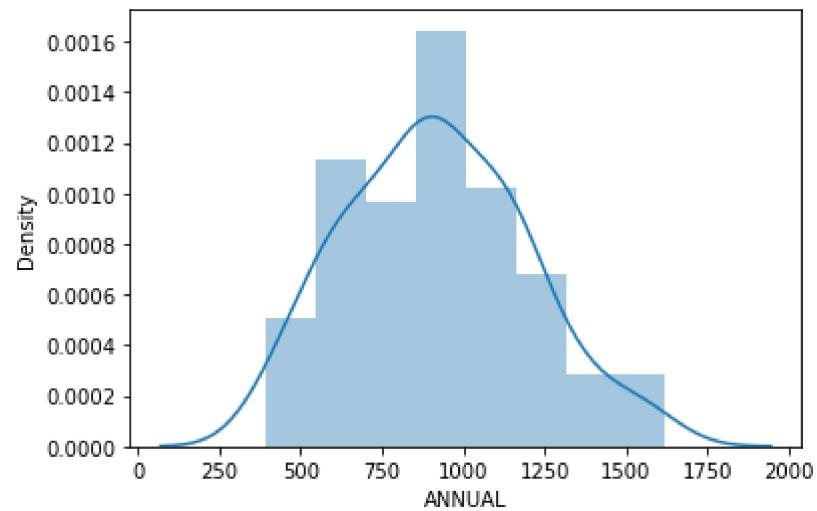




```
In [17]: 1 sns.distplot(df['ANNUAL'])
```

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:>
```

