

Importing Libraries

In [1]:

```
import numpy as np
import pandas as pd
import seaborn as sns
import matplotlib.pyplot as plt
```

Importing Datasets

In [2]:

```
df=pd.read_csv("rainfall_west madhya pradesh.csv")
df
```

Out[2]:

		index	SUBDIVISION	YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	12
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	
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	
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	
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	
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	
...	
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	
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	
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	
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	
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	

115 rows × 20 columns

head

In [3]:

```
df.head(5)
df
```

Out[3]:

		index	SUBDIVISION	YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DECEMBER
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	0.0
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	0.0
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
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	0.0
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
...
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
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
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	0.0
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	0.0
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	0.0

115 rows × 20 columns



tail

In [4]:

```
df.tail(5)
df
```

Out[4]:

		index	SUBDIVISION	YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	12
		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
		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
		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
		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
		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
		
		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
		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
		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
		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
		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

115 rows × 20 columns



Data Cleaning and Data Preprocessing

describe()

In [5]: `df.describe()`

	index	YEAR	JAN	FEB	MAR	APR	MAY	JUN
count	115.000000	115.000000	115.000000	114.000000	115.000000	115.000000	115.000000	115.000000
mean	2104.000000	1958.000000	9.241739	6.307895	5.173043	2.375652	7.657391	111.781739
std	33.341666	33.341666	11.257917	8.993755	8.946403	3.483157	10.401679	60.820402
min	2047.000000	1901.000000	0.000000	0.000000	0.000000	0.000000	0.000000	12.100000
25%	2075.500000	1929.500000	0.900000	0.525000	0.200000	0.200000	1.350000	65.650000
50%	2104.000000	1958.000000	4.800000	2.800000	2.000000	1.400000	3.500000	99.900000
75%	2132.500000	1986.500000	14.700000	8.200000	6.300000	3.000000	10.000000	147.500000
max	2161.000000	2015.000000	54.100000	40.500000	53.500000	24.800000	62.700000	306.300000

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shape

In [6]: `np.shape(df)`

Out[6]: (115, 20)

size

In [7]: `np.size(df)`

Out[7]: 2300

dropna

In [8]: `df=df.dropna()`

columns

In [9]: `df.columns`

Out[9]: 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')

info()

In [10]:

`df.info()`

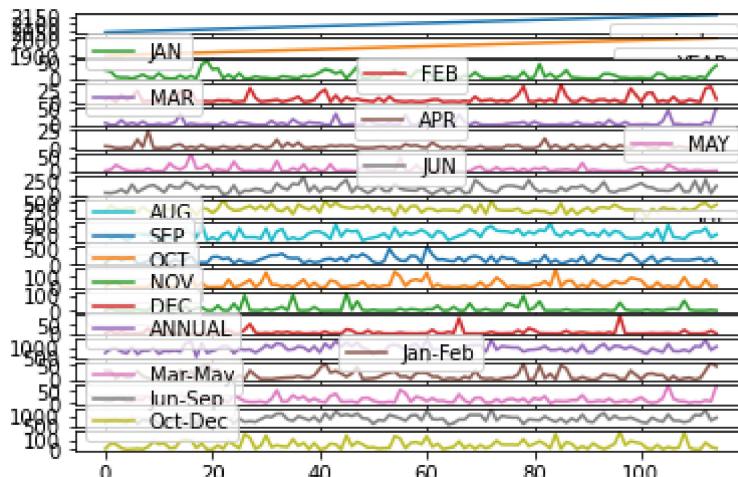
```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 114 entries, 0 to 114
Data columns (total 20 columns):
 #   Column      Non-Null Count  Dtype  
--- 
 0   index       114 non-null    int64  
 1   SUBDIVISION 114 non-null    object  
 2   YEAR        114 non-null    int64  
 3   JAN         114 non-null    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 [11]:

`df.plot.line(subplots=True)`

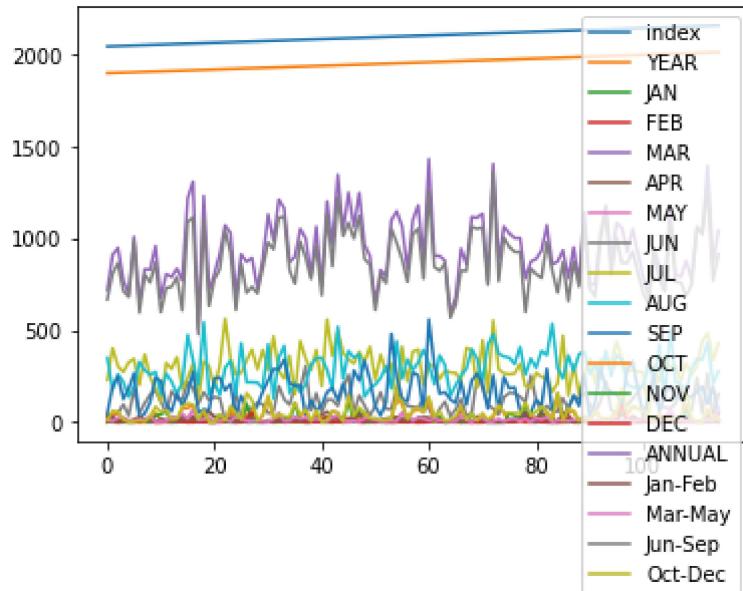
```
Out[11]: array([<AxesSubplot:>, <AxesSubplot:>, <AxesSubplot:>, <AxesSubplot:>,
   <AxesSubplot:>, <AxesSubplot:>, <AxesSubplot:>, <AxesSubplot:>,
   <AxesSubplot:>, <AxesSubplot:>, <AxesSubplot:>, <AxesSubplot:>,
   <AxesSubplot:>, <AxesSubplot:>, <AxesSubplot:>, <AxesSubplot:>,
   <AxesSubplot:>, <AxesSubplot:>], dtype=object)
```



Line chart

```
In [12]: df.plot.line()
```

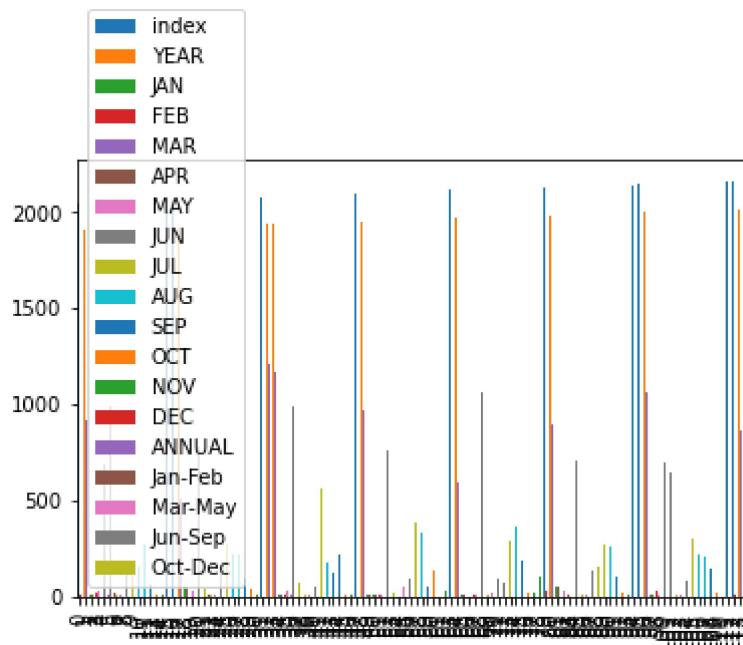
```
Out[12]: <AxesSubplot:>
```



Bar chart

