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

UTTARAKHAND

In [3]:
```
df=data.iloc[1242:1357]
df
```

Out[3]:

	index	SUBDIVISION	YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	C
1242	1242	UTTARAKHAND	1901	134.5	81.4	44.5	5.9	60.8	33.6	381.1	612.3	167.1	1
1243	1243	UTTARAKHAND	1902	0.0	17.0	52.2	63.7	52.1	113.1	444.1	327.5	220.4	3
1244	1244	UTTARAKHAND	1903	68.0	7.9	87.6	10.3	37.5	83.0	251.6	442.7	249.3	5
1245	1245	UTTARAKHAND	1904	40.0	5.2	78.3	13.6	61.1	180.1	449.6	417.2	174.1	
1246	1246	UTTARAKHAND	1905	115.4	80.7	99.8	26.1	70.3	111.5	299.9	349.5	129.5	
...	...	...	...	...	...	...	...	...	...	...	...	...	...
1352	1352	UTTARAKHAND	2011	30.9	65.2	18.0	30.9	84.2	223.1	433.3	523.7	148.4	
1353	1353	UTTARAKHAND	2012	38.8	11.9	28.1	39.2	9.1	46.0	387.1	419.5	220.6	
1354	1354	UTTARAKHAND	2013	73.0	188.3	22.0	24.7	18.2	488.9	413.4	359.4	111.3	2
1355	1355	UTTARAKHAND	2014	45.9	99.9	68.4	37.6	52.9	62.9	462.7	264.2	107.9	4
1356	1356	UTTARAKHAND	2015	54.5	62.6	127.3	57.3	38.0	186.6	337.0	305.3	52.6	1

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
1242	1242	UTTARAKHAND	1901	134.5	81.4	44.5	5.9	60.8	33.6	381.1	612.3	167.1	16
1243	1243	UTTARAKHAND	1902	0.0	17.0	52.2	63.7	52.1	113.1	444.1	327.5	220.4	31
1244	1244	UTTARAKHAND	1903	68.0	7.9	87.6	10.3	37.5	83.0	251.6	442.7	249.3	57
1245	1245	UTTARAKHAND	1904	40.0	5.2	78.3	13.6	61.1	180.1	449.6	417.2	174.1	6
1246	1246	UTTARAKHAND	1905	115.4	80.7	99.8	26.1	70.3	111.5	299.9	349.5	129.5	0

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

Out[5]:

	index	SUBDIVISION	YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	O
1352	1352	UTTARAKHAND	2011	30.9	65.2	18.0	30.9	84.2	223.1	433.3	523.7	148.4	
1353	1353	UTTARAKHAND	2012	38.8	11.9	28.1	39.2	9.1	46.0	387.1	419.5	220.6	
1354	1354	UTTARAKHAND	2013	73.0	188.3	22.0	24.7	18.2	488.9	413.4	359.4	111.3	2
1355	1355	UTTARAKHAND	2014	45.9	99.9	68.4	37.6	52.9	62.9	462.7	264.2	107.9	4
1356	1356	UTTARAKHAND	2015	54.5	62.6	127.3	57.3	38.0	186.6	337.0	305.3	52.6	1

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

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 115 entries, 1242 to 1356
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	C
1242	1242	UTTARAKHAND	1901	134.5	81.4	44.5	5.9	60.8	33.6	381.1	612.3	167.1	1
1243	1243	UTTARAKHAND	1902	0.0	17.0	52.2	63.7	52.1	113.1	444.1	327.5	220.4	3
1244	1244	UTTARAKHAND	1903	68.0	7.9	87.6	10.3	37.5	83.0	251.6	442.7	249.3	5
1245	1245	UTTARAKHAND	1904	40.0	5.2	78.3	13.6	61.1	180.1	449.6	417.2	174.1	
1246	1246	UTTARAKHAND	1905	115.4	80.7	99.8	26.1	70.3	111.5	299.9	349.5	129.5	
...	...	...	...	...	...	...	...	...	...	...	...	...	...
1352	1352	UTTARAKHAND	2011	30.9	65.2	18.0	30.9	84.2	223.1	433.3	523.7	148.4	
1353	1353	UTTARAKHAND	2012	38.8	11.9	28.1	39.2	9.1	46.0	387.1	419.5	220.6	
1354	1354	UTTARAKHAND	2013	73.0	188.3	22.0	24.7	18.2	488.9	413.4	359.4	111.3	2
1355	1355	UTTARAKHAND	2014	45.9	99.9	68.4	37.6	52.9	62.9	462.7	264.2	107.9	4
1356	1356	UTTARAKHAND	2015	54.5	62.6	127.3	57.3	38.0	186.6	337.0	305.3	52.6	1

