FINAL ASSESSMENT 2

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

```python
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

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In [3]:
```
df=data.iloc[3312:3427]
df
```

Out[3]:

	index	SUBDIVISION	YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT
3312	3312	RAYALSEEMA	1901	7.0	50.2	0.0	12.1	38.9	53.0	73.4	60.3	109.0	81.6
3313	3313	RAYALSEEMA	1902	10.0	0.2	1.7	11.0	36.8	73.6	41.3	148.3	181.7	188.5
3314	3314	RAYALSEEMA	1903	30.0	0.1	0.0	3.6	80.5	67.5	127.5	140.6	219.7	95.3
3315	3315	RAYALSEEMA	1904	14.8	0.0	1.7	7.1	58.8	39.8	75.1	19.4	84.7	111.5
3316	3316	RAYALSEEMA	1905	6.5	6.8	17.0	18.3	44.2	66.1	50.9	219.3	36.5	180.2
...	...	...	...	...	...	...	...	...	...	...	...	...	...
3422	3422	RAYALSEEMA	2011	0.8	12.1	0.0	34.6	33.0	44.5	128.9	163.6	71.2	107.5
3423	3423	RAYALSEEMA	2012	2.7	0.0	2.5	32.7	38.8	47.0	139.7	120.0	69.5	113.7
3424	3424	RAYALSEEMA	2013	1.3	30.6	11.5	26.8	38.9	73.8	95.7	110.3	163.2	169.3
3425	3425	RAYALSEEMA	2014	0.2	0.7	12.5	5.1	46.7	66.3	68.7	115.1	81.4	104.6
3426	3426	RAYALSEEMA	2015	1.9	0.0	13.4	73.4	39.7	73.0	43.1	123.6	136.3	106.7

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	OCT
3312	3312	RAYALSEEMA	1901	7.0	50.2	0.0	12.1	38.9	53.0	73.4	60.3	109.0	81.6
3313	3313	RAYALSEEMA	1902	10.0	0.2	1.7	11.0	36.8	73.6	41.3	148.3	181.7	188.5
3314	3314	RAYALSEEMA	1903	30.0	0.1	0.0	3.6	80.5	67.5	127.5	140.6	219.7	95.3
3315	3315	RAYALSEEMA	1904	14.8	0.0	1.7	7.1	58.8	39.8	75.1	19.4	84.7	111.5
3316	3316	RAYALSEEMA	1905	6.5	6.8	17.0	18.3	44.2	66.1	50.9	219.3	36.5	180.2

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

Out[5]:

	index	SUBDIVISION	YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT
3422	3422	RAYALSEEMA	2011	0.8	12.1	0.0	34.6	33.0	44.5	128.9	163.6	71.2	107.5
3423	3423	RAYALSEEMA	2012	2.7	0.0	2.5	32.7	38.8	47.0	139.7	120.0	69.5	113.7
3424	3424	RAYALSEEMA	2013	1.3	30.6	11.5	26.8	38.9	73.8	95.7	110.3	163.2	169.3
3425	3425	RAYALSEEMA	2014	0.2	0.7	12.5	5.1	46.7	66.3	68.7	115.1	81.4	104.6
3426	3426	RAYALSEEMA	2015	1.9	0.0	13.4	73.4	39.7	73.0	43.1	123.6	136.3	106.7

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

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 115 entries, 3312 to 3426
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]:
```python
#filling null values
df1=df.fillna(0)
df1
```

Out[7]:

	index	SUBDIVISION	YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT
3312	3312	RAYALSEEMA	1901	7.0	50.2	0.0	12.1	38.9	53.0	73.4	60.3	109.0	81.6
3313	3313	RAYALSEEMA	1902	10.0	0.2	1.7	11.0	36.8	73.6	41.3	148.3	181.7	188.5
3314	3314	RAYALSEEMA	1903	30.0	0.1	0.0	3.6	80.5	67.5	127.5	140.6	219.7	95.3
3315	3315	RAYALSEEMA	1904	14.8	0.0	1.7	7.1	58.8	39.8	75.1	19.4	84.7	111.5
3316	3316	RAYALSEEMA	1905	6.5	6.8	17.0	18.3	44.2	66.1	50.9	219.3	36.5	180.2
...	...	...	...	...	...	...	...	...	...	...	...	...	...
3422	3422	RAYALSEEMA	2011	0.8	12.1	0.0	34.6	33.0	44.5	128.9	163.6	71.2	107.5
3423	3423	RAYALSEEMA	2012	2.7	0.0	2.5	32.7	38.8	47.0	139.7	120.0	69.5	113.7
3424	3424	RAYALSEEMA	2013	1.3	30.6	11.5	26.8	38.9	73.8	95.7	110.3	163.2	169.3
3425	3425	RAYALSEEMA	2014	0.2	0.7	12.5	5.1	46.7	66.3	68.7	115.1	81.4	104.6
3426	3426	RAYALSEEMA	2015	1.9	0.0	13.4	73.4	39.7	73.0	43.1	123.6	136.3	106.7

115 rows × 20 columns

In [8]:
```python
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	115.0
mean	3369.000000	1958.000000	9.867826	5.680000	8.076522	19.808696	50.475652	64.7
std	33.341666	33.341666	19.121736	11.652063	13.711580	17.575449	37.569280	34.0
min	3312.000000	1901.000000	0.000000	0.000000	0.000000	0.700000	4.100000	23.5
25%	3340.500000	1929.500000	0.200000	0.000000	0.300000	8.250000	29.150000	44.9
50%	3369.000000	1958.000000	1.900000	1.000000	4.000000	12.400000	41.400000	57.6
75%	3397.500000	1986.500000	9.900000	5.700000	10.850000	27.250000	55.150000	74.7
max	3426.000000	2015.000000	115.300000	81.000000	86.900000	93.500000	239.800000	270.7
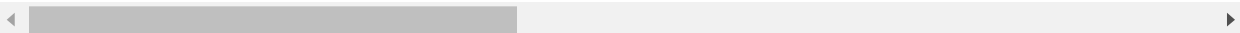
In [9]:
```python
df1.columns
```

