

```
In [54]: import pandas as pd
```

```
In [55]: data=pd.read_csv("/home/placement/Desktop/hema/rainfall in india 1901-2015.csv")
```

```
In [56]: data.describe()
```

```
Out[56]:
```

	YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	
count	4116.000000	4112.000000	4113.000000	4110.000000	4112.000000	4113.000000	4111.000000	4109.000000	4112.000000	4110.000000	4109.0
mean	1958.218659	18.957320	21.805325	27.359197	43.127432	85.745417	230.234444	347.214334	290.263497	197.361922	95.1
std	33.140898	33.585371	35.909488	46.959424	67.831168	123.234904	234.710758	269.539667	188.770477	135.408345	99.1
min	1901.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.400000	0.000000	0.000000	0.100000	0.0
25%	1930.000000	0.600000	0.600000	1.000000	3.000000	8.600000	70.350000	175.600000	155.975000	100.525000	14.0
50%	1958.000000	6.000000	6.700000	7.800000	15.700000	36.600000	138.700000	284.800000	259.400000	173.900000	65.1
75%	1987.000000	22.200000	26.800000	31.300000	49.950000	97.200000	305.150000	418.400000	377.800000	265.800000	148.4
max	2015.000000	583.700000	403.500000	605.600000	595.100000	1168.600000	1609.900000	2362.800000	1664.600000	1222.000000	948.1

```
In [57]: data.info()#information about data given
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 4116 entries, 0 to 4115
Data columns (total 19 columns):
#   Column                Non-Null Count  Dtype
---  -
0   SUBDIVISION           4116 non-null  object
1   YEAR                  4116 non-null  int64
2   JAN                   4112 non-null  float64
3   FEB                   4113 non-null  float64
4   MAR                   4110 non-null  float64
5   APR                   4112 non-null  float64
6   MAY                   4113 non-null  float64
7   JUN                   4111 non-null  float64
8   JUL                   4109 non-null  float64
9   AUG                   4112 non-null  float64
10  SEP                   4110 non-null  float64
11  OCT                   4109 non-null  float64
12  NOV                   4105 non-null  float64
13  DEC                   4106 non-null  float64
14  ANNUAL                4090 non-null  float64
15  Jan-Feb               4110 non-null  float64
16  Mar-May               4107 non-null  float64
17  Jun-Sep               4106 non-null  float64
18  Oct-Dec               4103 non-null  float64
dtypes: float64(17), int64(1), object(1)
memory usage: 611.1+ KB
```

```
In [58]: list(data)
```

```
Out[58]: ['SUBDIVISION',  
          'YEAR',  
          'JAN',  
          'FEB',  
          'MAR',  
          'APR',  
          'MAY',  
          'JUN',  
          'JUL',  
          'AUG',  
          'SEP',  
          'OCT',  
          'NOV',  
          'DEC',  
          'ANNUAL',  
          'Jan-Feb',  
          'Mar-May',  
          'Jun-Sep',  
          'Oct-Dec']
```

```
In [59]: data.groupby(['SUBDIVISION']).count()
```

```
Out[59]:
```

	YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	Jan-Feb	Mar-May	Jun-Sep	Oct-Dec
SUBDIVISION																		
ANDAMAN & NICOBAR ISLANDS	110	110	110	108	108	109	108	108	108	107	108	108	107	104	110	107	107	107
ARUNACHAL PRADESH	97	96	96	95	97	97	96	96	97	97	95	95	95	91	96	95	95	94
ASSAM & MEGHALAYA	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115
BIHAR	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115
CHHATTISGARH	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115
COASTAL ANDHRA PRADESH	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115
COASTAL KARNATAKA	115	114	115	115	115	115	115	115	115	115	115	115	115	114	114	115	115	115
EAST MADHYA PRADESH	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115
EAST RAJASTHAN	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115
EAST UTTAR PRADESH	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115
GANGETIC WEST BENGAL	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115
GUJARAT REGION	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115
HARYANA DELHI & CHANDIGARH	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115
HIMACHAL PRADESH	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115
JAMMU & KASHMIR	115	115	115	115	115	115	115	114	115	115	115	114	114	114	115	115	114	114
JHARKHAND	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115
KERALA	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115
KONKAN & GOA	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115
LAKSHADWEEP	114	112	113	112	112	112	112	111	112	111	111	108	110	103	111	110	110	108
MADHYA MAHARASHTRA	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115
MATATHWADA	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115
NAGA MANI MIZO TRIPURA	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115

	YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	Jan-Feb	Mar-May	Jun-Sep	Oct-Dec
SUBDIVISION																		
NORTH INTERIOR KARNATAKA	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115
ORISSA	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115
PUNJAB	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115
RAYALSEEMA	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115
SAURASHTRA & KUTCH	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115
SOUTH INTERIOR KARNATAKA	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115
SUB HIMALAYAN WEST BENGAL & SIKKIM	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115
TAMIL NADU	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115
TELANGANA	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115
UTTARAKHAND	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115
VIDARBHA	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115
WEST MADHYA PRADESH	115	115	114	115	115	115	115	115	115	115	115	115	115	115	114	114	115	115
WEST RAJASTHAN	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115
WEST UTTAR PRADESH	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115

```
In [60]: data.isna().sum()
```

```
Out[60]: SUBDIVISION      0  
        YEAR            0  
        JAN             4  
        FEB             3  
        MAR             6  
        APR             4  
        MAY             3  
        JUN             5  
        JUL             7  
        AUG             4  
        SEP             6  
        OCT             7  
        NOV            11  
        DEC            10  
        ANNUAL          26  
        Jan-Feb         6  
        Mar-May         9  
        Jun-Sep         10  
        Oct-Dec         13  
        dtype: int64
```

```
In [61]: data1=data.loc[(data.YEAR<=2010)]
```

In [62]: data1

Out[62]:

	SUBDIVISION	YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	Jan-Feb	Mar-May	Jun-Sep	
0	ANDAMAN & NICOBAR ISLANDS	1901	49.2	87.1	29.2	2.3	528.8	517.5	365.1	481.1	332.6	388.5	558.2	33.6	3373.2	136.3	560.3	1696.3	9
1	ANDAMAN & NICOBAR ISLANDS	1902	0.0	159.8	12.2	0.0	446.1	537.1	228.9	753.7	666.2	197.2	359.0	160.5	3520.7	159.8	458.3	2185.9	7
2	ANDAMAN & NICOBAR ISLANDS	1903	12.7	144.0	0.0	1.0	235.1	479.9	728.4	326.7	339.0	181.2	284.4	225.0	2957.4	156.7	236.1	1874.0	6
3	ANDAMAN & NICOBAR ISLANDS	1904	9.4	14.7	0.0	202.4	304.5	495.1	502.0	160.1	820.4	222.2	308.7	40.1	3079.6	24.1	506.9	1977.6	5
4	ANDAMAN & NICOBAR ISLANDS	1905	1.3	0.0	3.3	26.9	279.5	628.7	368.7	330.5	297.0	260.7	25.4	344.7	2566.7	1.3	309.7	1624.9	6
...
4106	LAKSHADWEEP	2006	20.1	0.0	33.0	0.3	327.9	286.9	172.3	150.7	318.5	119.1	158.9	10.9	1598.6	20.1	361.2	928.4	2
4107	LAKSHADWEEP	2007	2.5	4.2	0.2	22.2	166.2	573.4	427.4	294.7	457.5	256.1	47.6	109.6	2361.6	6.7	188.6	1753.0	4
4108	LAKSHADWEEP	2008	5.5	19.8	120.7	15.8	180.4	254.6	363.9	206.6	108.9	252.9	67.6	130.1	1726.8	25.3	316.9	934.0	4
4109	LAKSHADWEEP	2009	4.7	1.5	0.1	18.1	162.1	401.2	266.4	185.0	145.1	87.4	166.2	132.3	1570.1	6.2	180.3	997.7	3
4110	LAKSHADWEEP	2010	18.8	0.0	1.2	35.6	79.0	318.9	336.7	335.1	161.5	155.4	201.5	81.5	1725.2	18.8	115.8	1152.2	4