```
In [13]: df.plot.bar()
```

```
Out[13]: <AxesSubplot:>
```

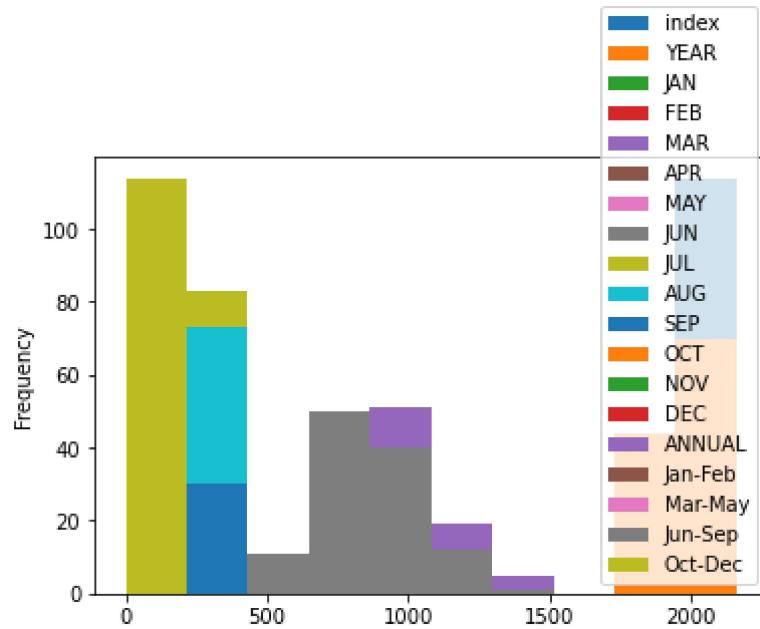


Histogram

In [14]:

df.plot.hist()

Out[14]: <AxesSubplot:ylabel='Frequency'>

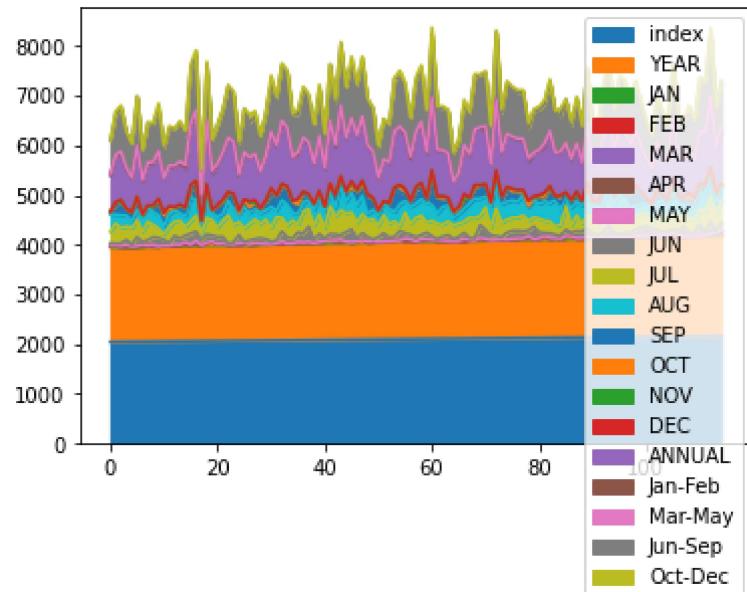


Area chart

In [15]:

df.plot.area()

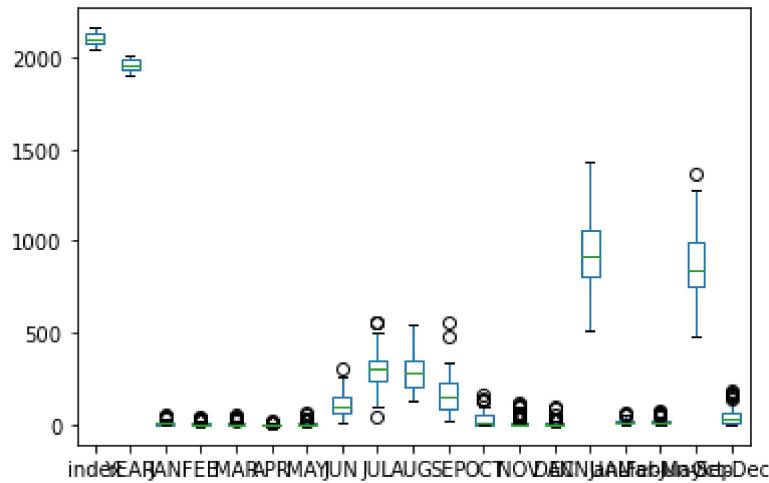
Out[15]: <AxesSubplot:>



Box chart

