

FINAL ASSESSMENT 2

```
In [1]: #importing libraries
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
```

```
In [2]: #importing dataset
data=pd.read_csv(r"C:\Users\user\Downloads\rainfall in india 1901-2015.csv")
data
```

Out[2]:

	index	SUBDIVISION	YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	
0	0	ANDAMAN & NICOBAR ISLANDS	1901	49.2	87.1	29.2	2.3	528.8	517.5	365.1	481.1	332.6	;
1	1	ANDAMAN & NICOBAR ISLANDS	1902	0.0	159.8	12.2	0.0	446.1	537.1	228.9	753.7	666.2	;
2	2	ANDAMAN & NICOBAR ISLANDS	1903	12.7	144.0	0.0	1.0	235.1	479.9	728.4	326.7	339.0	;
3	3	ANDAMAN & NICOBAR ISLANDS	1904	9.4	14.7	0.0	202.4	304.5	495.1	502.0	160.1	820.4	;
4	4	ANDAMAN & NICOBAR ISLANDS	1905	1.3	0.0	3.3	26.9	279.5	628.7	368.7	330.5	297.0	;
...	
4111	4111	LAKSHADWEEP	2011	5.1	2.8	3.1	85.9	107.2	153.6	350.2	254.0	255.2	
4112	4112	LAKSHADWEEP	2012	19.2	0.1	1.6	76.8	21.2	327.0	231.5	381.2	179.8	;
4113	4113	LAKSHADWEEP	2013	26.2	34.4	37.5	5.3	88.3	426.2	296.4	154.4	180.0	
4114	4114	LAKSHADWEEP	2014	53.2	16.1	4.4	14.9	57.4	244.1	116.1	466.1	132.2	;
4115	4115	LAKSHADWEEP	2015	2.2	0.5	3.7	87.1	133.1	296.6	257.5	146.4	160.4	;

4116 rows × 20 columns



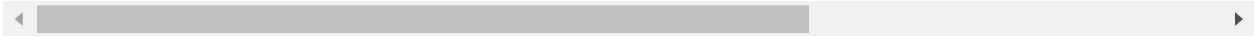
KONKAN & GOA

```
In [3]: df=data.iloc[2507:2622]
df
```

Out[3]:

	index	SUBDIVISION	YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	O
2507	2507	KONKAN & GOA	1901	5.6	0.1	0.4	35.7	19.9	746.1	1075.5	748.0	117.4	3i
2508	2508	KONKAN & GOA	1902	0.3	0.0	0.0	0.4	7.6	428.2	943.6	515.1	613.8	7i
2509	2509	KONKAN & GOA	1903	0.0	0.0	0.1	0.0	201.1	470.5	1298.6	673.9	285.1	14i
2510	2510	KONKAN & GOA	1904	0.0	0.1	6.6	6.3	4.6	975.8	771.7	321.3	217.0	9i
2511	2511	KONKAN & GOA	1905	0.1	0.1	0.0	0.4	8.6	293.7	770.6	305.5	208.3	8i
...
2617	2617	KONKAN & GOA	2011	0.0	0.0	0.0	3.4	1.1	857.0	1384.1	987.9	468.3	12i
2618	2618	KONKAN & GOA	2012	0.0	0.0	0.0	0.6	1.1	633.0	928.5	762.5	515.3	17i
2619	2619	KONKAN & GOA	2013	1.8	5.4	0.1	0.1	18.5	1028.3	1478.5	497.6	340.7	14i
2620	2620	KONKAN & GOA	2014	1.3	5.3	1.8	0.7	21.3	238.2	1293.2	658.0	419.5	9i
2621	2621	KONKAN & GOA	2015	2.7	0.0	36.8	3.6	11.3	764.0	526.5	377.3	240.9	9