3936 rows × 19 columns



In [73]: data1=data.loc[(data.YEAR<2010)]#data till year 2010

In [74]: data1

Out[74]:

	SUBDIVISION	YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	Jan-Feb	Mar-May	Jun-Sep	
0	ANDAMAN & NICOBAR ISLANDS	1901	49.2	87.1	29.2	2.3	528.8	517.5	365.1	481.1	332.6	388.5	558.2	33.6	3373.2	136.3	560.3	1696.3	9
1	ANDAMAN & NICOBAR ISLANDS	1902	0.0	159.8	12.2	0.0	446.1	537.1	228.9	753.7	666.2	197.2	359.0	160.5	3520.7	159.8	458.3	2185.9	7
2	ANDAMAN & NICOBAR ISLANDS	1903	12.7	144.0	0.0	1.0	235.1	479.9	728.4	326.7	339.0	181.2	284.4	225.0	2957.4	156.7	236.1	1874.0	6
3	ANDAMAN & NICOBAR ISLANDS	1904	9.4	14.7	0.0	202.4	304.5	495.1	502.0	160.1	820.4	222.2	308.7	40.1	3079.6	24.1	506.9	1977.6	5
4	ANDAMAN & NICOBAR ISLANDS	1905	1.3	0.0	3.3	26.9	279.5	628.7	368.7	330.5	297.0	260.7	25.4	344.7	2566.7	1.3	309.7	1624.9	6
...
4105	LAKSHADWEEP	2005	17.6	11.1	0.0	37.0	92.8	248.5	378.9	102.4	278.0	164.2	218.3	26.6	1575.4	28.7	129.8	1007.8	4
4106	LAKSHADWEEP	2006	20.1	0.0	33.0	0.3	327.9	286.9	172.3	150.7	318.5	119.1	158.9	10.9	1598.6	20.1	361.2	928.4	2
4107	LAKSHADWEEP	2007	2.5	4.2	0.2	22.2	166.2	573.4	427.4	294.7	457.5	256.1	47.6	109.6	2361.6	6.7	188.6	1753.0	4
4108	LAKSHADWEEP	2008	5.5	19.8	120.7	15.8	180.4	254.6	363.9	206.6	108.9	252.9	67.6	130.1	1726.8	25.3	316.9	934.0	4
4109	LAKSHADWEEP	2009	4.7	1.5	0.1	18.1	162.1	401.2	266.4	185.0	145.1	87.4	166.2	132.3	1570.1	6.2	180.3	997.7	3

3900 rows × 19 columns



In [75]: data2=data.drop(['ANNUAL', 'Jan-Feb', 'Mar-May', 'Jun-Sep', 'Oct-Dec'],axis=1)

In [76]: data2

Out[76]:

	SUBDIVISION	YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	ANDAMAN & NICOBAR ISLANDS	1901	49.2	87.1	29.2	2.3	528.8	517.5	365.1	481.1	332.6	388.5	558.2	33.6
1	ANDAMAN & NICOBAR ISLANDS	1902	0.0	159.8	12.2	0.0	446.1	537.1	228.9	753.7	666.2	197.2	359.0	160.5
2	ANDAMAN & NICOBAR ISLANDS	1903	12.7	144.0	0.0	1.0	235.1	479.9	728.4	326.7	339.0	181.2	284.4	225.0
3	ANDAMAN & NICOBAR ISLANDS	1904	9.4	14.7	0.0	202.4	304.5	495.1	502.0	160.1	820.4	222.2	308.7	40.1
4	ANDAMAN & NICOBAR ISLANDS	1905	1.3	0.0	3.3	26.9	279.5	628.7	368.7	330.5	297.0	260.7	25.4	344.7
...
4111	LAKSHADWEEP	2011	5.1	2.8	3.1	85.9	107.2	153.6	350.2	254.0	255.2	117.4	184.3	14.9
4112	LAKSHADWEEP	2012	19.2	0.1	1.6	76.8	21.2	327.0	231.5	381.2	179.8	145.9	12.4	8.8
4113	LAKSHADWEEP	2013	26.2	34.4	37.5	5.3	88.3	426.2	296.4	154.4	180.0	72.8	78.1	26.7
4114	LAKSHADWEEP	2014	53.2	16.1	4.4	14.9	57.4	244.1	116.1	466.1	132.2	169.2	59.0	62.3
4115	LAKSHADWEEP	2015	2.2	0.5	3.7	87.1	133.1	296.6	257.5	146.4	160.4	165.4	231.0	159.0