```
In [16]: df.plot.box()
```

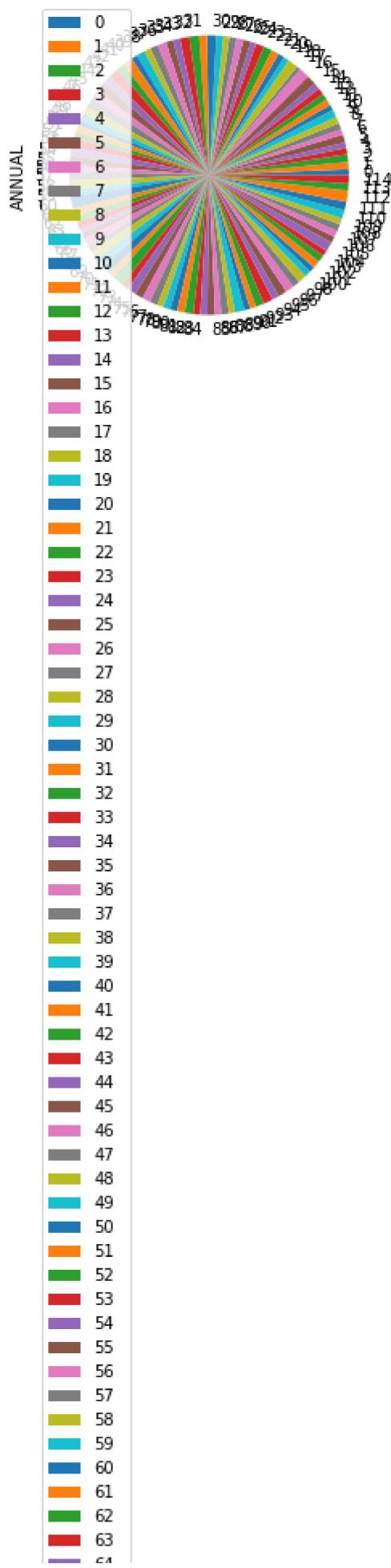
```
Out[16]: <AxesSubplot:
```

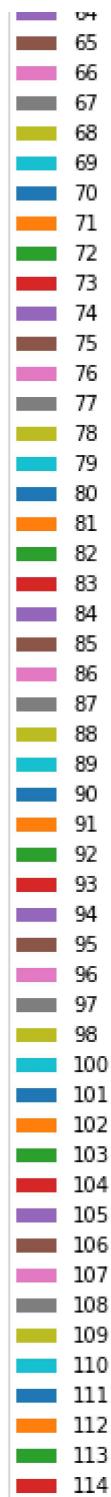


Pie chart

```
In [17]: df.plot.pie(y='ANNUAL')
```

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

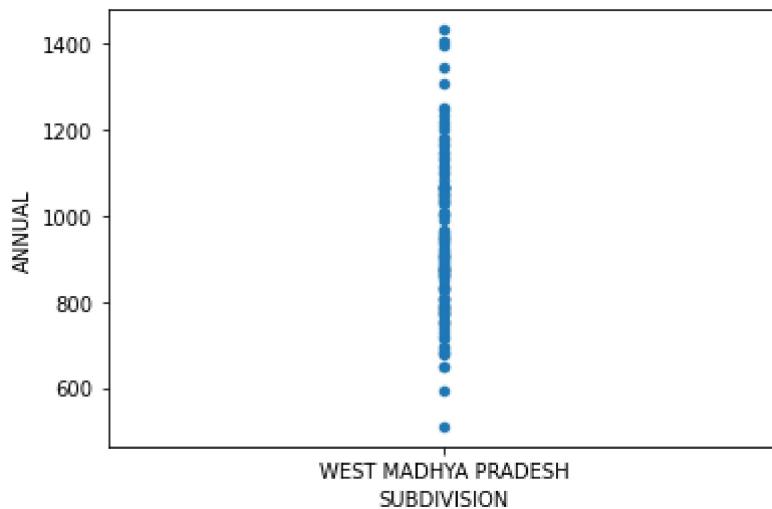




Scatter chart