115 rows × 20 columns



Data Cleaning and Preprocessing

In [4]: `df.head()`

Out[4]:

	index	SUBDIVISION	YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OC
2507	2507	KONKAN & GOA	1901	5.6	0.1	0.4	35.7	19.9	746.1	1075.5	748.0	117.4	38
2508	2508	KONKAN & GOA	1902	0.3	0.0	0.0	0.4	7.6	428.2	943.6	515.1	613.8	74
2509	2509	KONKAN & GOA	1903	0.0	0.0	0.1	0.0	201.1	470.5	1298.6	673.9	285.1	140
2510	2510	KONKAN & GOA	1904	0.0	0.1	6.6	6.3	4.6	975.8	771.7	321.3	217.0	90
2511	2511	KONKAN & GOA	1905	0.1	0.1	0.0	0.4	8.6	293.7	770.6	305.5	208.3	83



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

Out[5]:

	index	SUBDIVISION	YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OC
2617	2617	KONKAN & GOA	2011	0.0	0.0	0.0	3.4	1.1	857.0	1384.1	987.9	468.3	120
2618	2618	KONKAN & GOA	2012	0.0	0.0	0.0	0.6	1.1	633.0	928.5	762.5	515.3	175
2619	2619	KONKAN & GOA	2013	1.8	5.4	0.1	0.1	18.5	1028.3	1478.5	497.6	340.7	149
2620	2620	KONKAN & GOA	2014	1.3	5.3	1.8	0.7	21.3	238.2	1293.2	658.0	419.5	98
2621	2621	KONKAN & GOA	2015	2.7	0.0	36.8	3.6	11.3	764.0	526.5	377.3	240.9	91



```
In [6]: df.info()
```

```
<class 'pandas.core.frame.DataFrame'>  
RangeIndex: 115 entries, 2507 to 2621  
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: 18.1+ KB
```

In [7]:

#filling null values
df1=df.fillna(0)
df1

Out[7]:

	index	SUBDIVISION	YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	O
2507	2507	KONKAN & GOA	1901	5.6	0.1	0.4	35.7	19.9	746.1	1075.5	748.0	117.4	3i
2508	2508	KONKAN & GOA	1902	0.3	0.0	0.0	0.4	7.6	428.2	943.6	515.1	613.8	7.
2509	2509	KONKAN & GOA	1903	0.0	0.0	0.1	0.0	201.1	470.5	1298.6	673.9	285.1	14i
2510	2510	KONKAN & GOA	1904	0.0	0.1	6.6	6.3	4.6	975.8	771.7	321.3	217.0	9i
2511	2511	KONKAN & GOA	1905	0.1	0.1	0.0	0.4	8.6	293.7	770.6	305.5	208.3	8:
...	
2617	2617	KONKAN & GOA	2011	0.0	0.0	0.0	3.4	1.1	857.0	1384.1	987.9	468.3	12i
2618	2618	KONKAN & GOA	2012	0.0	0.0	0.0	0.6	1.1	633.0	928.5	762.5	515.3	17:
2619	2619	KONKAN & GOA	2013	1.8	5.4	0.1	0.1	18.5	1028.3	1478.5	497.6	340.7	14:
2620	2620	KONKAN & GOA	2014	1.3	5.3	1.8	0.7	21.3	238.2	1293.2	658.0	419.5	9i
2621	2621	KONKAN & GOA	2015	2.7	0.0	36.8	3.6	11.3	764.0	526.5	377.3	240.9	9

115 rows × 20 columns



In [8]: `df1.describe()`

Out[8]:

	index	YEAR	JAN	FEB	MAR	APR	MAY	
count	115.000000	115.000000	115.000000	115.000000	115.000000	115.000000	115.000000	115
mean	2564.000000	1958.000000	1.262609	0.546957	1.374783	4.266087	33.515652	688
std	33.341666	33.341666	3.884234	2.048034	4.749309	9.103141	58.327263	197
min	2507.000000	1901.000000	0.000000	0.000000	0.000000	0.000000	0.000000	238
25%	2535.500000	1929.500000	0.000000	0.000000	0.000000	0.300000	2.900000	552
50%	2564.000000	1958.000000	0.000000	0.000000	0.100000	1.300000	9.700000	706
75%	2592.500000	1986.500000	0.500000	0.100000	0.400000	4.200000	30.300000	804
max	2621.000000	2015.000000	31.800000	18.400000	36.800000	67.300000	345.400000	1118