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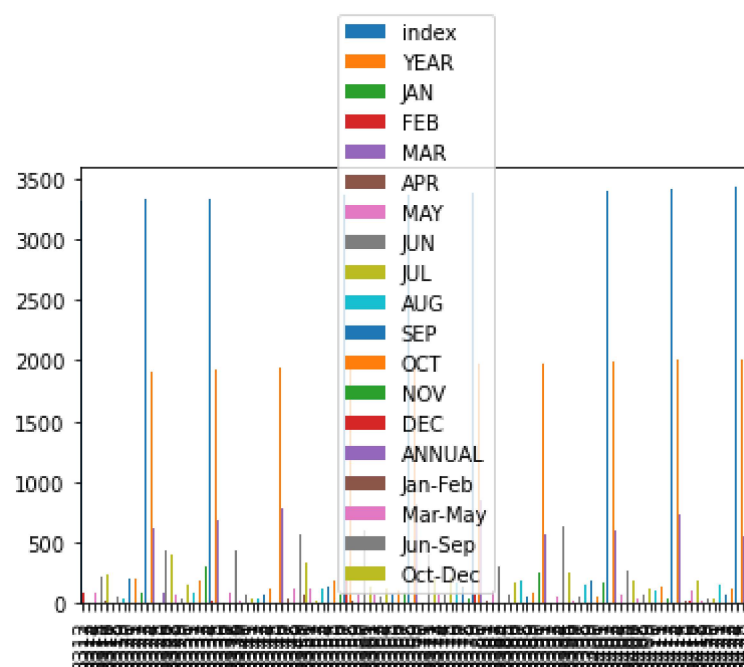
Data Visulaization
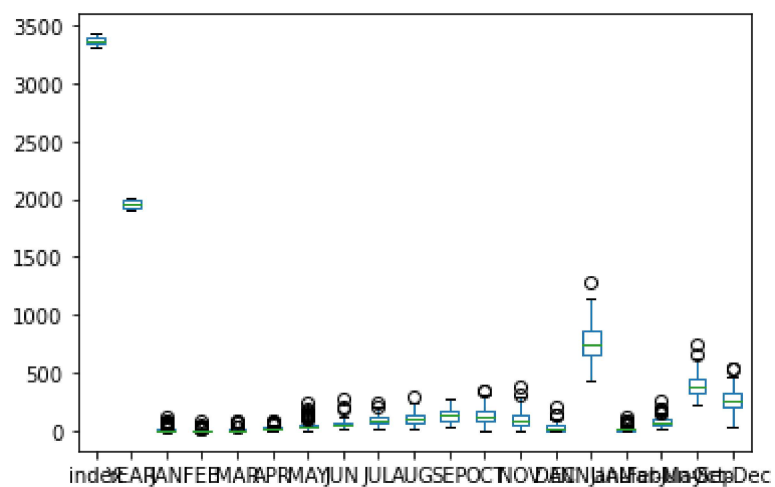
In [10]: `df1.plot.line()`