4116 rows × 14 columns

In [77]: data2['SUBDIVISION'].unique()

Out[77]: array(['ANDAMAN & NICOBAR ISLANDS', 'ARUNACHAL PRADESH',
 'ASSAM & MEGHALAYA', 'NAGA MANI MIZO TRIPURA',
 'SUB HIMALAYAN WEST BENGAL & SIKKIM', 'GANGETIC WEST BENGAL',
 'ORISSA', 'JHARKHAND', 'BIHAR', 'EAST UTTAR PRADESH',
 'WEST UTTAR PRADESH', 'UTTARAKHAND', 'HARYANA DELHI & CHANDIGARH',
 'PUNJAB', 'HIMACHAL PRADESH', 'JAMMU & KASHMIR', 'WEST RAJASTHAN',
 'EAST RAJASTHAN', 'WEST MADHYA PRADESH', 'EAST MADHYA PRADESH',
 'GUJARAT REGION', 'SAURASHTRA & KUTCH', 'KONKAN & GOA',
 'MADHYA MAHARASHTRA', 'MATATHWADA', 'VIDARBHA', 'CHHATTISGARH',
 'COASTAL ANDHRA PRADESH', 'TELANGANA', 'RAYALSEEMA', 'TAMIL NADU',
 'COASTAL KARNATAKA', 'NORTH INTERIOR KARNATAKA',
 'SOUTH INTERIOR KARNATAKA', 'KERALA', 'LAKSHADWEEP'], dtype=object)

```
In [79]: data3=data2.loc[(data2.SUBDIVISION=="COASTAL ANDHRA PRADESH")]
```

```
In [80]: data3
```

```
Out[80]:
```

	SUBDIVISION	YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
3082	COASTAL ANDHRA PRADESH	1901	18.8	80.9	7.2	28.7	68.7	77.7	113.0	133.7	125.3	173.4	164.8	1.5
3083	COASTAL ANDHRA PRADESH	1902	2.0	0.0	2.8	23.9	37.6	72.6	144.5	236.1	204.5	262.0	50.4	27.1
3084	COASTAL ANDHRA PRADESH	1903	0.8	13.3	0.2	6.2	73.4	154.0	248.6	258.0	216.5	159.1	173.9	12.1
3085	COASTAL ANDHRA PRADESH	1904	1.3	0.0	5.4	3.0	136.3	107.8	120.2	117.7	116.8	240.9	0.0	10.7
3086	COASTAL ANDHRA PRADESH	1905	1.1	16.7	68.0	37.0	68.8	84.4	64.6	210.8	170.2	66.0	7.4	0.0
...
3192	COASTAL ANDHRA PRADESH	2011	0.0	17.9	0.9	62.3	67.9	86.8	196.0	215.8	129.7	74.6	4.9	5.0
3193	COASTAL ANDHRA PRADESH	2012	37.6	0.0	2.7	24.0	39.3	95.4	221.9	221.2	246.5	140.0	289.7	0.0
3194	COASTAL ANDHRA PRADESH	2013	2.0	29.6	0.2	48.0	28.2	127.5	162.4	123.1	132.0	411.5	53.1	2.8
3195	COASTAL ANDHRA PRADESH	2014	0.4	1.2	9.1	6.0	112.9	45.7	151.8	177.8	144.5	195.6	23.7	6.4
3196	COASTAL ANDHRA PRADESH	2015	2.0	0.6	5.5	32.3	34.1	283.8	116.0	192.0	201.8	59.7	81.2	2.0