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	1299.000000	1958.000000	53.797391	63.452174	57.272174	35.166087	55.338261	162.
std	33.341666	33.341666	40.887384	44.040532	42.438752	24.116540	36.597919	86.
min	1242.000000	1901.000000	0.000000	0.000000	0.000000	1.100000	3.600000	33.
25%	1270.500000	1929.500000	21.400000	27.950000	22.850000	18.250000	28.050000	104.
50%	1299.000000	1958.000000	49.700000	60.100000	47.700000	30.700000	50.500000	139.
75%	1327.500000	1986.500000	76.200000	88.100000	80.600000	51.200000	71.450000	211.
max	1356.000000	2015.000000	211.400000	188.300000	190.300000	132.900000	270.200000	488.

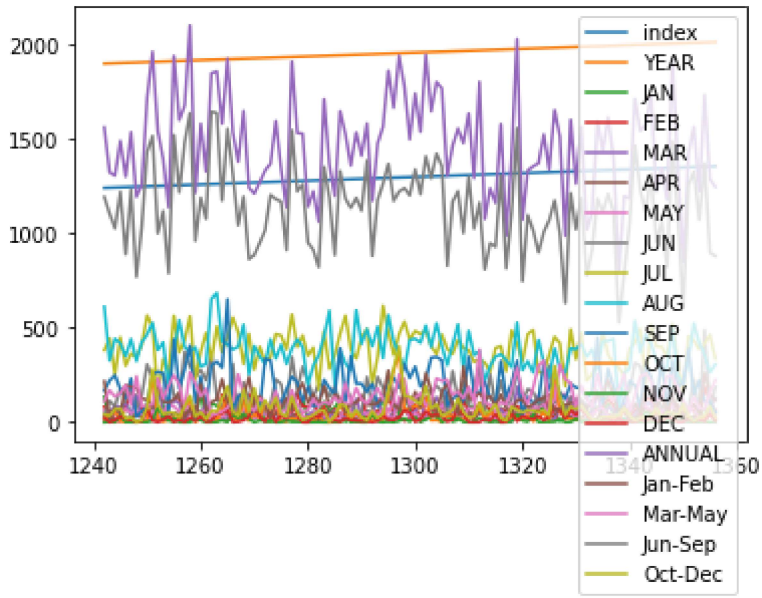
In [9]:
```
df1.columns
```

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 Visulaization

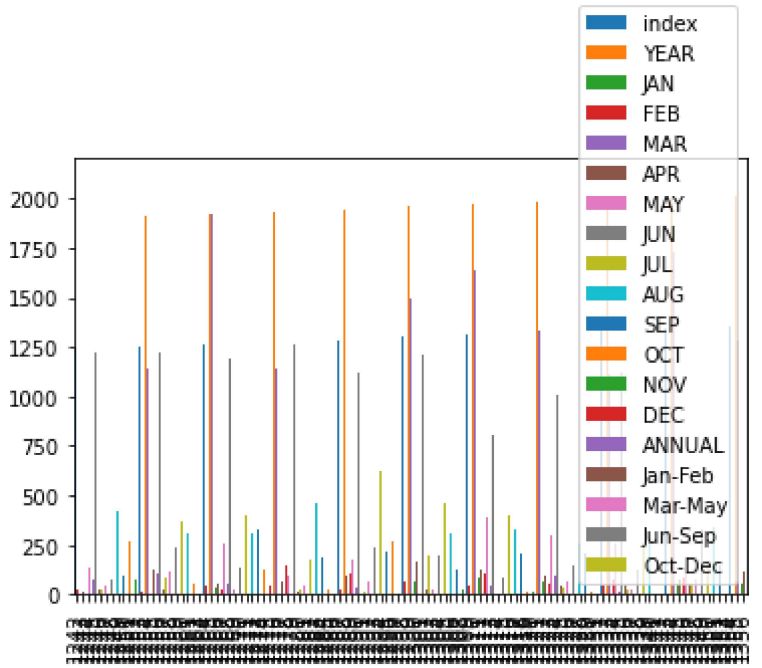
In [10]:
```
df1.plot.line()
```

Out[10]: <AxesSubplot:>



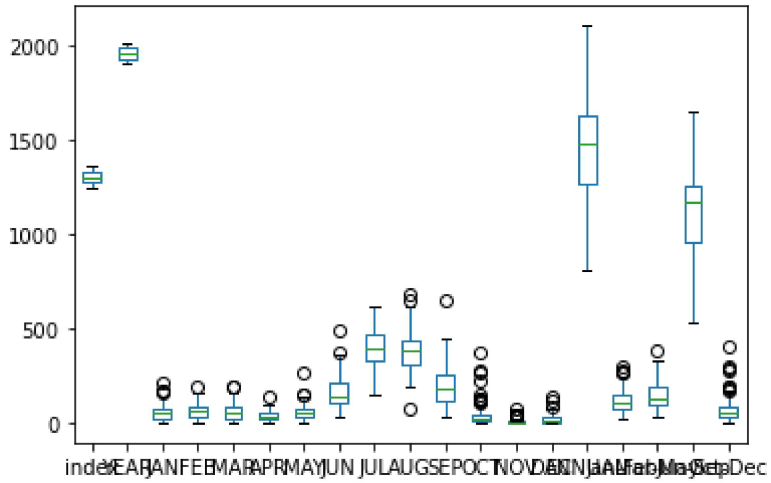
In [11]:
```
df1.plot.bar()
```

Out[11]: <AxesSubplot:>



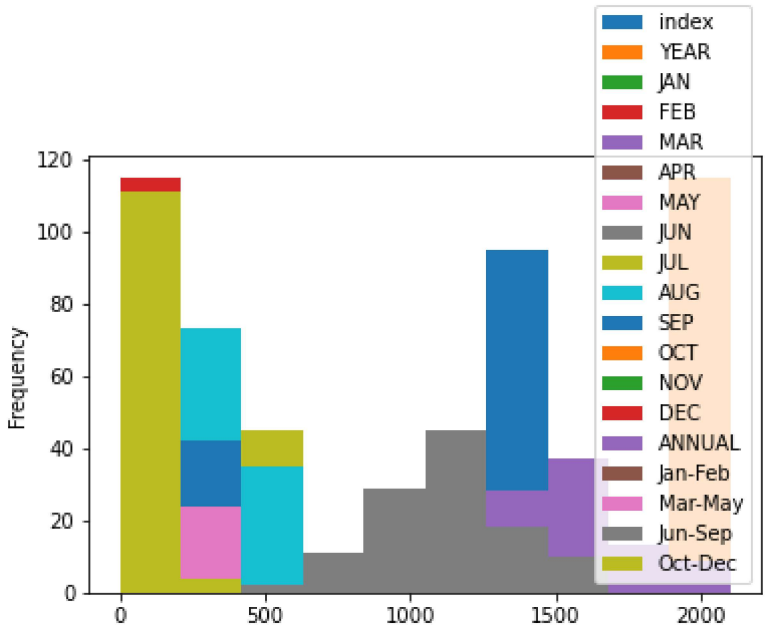
In [12]:
```
df1.plot.box()
```

Out[12]: <AxesSubplot:>



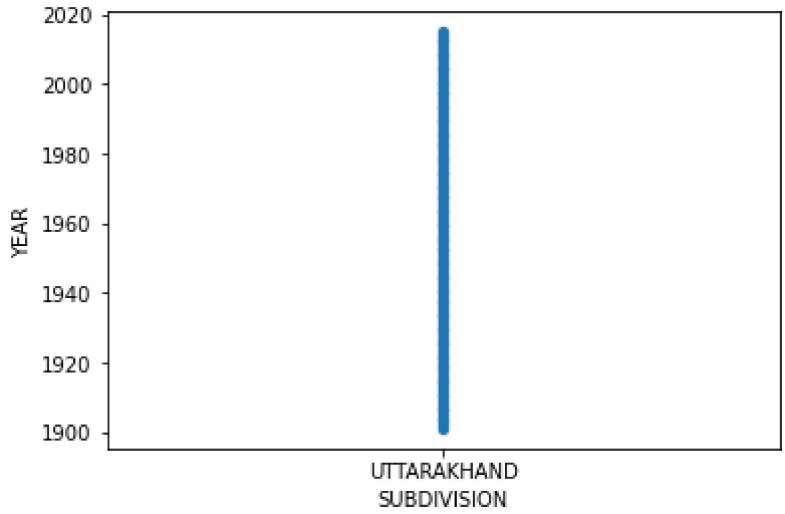
In [13]:
```