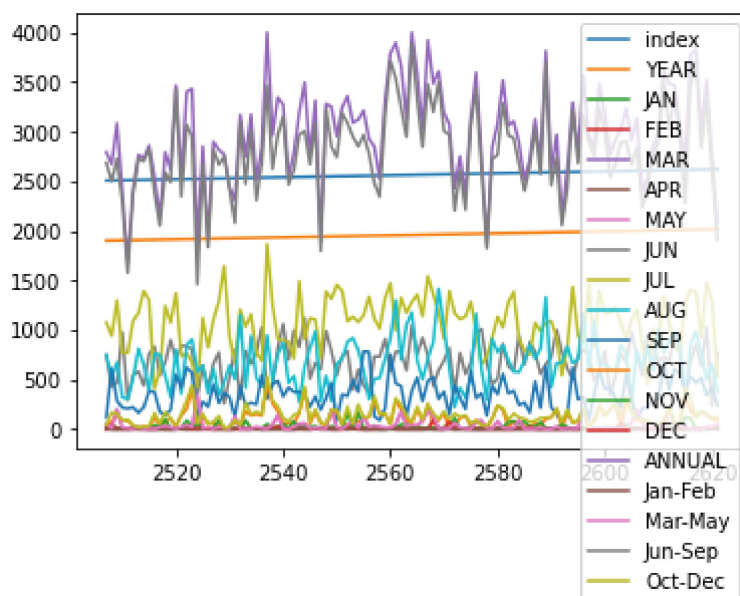
In [9]: `df1.columns`

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')

