

## 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('WEST MADHYA PRADESH.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	2047		WEST MADHYA PRADESH	1901	25.8	5.8	5.8	2.8	2.1	41.2	228.9	349.9	47.9	5.6	0.0	2.4	718.2	31.6	10.7	667
1	2048		WEST MADHYA PRADESH	1902	22.1	8.4	0.0	2.0	5.9	35.9	401.9	179.4	194.1	37.9	10.0	14.2	911.7	30.5	8.0	811
2	2049		WEST MADHYA PRADESH	1903	5.3	0.0	0.0	0.0	22.3	50.6	304.9	261.1	250.2	55.1	0.0	0.0	949.6	5.3	22.3	866
3	2050		WEST MADHYA PRADESH	1904	3.2	15.5	14.8	0.0	12.0	96.6	273.0	218.6	125.9	3.3	1.8	9.6	774.4	18.7	26.9	714
4	2051		WEST MADHYA PRADESH	1905	3.5	4.4	1.1	0.8	3.0	36.1	326.3	137.6	183.5	0.3	0.0	0.0	696.5	7.9	4.9	683
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
110	2157		WEST MADHYA PRADESH	2011	0.0	1.7	0.1	1.8	3.6	241.5	306.7	343.3	165.0	0.2	0.0	0.0	1063.9	1.7	5.5	1056
111	2158		WEST MADHYA PRADESH	2012	6.2	0.0	0.0	0.9	3.1	48.2	439.2	341.2	194.3	2.1	0.0	0.0	1035.2	6.2	4.0	1023
112	2159		WEST MADHYA PRADESH	2013	1.7	31.1	8.5	2.8	0.4	263.7	485.1	432.6	98.9	68.7	0.3	2.4	1396.3	32.8	11.7	1280
113	2160		WEST MADHYA PRADESH	2014	25.6	34.4	4.6	1.4	1.4	30.6	337.4	211.0	192.6	7.0	3.0	15.8	864.9	60.0	7.5	771
114	2161		WEST MADHYA PRADESH	2015	40.2	6.4	53.5	13.3	2.0	154.1	428.2	276.6	55.6	11.0	0.3	1.0	1042.3	46.6	68.9	914

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-S
0	2047		WEST MADHYA PRADESH	1901	25.8	5.8	5.8	2.8	2.1	41.2	228.9	349.9	47.9	5.6	0.0	2.4	718.2	31.6	10.7	667
1	2048		WEST MADHYA PRADESH	1902	22.1	8.4	0.0	2.0	5.9	35.9	401.9	179.4	194.1	37.9	10.0	14.2	911.7	30.5	8.0	811
2	2049		WEST MADHYA PRADESH	1903	5.3	0.0	0.0	0.0	22.3	50.6	304.9	261.1	250.2	55.1	0.0	0.0	949.6	5.3	22.3	866
3	2050		WEST MADHYA PRADESH	1904	3.2	15.5	14.8	0.0	12.0	96.6	273.0	218.6	125.9	3.3	1.8	9.6	774.4	18.7	26.9	714
4	2051		WEST MADHYA PRADESH	1905	3.5	4.4	1.1	0.8	3.0	36.1	326.3	137.6	183.5	0.3	0.0	0.0	696.5	7.9	4.9	683
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
110	2157		WEST MADHYA PRADESH	2011	0.0	1.7	0.1	1.8	3.6	241.5	306.7	343.3	165.0	0.2	0.0	0.0	1063.9	1.7	5.5	1056
111	2158		WEST MADHYA PRADESH	2012	6.2	0.0	0.0	0.9	3.1	48.2	439.2	341.2	194.3	2.1	0.0	0.0	1035.2	6.2	4.0	1023
112	2159		WEST MADHYA PRADESH	2013	1.7	31.1	8.5	2.8	0.4	263.7	485.1	432.6	98.9	68.7	0.3	2.4	1396.3	32.8	11.7	1280
113	2160		WEST MADHYA PRADESH	2014	25.6	34.4	4.6	1.4	1.4	30.6	337.4	211.0	192.6	7.0	3.0	15.8	864.9	60.0	7.5	771
114	2161		WEST MADHYA PRADESH	2015	40.2	6.4	53.5	13.3	2.0	154.1	428.2	276.6	55.6	11.0	0.3	1.0	1042.3	46.6	68.9	914