```
In [18]: df.plot.scatter(x='SUBDIVISION' ,y='ANNUAL')
```

```
Out[18]: <AxesSubplot:xlabel='SUBDIVISION', ylabel='ANNUAL'>
```



In [19]:

`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 [20]:

`df.describe()`

Out[20]:

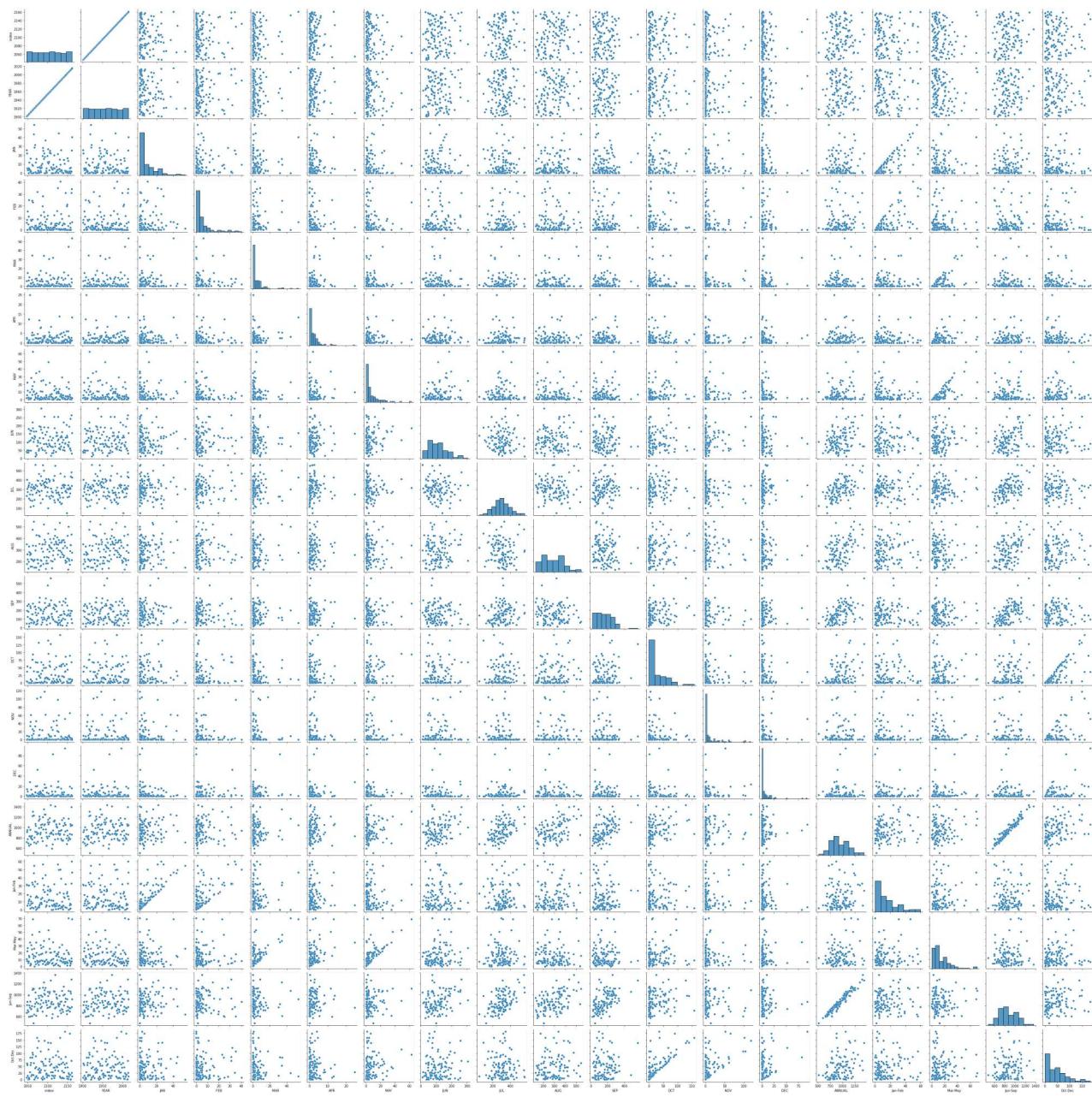
	index	YEAR	JAN	FEB	MAR	APR	MAY	JUN
count	114.000000	114.000000	114.000000	114.000000	114.000000	114.000000	114.000000	114.000000
mean	2103.631579	1957.631579	9.321930	6.307895	5.217544	2.395614	7.460526	111.942982
std	33.252923	33.252923	11.274584	8.993755	8.973109	3.491922	10.230153	61.064233
min	2047.000000	1901.000000	0.000000	0.000000	0.000000	0.000000	0.000000	12.100000
