

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_punjab.csv")
df
```

Out[2]:

	index	SUBDIVISION	YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	12
0	1472	PUNJAB	1901	55.7	50.1	25.2	2.1	25.2	10.4	178.2	145.0	24.4	3.7	0.0	
1	1473	PUNJAB	1902	0.0	0.8	9.9	10.9	29.6	49.9	125.6	94.9	67.2	9.0	0.0	
2	1474	PUNJAB	1903	29.5	0.5	45.0	1.3	9.2	5.2	212.2	119.1	132.5	6.9	0.0	
3	1475	PUNJAB	1904	24.2	1.7	87.8	1.2	13.8	22.0	59.9	124.0	73.8	7.4	9.8	
4	1476	PUNJAB	1905	53.0	40.3	24.3	0.5	2.2	19.2	122.6	50.3	111.1	1.2	0.0	
...	
110	1582	PUNJAB	2011	3.5	35.6	8.2	17.8	18.9	162.9	120.9	193.5	140.2	0.0	1.0	
111	1583	PUNJAB	2012	62.6	3.2	1.9	31.1	1.6	11.9	120.2	135.1	112.3	2.2	0.4	
112	1584	PUNJAB	2013	9.3	50.1	11.6	3.4	3.6	120.3	117.9	217.1	24.4	16.2	6.1	
113	1585	PUNJAB	2014	21.8	20.1	30.3	24.5	20.8	20.6	76.3	41.9	105.8	6.0	0.7	
114	1586	PUNJAB	2015	17.7	31.3	68.5	29.8	16.7	48.3	130.2	88.6	69.2	9.0	0.8	

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	12
0	1472	PUNJAB	1901	55.7	50.1	25.2	2.1	25.2	10.4	178.2	145.0	24.4	3.7	0.0	
1	1473	PUNJAB	1902	0.0	0.8	9.9	10.9	29.6	49.9	125.6	94.9	67.2	9.0	0.0	

	index	SUBDIVISION	YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	1
2	1474	PUNJAB	1903	29.5	0.5	45.0	1.3	9.2	5.2	212.2	119.1	132.5	6.9	0.0	
3	1475	PUNJAB	1904	24.2	1.7	87.8	1.2	13.8	22.0	59.9	124.0	73.8	7.4	9.8	
4	1476	PUNJAB	1905	53.0	40.3	24.3	0.5	2.2	19.2	122.6	50.3	111.1	1.2	0.0	
...	
110	1582	PUNJAB	2011	3.5	35.6	8.2	17.8	18.9	162.9	120.9	193.5	140.2	0.0	1.0	
111	1583	PUNJAB	2012	62.6	3.2	1.9	31.1	1.6	11.9	120.2	135.1	112.3	2.2	0.4	
112	1584	PUNJAB	2013	9.3	50.1	11.6	3.4	3.6	120.3	117.9	217.1	24.4	16.2	6.1	
113	1585	PUNJAB	2014	21.8	20.1	30.3	24.5	20.8	20.6	76.3	41.9	105.8	6.0	0.7	
114	1586	PUNJAB	2015	17.7	31.3	68.5	29.8	16.7	48.3	130.2	88.6	69.2	9.0	0.8	

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	1
0	1472	PUNJAB	1901	55.7	50.1	25.2	2.1	25.2	10.4	178.2	145.0	24.4	3.7	0.0	
1	1473	PUNJAB	1902	0.0	0.8	9.9	10.9	29.6	49.9	125.6	94.9	67.2	9.0	0.0	
2	1474	PUNJAB	1903	29.5	0.5	45.0	1.3	9.2	5.2	212.2	119.1	132.5	6.9	0.0	
3	1475	PUNJAB	1904	24.2	1.7	87.8	1.2	13.8	22.0	59.9	124.0	73.8	7.4	9.8	
4	1476	PUNJAB	1905	53.0	40.3	24.3	0.5	2.2	19.2	122.6	50.3	111.1	1.2	0.0	
...	
110	1582	PUNJAB	2011	3.5	35.6	8.2	17.8	18.9	162.9	120.9	193.5	140.2	0.0	1.0	
111	1583	PUNJAB	2012	62.6	3.2	1.9	31.1	1.6	11.9	120.2	135.1	112.3	2.2	0.4	
112	1584	PUNJAB	2013	9.3	50.1	11.6	3.4	3.6	120.3	117.9	217.1	24.4	16.2	6.1	
113	1585	PUNJAB	2014	21.8	20.1	30.3	24.5	20.8	20.6	76.3	41.9	105.8	6.0	0.7	
114	1586	PUNJAB	2015	17.7	31.3	68.5	29.8	16.7	48.3	130.2	88.6	69.2	9.0	0.8	

115 rows × 20 columns

Data Cleaning and Data Preprocessing

describe()

In [5]:

```
df.describe()
```

Out[5]:

	index	YEAR	JAN	FEB	MAR	APR	MAY	JUN
count	115.000000	115.000000	115.000000	115.000000	115.000000	115.000000	115.000000	115.000000
mean	1529.000000	1958.000000	25.246087	26.786957	23.651304	12.660000	14.136522	46.466957
std	33.341666	33.341666	22.306656	23.473612	22.890109	16.751778	15.185232	33.349257
min	1472.000000	1901.000000	0.000000	0.000000	0.000000	0.000000	0.100000	1.600000
25%	1500.500000	1929.500000	7.250000	5.650000	6.900000	2.550000	3.350000	21.600000
50%	1529.000000	1958.000000	21.600000	21.300000	15.800000	6.700000	9.200000	40.700000
75%	1557.500000	1986.500000	36.100000	40.600000	33.650000	15.700000	19.700000	60.150000
max	1586.000000	2015.000000	112.100000	96.000000	108.500000	113.200000	98.300000	162.900000

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()
```

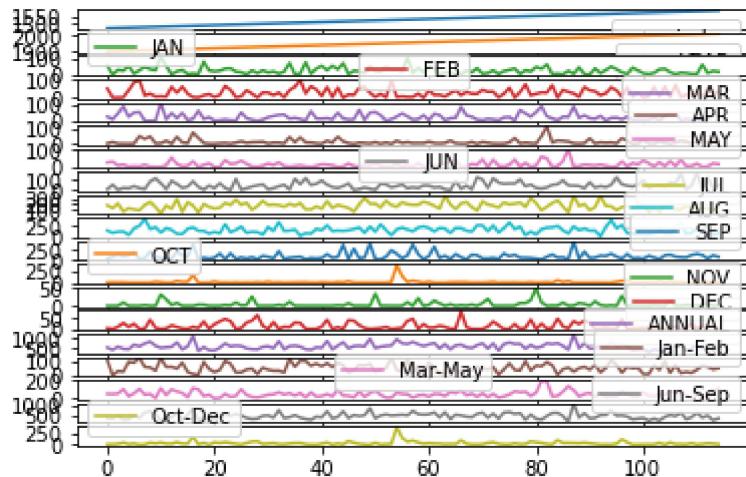
```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 115 entries, 0 to 114
Data columns (total 20 columns):
 #   Column      Non-Null Count  Dtype  
--- 
 0   index       115 non-null    int64  
 1   SUBDIVISION 115 non-null    object  
 2   YEAR        115 non-null    int64  
 3   JAN         115 non-null    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 [11]:

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

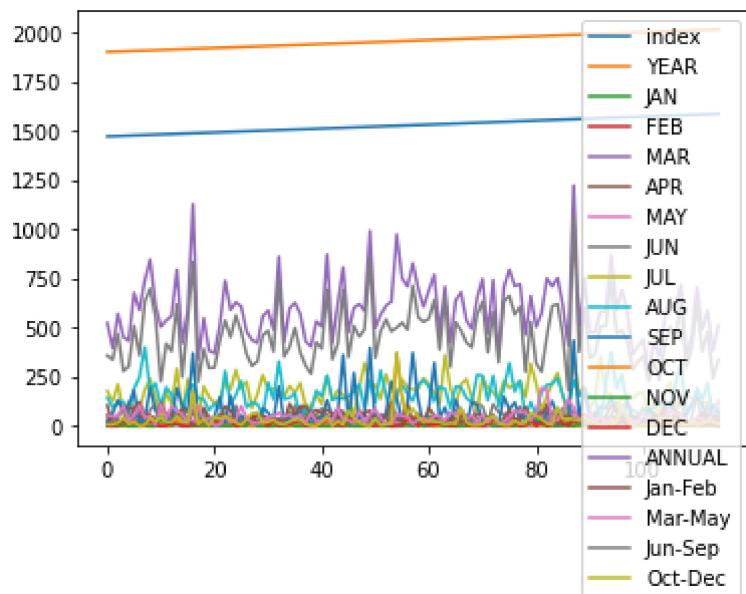
```
Out[11]: array([<AxesSubplot:>, <AxesSubplot:>, <AxesSubplot:>, <AxesSubplot:>,
   <AxesSubplot:>, <AxesSubplot:>, <AxesSubplot:>, <AxesSubplot:>,
   <AxesSubplot:>, <AxesSubplot:>, <AxesSubplot:>, <AxesSubplot:>,
   <AxesSubplot:>, <AxesSubplot:>, <AxesSubplot:>, <AxesSubplot:>,
   <AxesSubplot:>,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