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')
```

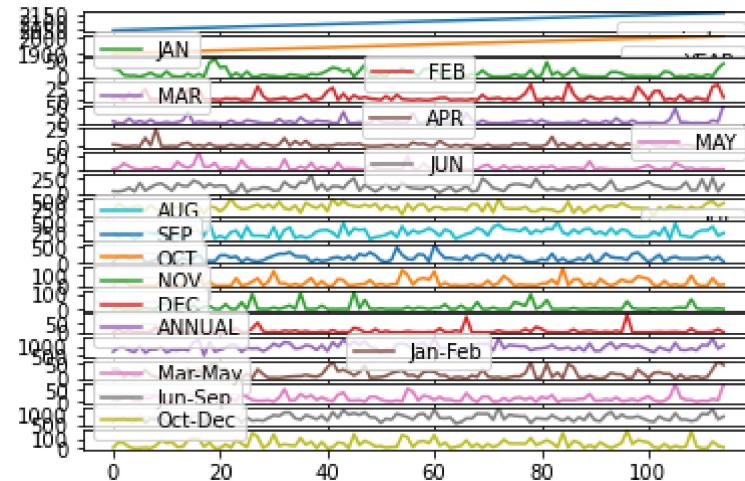
```
In [5]: 1 df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 114 entries, 0 to 114
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

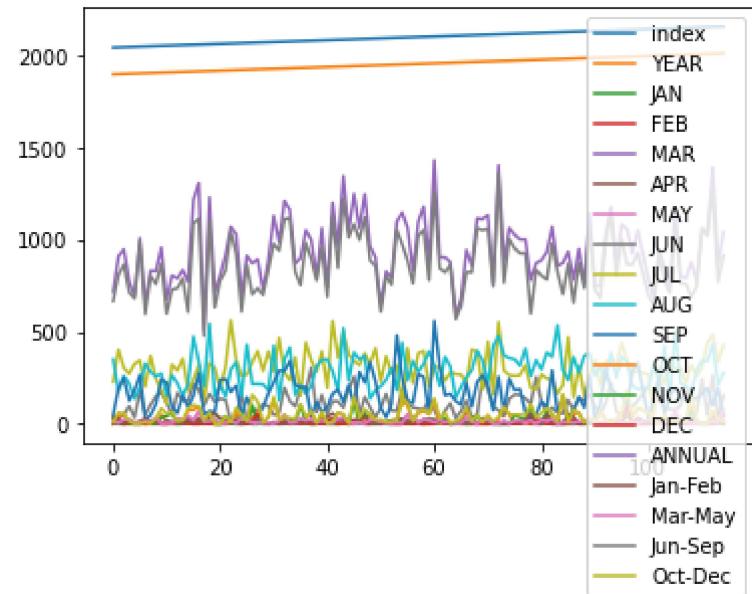
```
In [6]: 1 df.plot.line(subplots=True)
```

```
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()
```