Out[10]: `<AxesSubplot:>`
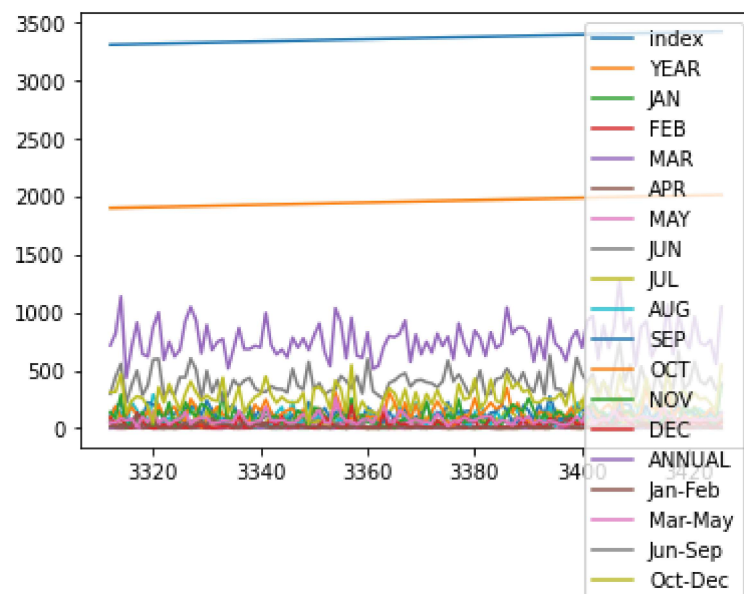
In [11]: `df1.plot.bar()`

Out[11]: `<AxesSubplot:>`
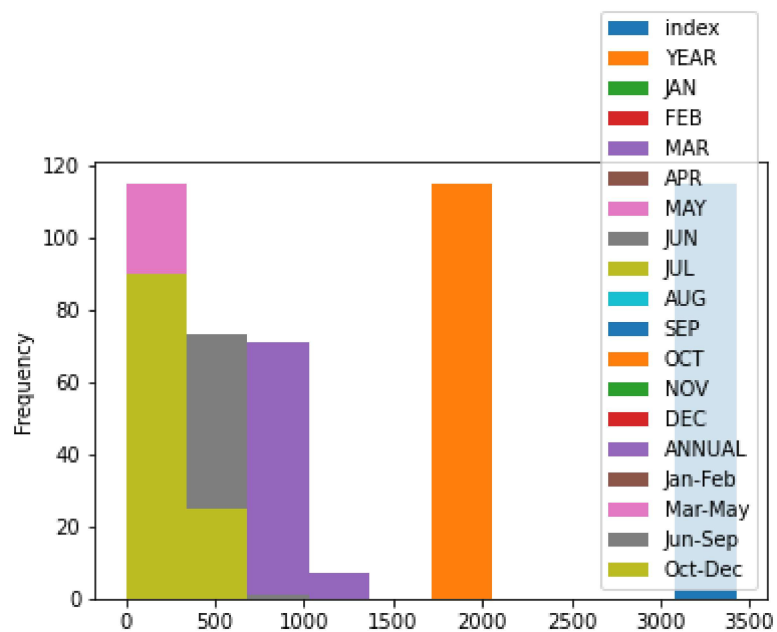
In [12]: `df1.plot.box()`