Line chart

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

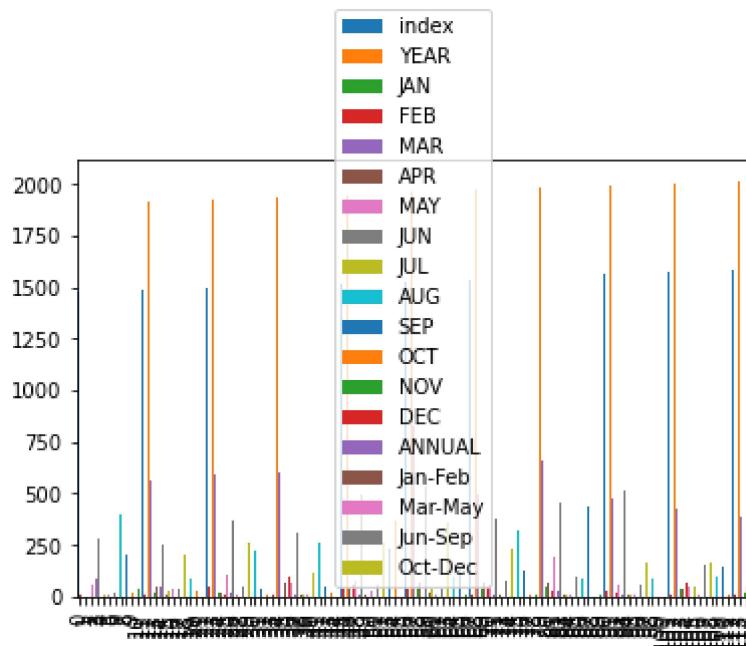
Out[12]: <AxesSubplot:>



Bar chart

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

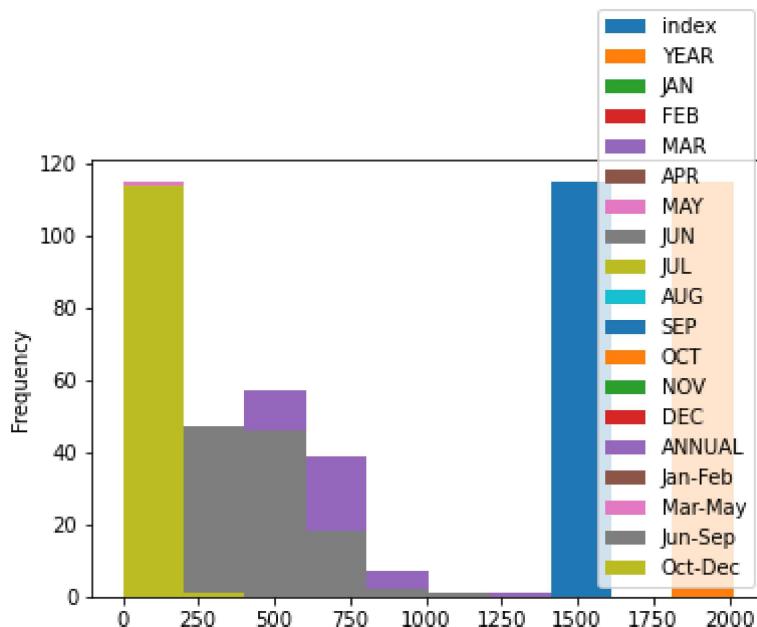
Out[13]: <AxesSubplot:>



Histogram

```
In [14]: df.plot.hist()
```

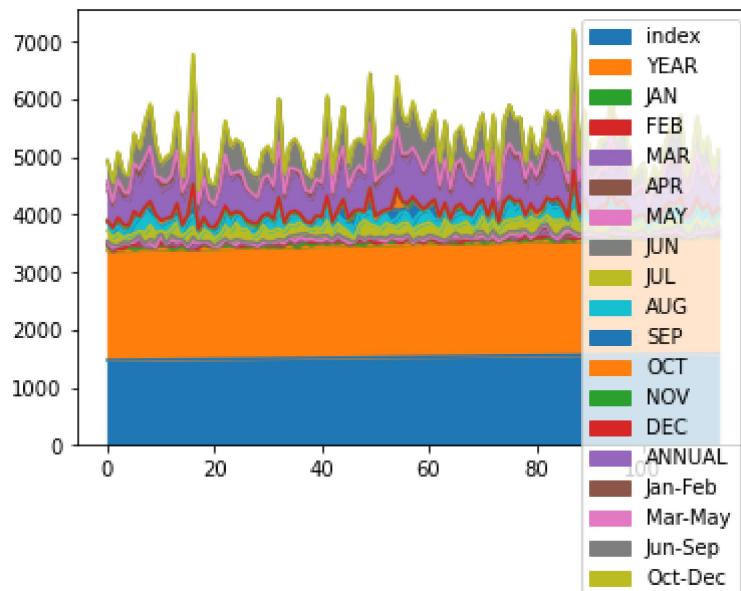
```
Out[14]: <AxesSubplot:ylabel='Frequency'>
```