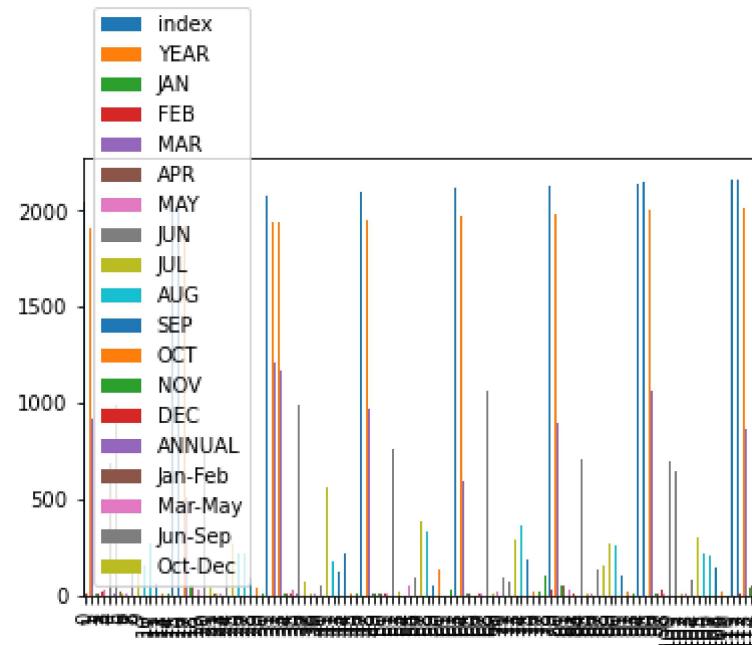
```
Out[7]: <AxesSubplot:>
```



## Bar Chart

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

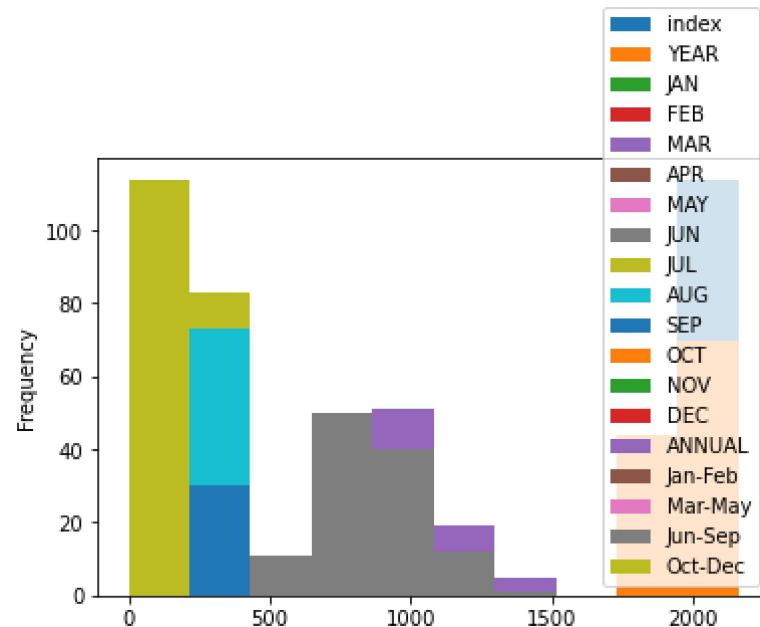
Out[8]: <AxesSubplot:>



## Histogram

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

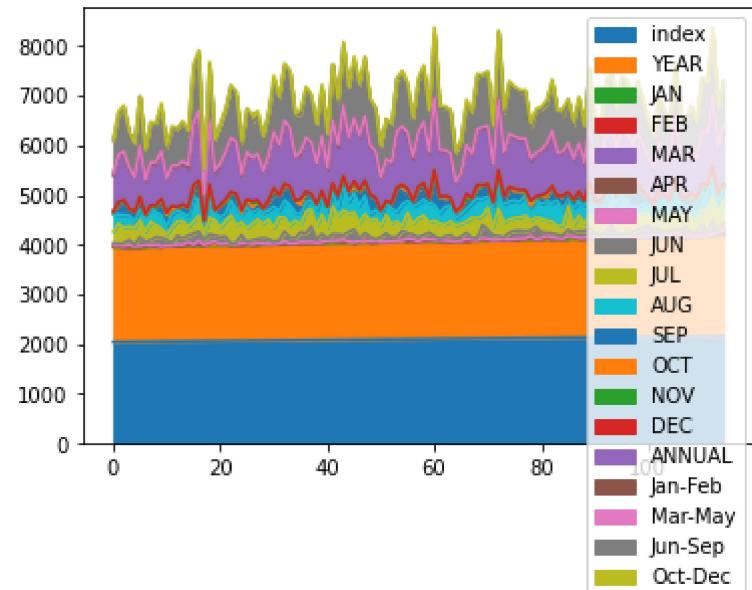
Out[9]: <AxesSubplot:ylabel='Frequency'>