Data Visualaization

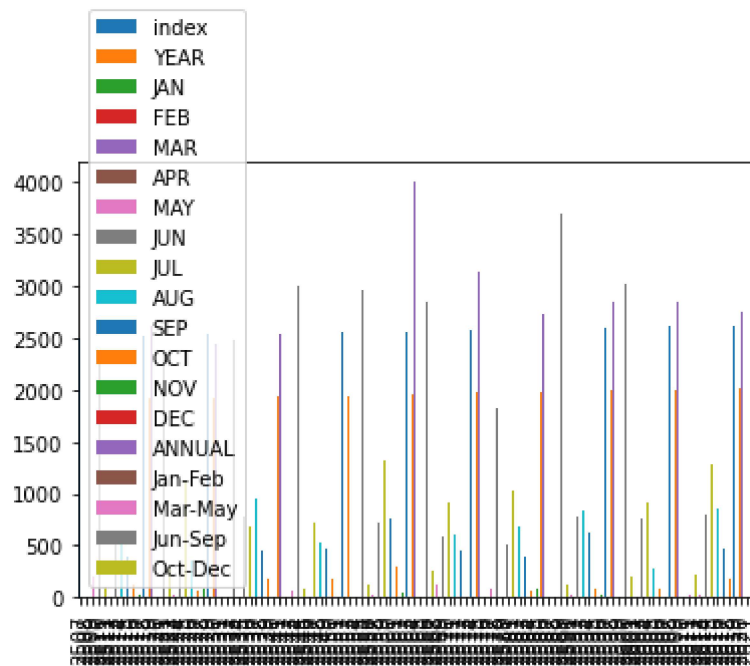
In [10]: `df1.plot.line()`

Out[10]: <AxesSubplot:>



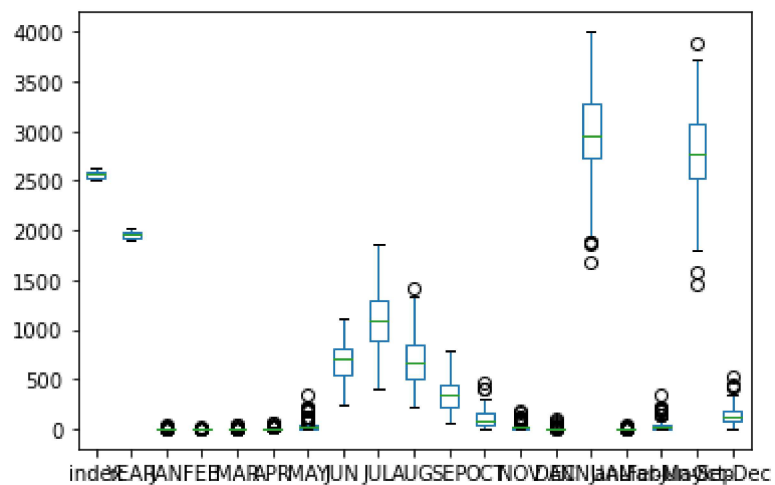
```
In [11]: df1.plot.bar()
```

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



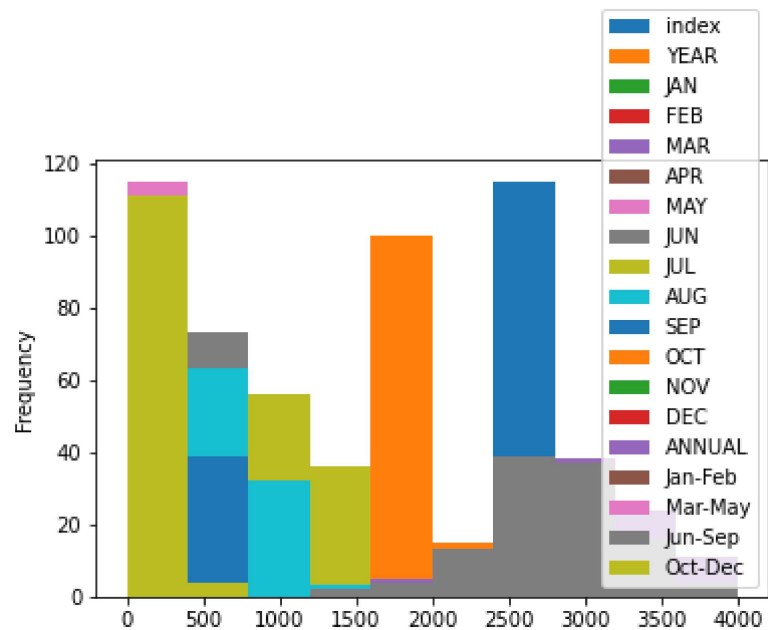
```
In [12]: df1.plot.box()
```

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



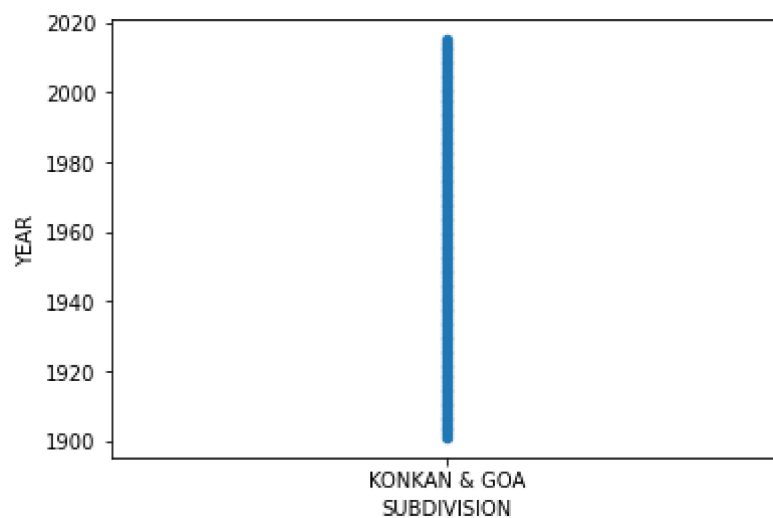
```
In [13]: df1.plot.hist()
```

```
Out[13]: <AxesSubplot:ylabel='Frequency'>
```