df1.plot.hist()
```

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



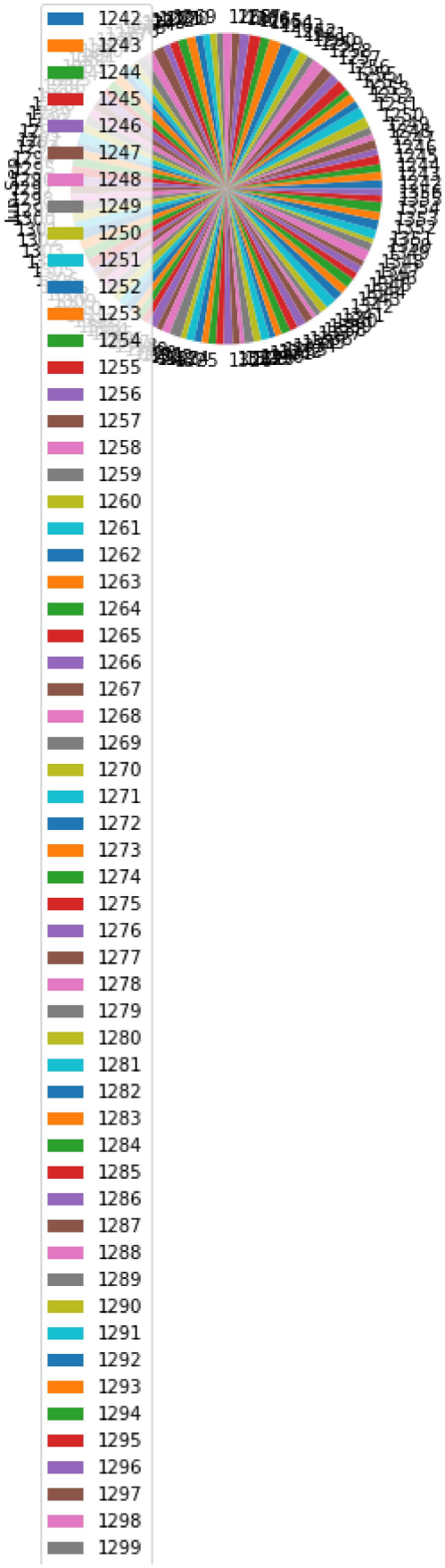
In [14]:
```
df1.plot.scatter(x="SUBDIVISION",y="YEAR")
```

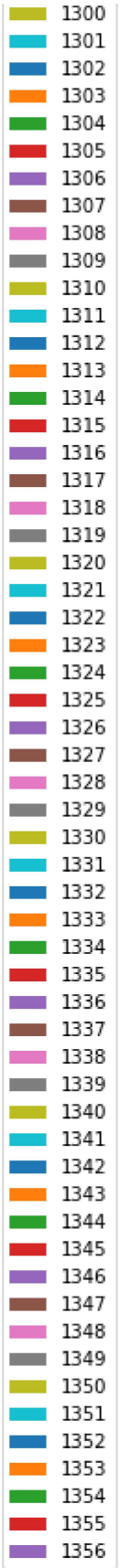
Out[14]: <AxesSubplot:xlabel='SUBDIVISION', ylabel='YEAR'>



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

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





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

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

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