## Area Chart

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

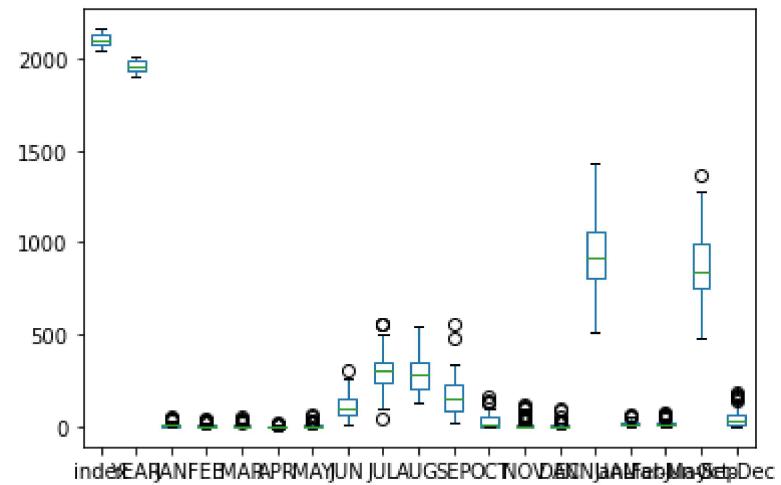
Out[10]: <AxesSubplot:>



## Box Chart

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

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

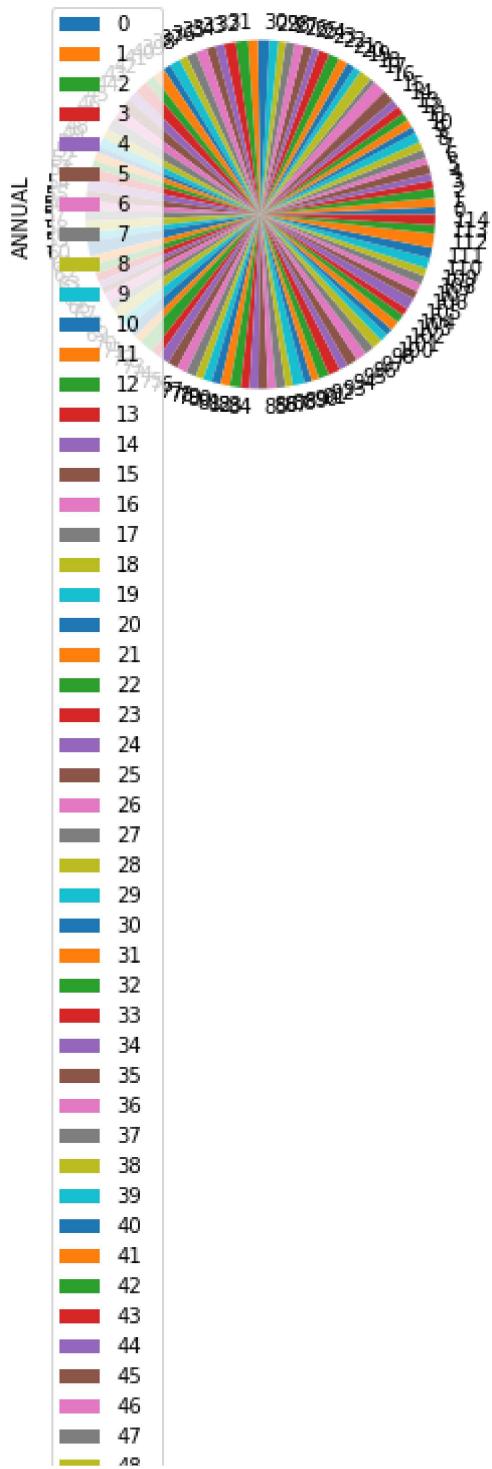


## Pie Chart

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

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





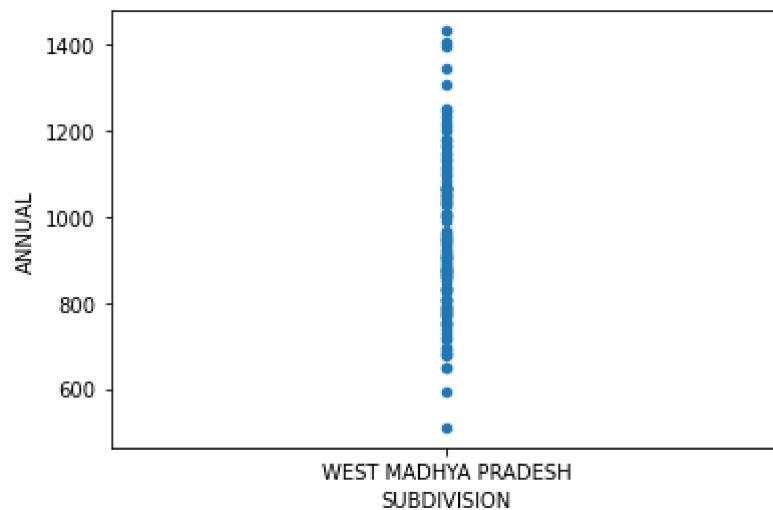
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## Scatter Plot

```
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: 114 entries, 0 to 114
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]:

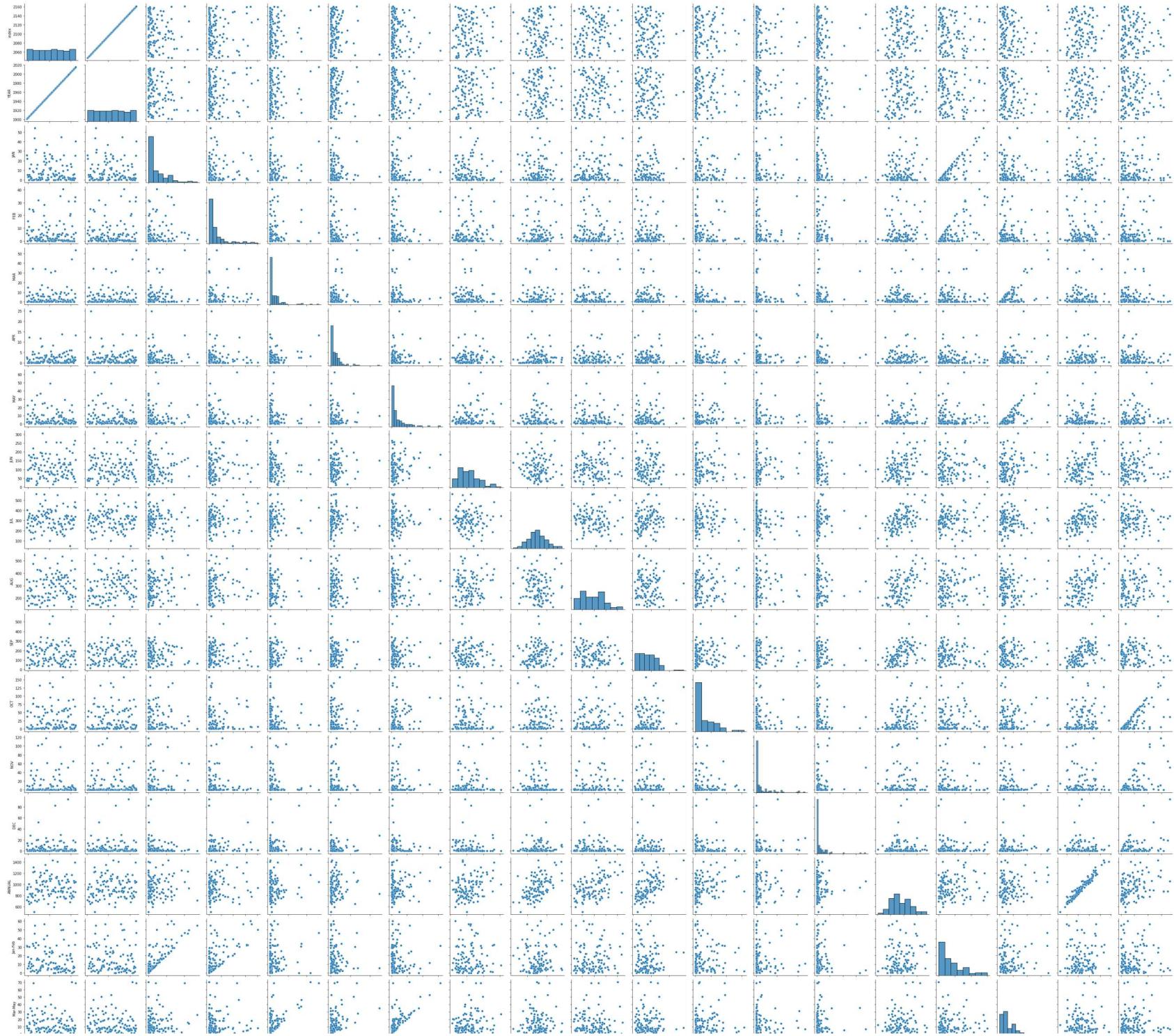
	index	YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG
count	114.000000	114.000000	114.000000	114.000000	114.000000	114.000000	114.000000	114.000000	114.000000	114.000000