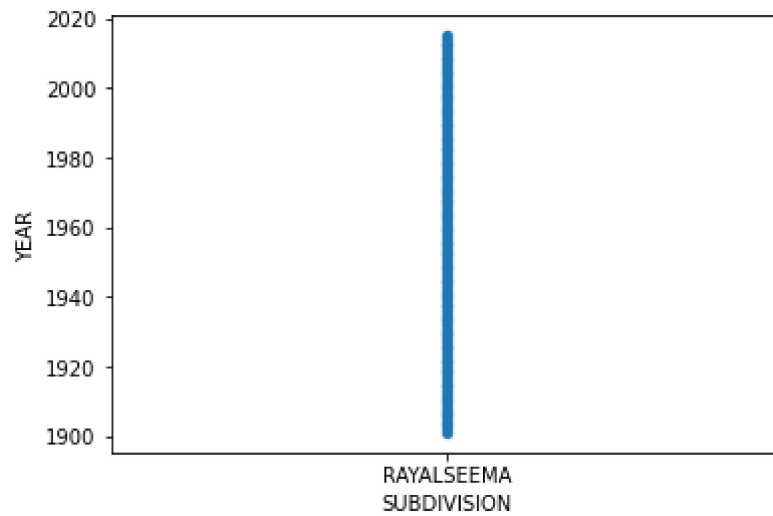Out[12]: `<AxesSubplot:>`

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

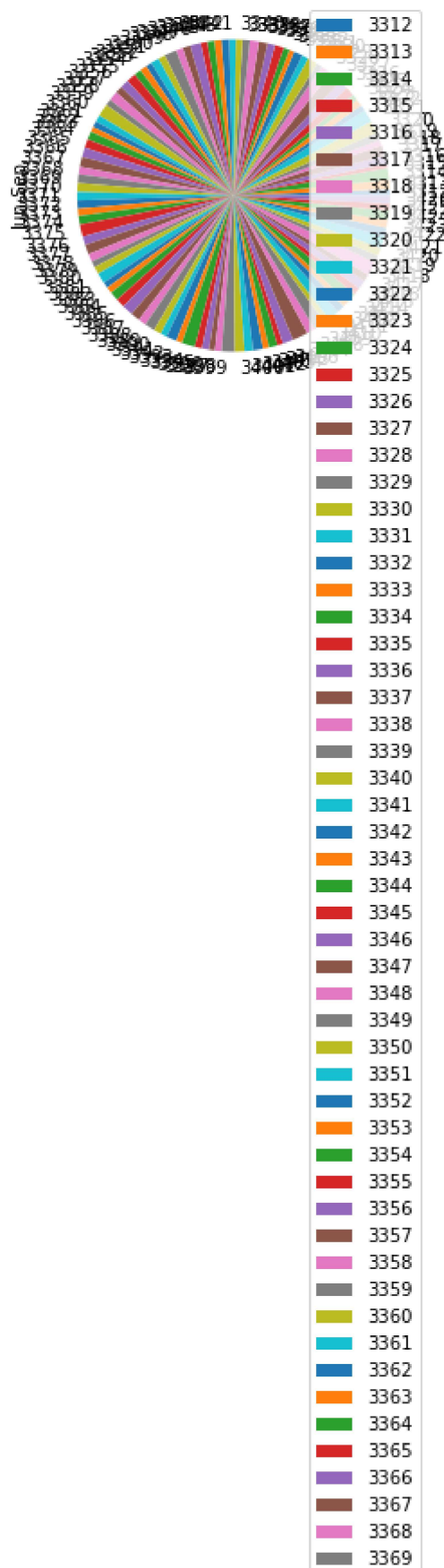Out[13]: `<AxesSubplot:ylabel='Frequency'>`

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

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

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

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

▬	3370
▬	3371
▬	3372
▬	3373
▬	3374
▬	3375
▬	3376
▬	3377
▬	3378
▬	3379
▬	3380
▬	3381
▬	3382
▬	3383
▬	3384
▬	3385
▬	3386
▬	3387
▬	3388
▬	3389
▬	3390
▬	3391
▬	3392
▬	3393
▬	3394
▬	3395
▬	3396
▬	3397
▬	3398
▬	3399
▬	3400
▬	3401
▬	3402
▬	3403
▬	3404
▬	3405
▬	3406
▬	3407
▬	3408
▬	3409
▬	3410
▬	3411
▬	3412
▬	3413
▬	3414
▬	3415
▬	3416
▬	3417
▬	3418
▬	3419
▬	3420
▬	3421
▬	3422
▬	3423
▬	3424
▬	3425
▬	3426