Area chart

```
In [15]: df.plot.area()
```

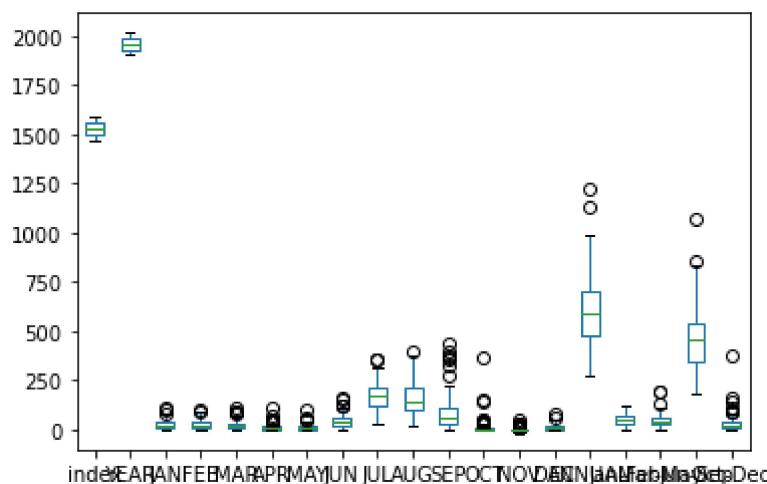
```
Out[15]: <AxesSubplot:>
```



Box chart

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

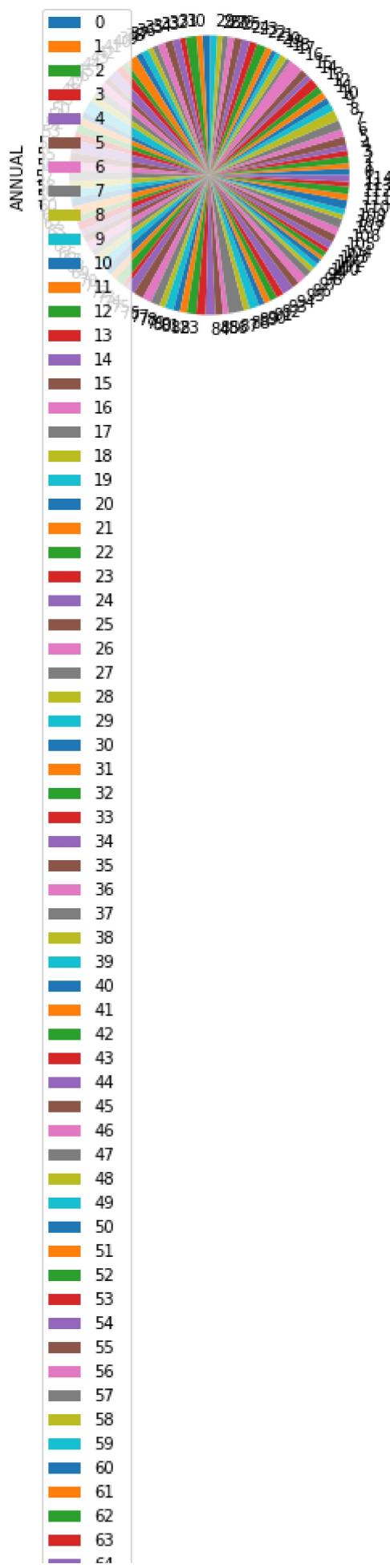
```
Out[16]: <AxesSubplot:>
```

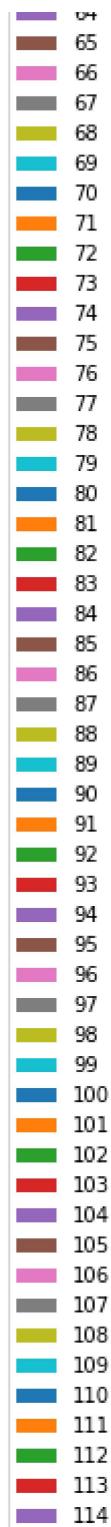


Pie chart

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

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

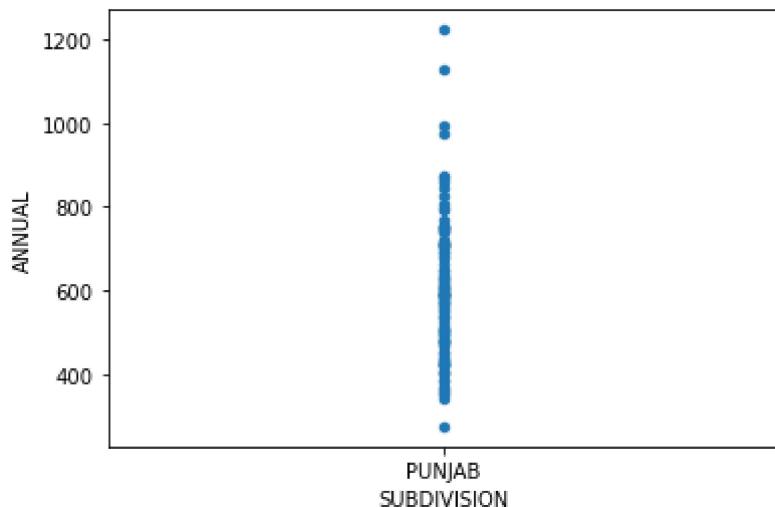




Scatter chart

```
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: 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 [20]:

`df.describe()`

Out[20]:

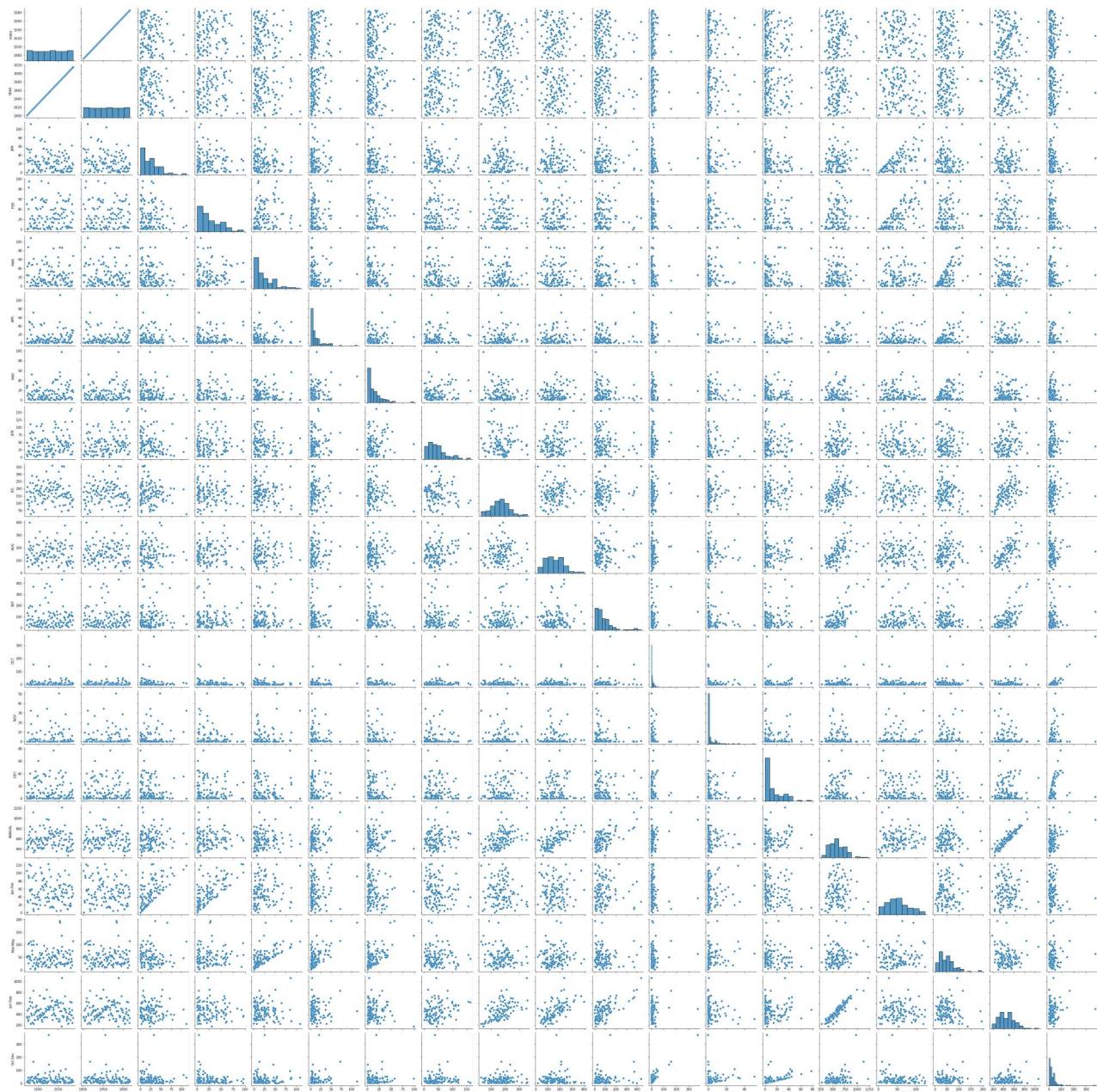
	index	YEAR	JAN	FEB	MAR	APR	MAY	JUN
count	115.000000	115.000000	115.000000	115.000000	115.000000	115.000000	115.000000	115.000000
mean	1529.000000	1958.000000	25.246087	26.786957	23.651304	12.660000	14.136522	46.466957
std	33.341666	33.341666	22.306656	23.473612	22.890109	16.751778	15.185232	33.349257
min	1472.000000	1901.000000	0.000000	0.000000	0.000000	0.000000	0.100000	1.600000
25%	1500.500000	1929.500000	7.250000	5.650000	6.900000	2.550000	3.350000	21.600000

	index	YEAR	JAN	FEB	MAR	APR	MAY	JUN