mean	2103.631579	1957.631579	9.321930	6.307895	5.217544	2.395614	7.460526	111.942982	302.828947	289.441228
std	33.252923	33.252923	11.274584	8.993755	8.973109	3.491922	10.230153	61.064233	96.629917	97.677314
min	2047.000000	1901.000000	0.000000	0.000000	0.000000	0.000000	0.000000	12.100000	46.900000	128.300000
25%	2075.250000	1929.250000	0.925000	0.525000	0.225000	0.200000	1.325000	64.875000	239.275000	211.150000
50%	2103.500000	1957.500000	5.000000	2.800000	2.050000	1.400000	3.500000	100.200000	305.250000	285.000000
75%	2131.750000	1985.750000	14.700000	8.200000	6.400000	3.000000	9.675000	148.750000	352.825000	351.475000
max	2161.000000	2015.000000	54.100000	40.500000	53.500000	24.800000	62.700000	306.300000	561.600000	545.100000

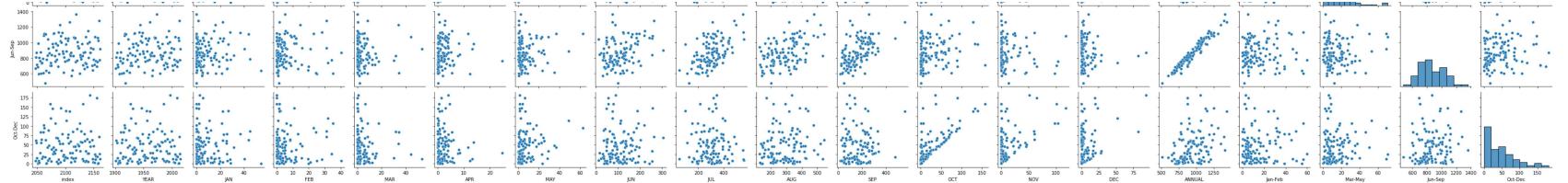
## EDA And Visualization

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