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

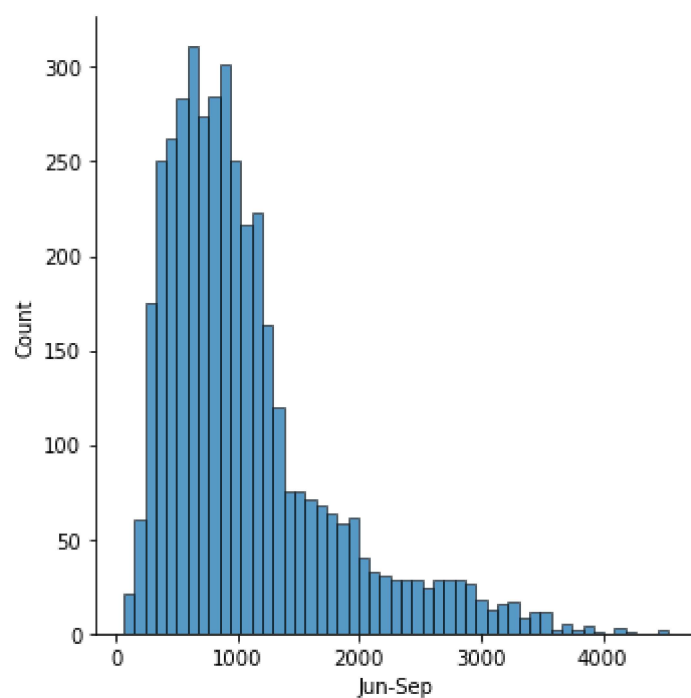Out[16]: `<seaborn.axisgrid.PairGrid at 0x17c5166d490>`
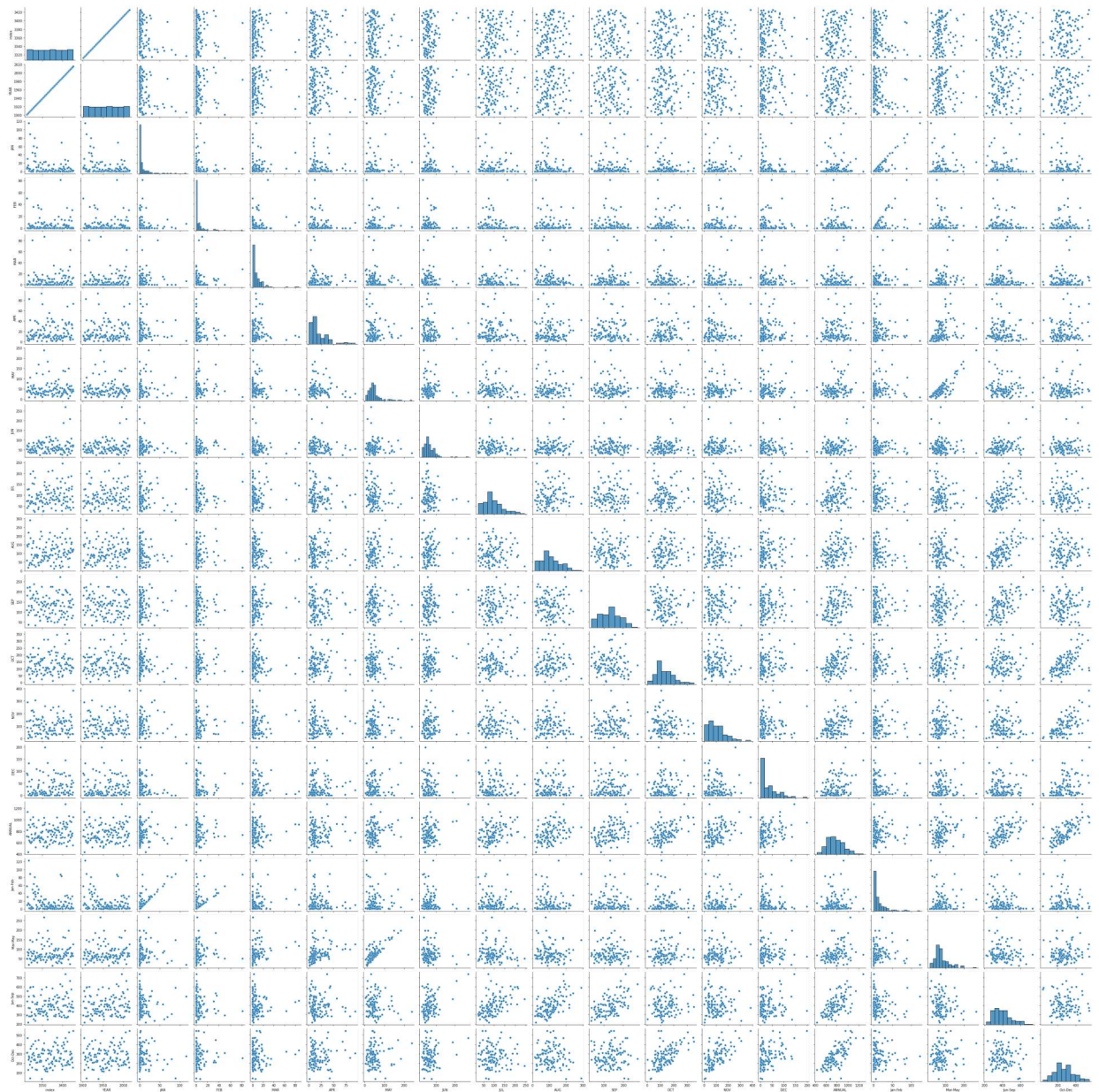
In [17]: `sns.displot(data["Jun-Sep"])`

Out[17]: `<seaborn.axisgrid.FacetGrid at 0x17c606416a0>`

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

Out[18]: `<AxesSubplot:>`