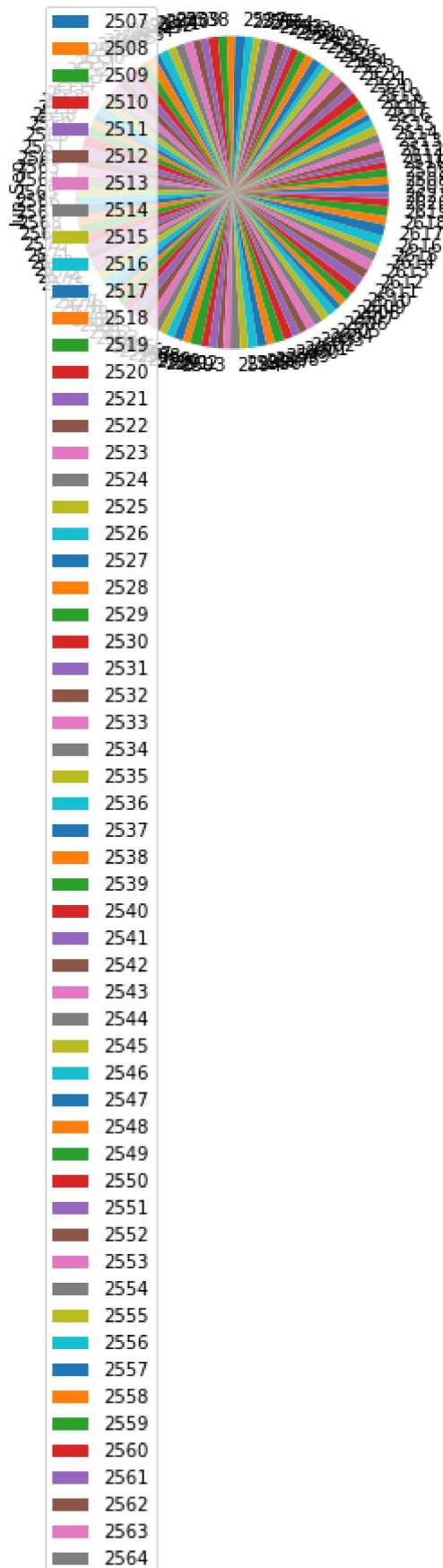
```
In [14]: df1.plot.scatter(x="SUBDIVISION",y="YEAR")
```

```
Out[14]: <AxesSubplot:xlabel='SUBDIVISION', ylabel='YEAR'>
```




```
In [15]: df2=df1[[ 'Jun-Sep']]
df2.plot.pie(subplots=True)
```