```
Out[16]: <seaborn.axisgrid.PairGrid at 0x2a10c097c10>
```



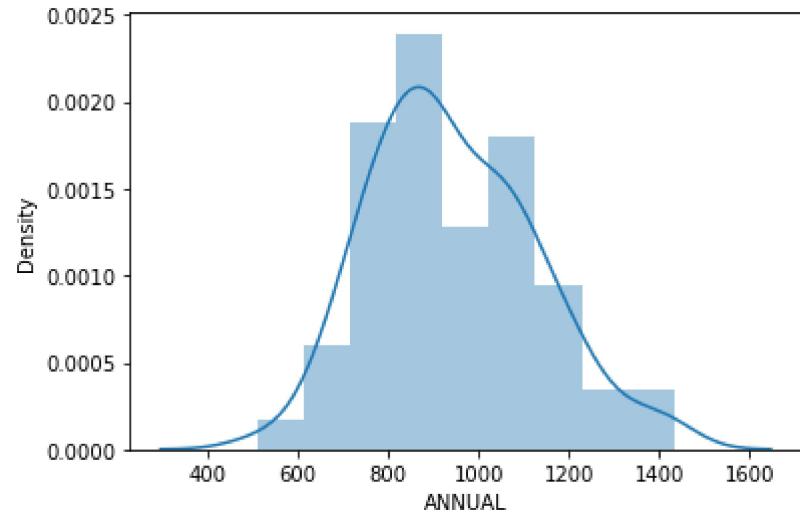




```
In [17]: 1 sns.distplot(df['ANNUAL'])
```

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:>
```