50%	1529.000000	1958.000000	21.600000	21.300000	15.800000	6.700000	9.200000	40.700000
75%	1557.500000	1986.500000	36.100000	40.600000	33.650000	15.700000	19.700000	60.150000
max	1586.000000	2015.000000	112.100000	96.000000	108.500000	113.200000	98.300000	162.900000

EDA AND VISUALIZATION

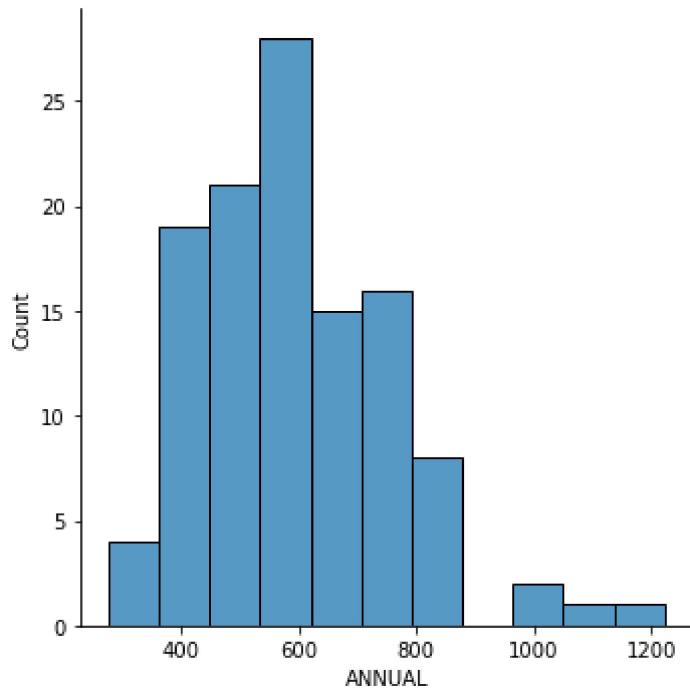
In [21]: `sns.pairplot(df)`

Out[21]: <seaborn.axisgrid.PairGrid at 0x26567f6d9d0>



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

Out[22]: <seaborn.axisgrid.FacetGrid at 0x265732ef2b0>

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

Out[23]: <AxesSubplot:>