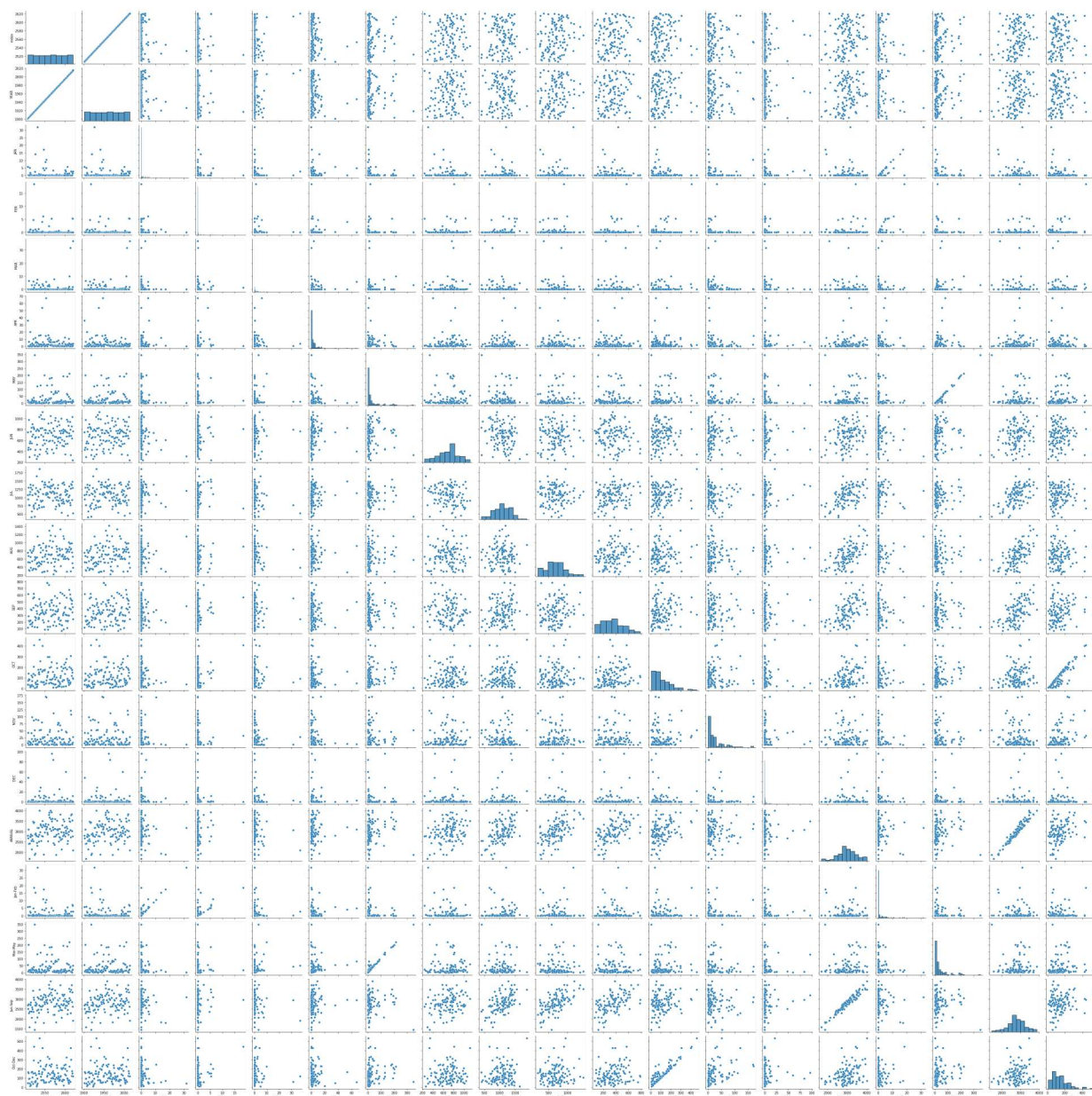
```
Out[15]: array([<AxesSubplot:ylabel='Jun-Sep'>], dtype=object)
```



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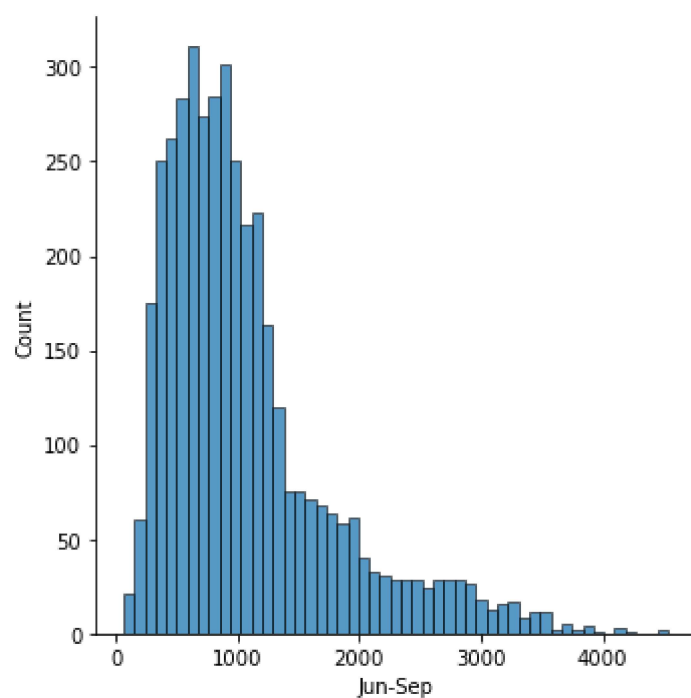
```
In [16]: sns.pairplot(df1)
```

```
Out[16]: <seaborn.axisgrid.PairGrid at 0x1a896876550>
```



```
In [17]: sns.displot(data["Jun-Sep"])
```

```
Out[17]: <seaborn.axisgrid.FacetGrid at 0x1a8a5bab130>
```



```
In [18]: sns.heatmap(df1.corr())
```

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