25%	2075.250000	1929.250000	0.925000	0.525000	0.225000	0.200000	1.325000	64.875000

	index	YEAR	JAN	FEB	MAR	APR	MAY	JUN
50%	2103.500000	1957.500000	5.000000	2.800000	2.050000	1.400000	3.500000	100.200000
75%	2131.750000	1985.750000	14.700000	8.200000	6.400000	3.000000	9.675000	148.750000
max	2161.000000	2015.000000	54.100000	40.500000	53.500000	24.800000	62.700000	306.300000

EDA AND VISUALIZATION

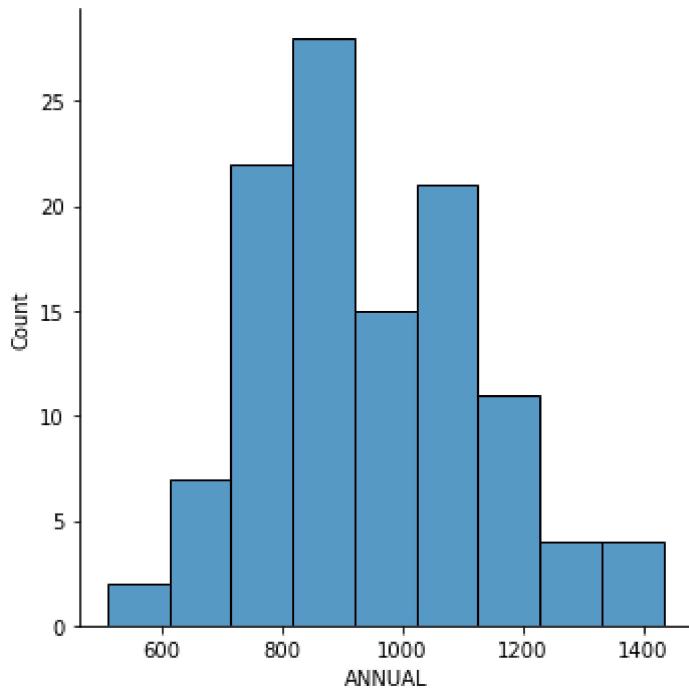
In [21]: `sns.pairplot(df)`

Out[21]: <seaborn.axisgrid.PairGrid at 0x204506acd30>



In [22]: `sns.displot(df['ANNUAL'])`

Out[22]: <seaborn.axisgrid.FacetGrid at 0x2045bc07130>

In [23]:
sns.heatmap(df.corr())

Out[23]: <AxesSubplot:>