115 rows × 14 columns

```
In [82]: data3.isna().sum()
```

```
Out[82]: SUBDIVISION    0  
        YEAR          0  
        JAN           0  
        FEB           0  
        MAR           0  
        APR           0  
        MAY           0  
        JUN           0  
        JUL           0  
        AUG           0  
        SEP           0  
        OCT           0  
        NOV           0  
        DEC           0  
        dtype: int64
```

```
In [96]: data3['ANNUAL RAIN']=data3.apply(lambda row:row.JAN + row.FEB + row.MAR + row.APR + row.MAY + row.JUN + row.
```

```
In [97]: import warnings  
        warnings.filterwarnings("ignore")
```

In [98]: data3

Out[98]:

	SUBDIVISION	YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL RAIN
3082	COASTAL ANDHRA PRADESH	1901	18.8	80.9	7.2	28.7	68.7	77.7	113.0	133.7	125.3	173.4	164.8	1.5	993.7
3083	COASTAL ANDHRA PRADESH	1902	2.0	0.0	2.8	23.9	37.6	72.6	144.5	236.1	204.5	262.0	50.4	27.1	1063.5
3084	COASTAL ANDHRA PRADESH	1903	0.8	13.3	0.2	6.2	73.4	154.0	248.6	258.0	216.5	159.1	173.9	12.1	1316.1
3085	COASTAL ANDHRA PRADESH	1904	1.3	0.0	5.4	3.0	136.3	107.8	120.2	117.7	116.8	240.9	0.0	10.7	860.1
3086	COASTAL ANDHRA PRADESH	1905	1.1	16.7	68.0	37.0	68.8	84.4	64.6	210.8	170.2	66.0	7.4	0.0	795.0
...
3192	COASTAL ANDHRA PRADESH	2011	0.0	17.9	0.9	62.3	67.9	86.8	196.0	215.8	129.7	74.6	4.9	5.0	861.8
3193	COASTAL ANDHRA PRADESH	2012	37.6	0.0	2.7	24.0	39.3	95.4	221.9	221.2	246.5	140.0	289.7	0.0	1318.3
3194	COASTAL ANDHRA PRADESH	2013	2.0	29.6	0.2	48.0	28.2	127.5	162.4	123.1	132.0	411.5	53.1	2.8	1120.4
3195	COASTAL ANDHRA PRADESH	2014	0.4	1.2	9.1	6.0	112.9	45.7	151.8	177.8	144.5	195.6	23.7	6.4	875.1
3196	COASTAL ANDHRA PRADESH	2015	2.0	0.6	5.5	32.3	34.1	283.8	116.0	192.0	201.8	59.7	81.2	2.0	1011.0

115 rows × 15 columns

In [103]: data4=data3.drop(['SUBDIVISION'],axis=1)

```
In [104]: data4
```

```
Out[104]:
```

	YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL RAIN
3082	1901	18.8	80.9	7.2	28.7	68.7	77.7	113.0	133.7	125.3	173.4	164.8	1.5	993.7
3083	1902	2.0	0.0	2.8	23.9	37.6	72.6	144.5	236.1	204.5	262.0	50.4	27.1	1063.5
3084	1903	0.8	13.3	0.2	6.2	73.4	154.0	248.6	258.0	216.5	159.1	173.9	12.1	1316.1
3085	1904	1.3	0.0	5.4	3.0	136.3	107.8	120.2	117.7	116.8	240.9	0.0	10.7	860.1
3086	1905	1.1	16.7	68.0	37.0	68.8	84.4	64.6	210.8	170.2	66.0	7.4	0.0	795.0
...
3192	2011	0.0	17.9	0.9	62.3	67.9	86.8	196.0	215.8	129.7	74.6	4.9	5.0	861.8
3193	2012	37.6	0.0	2.7	24.0	39.3	95.4	221.9	221.2	246.5	140.0	289.7	0.0	1318.3
3194	2013	2.0	29.6	0.2	48.0	28.2	127.5	162.4	123.1	132.0	411.5	53.1	2.8	1120.4
3195	2014	0.4	1.2	9.1	6.0	112.9	45.7	151.8	177.8	144.5	195.6	23.7	6.4	875.1
3196	2015	2.0	0.6	5.5	32.3	34.1	283.8	116.0	192.0	201.8	59.7	81.2	2.0	1011.0

115 rows × 14 columns

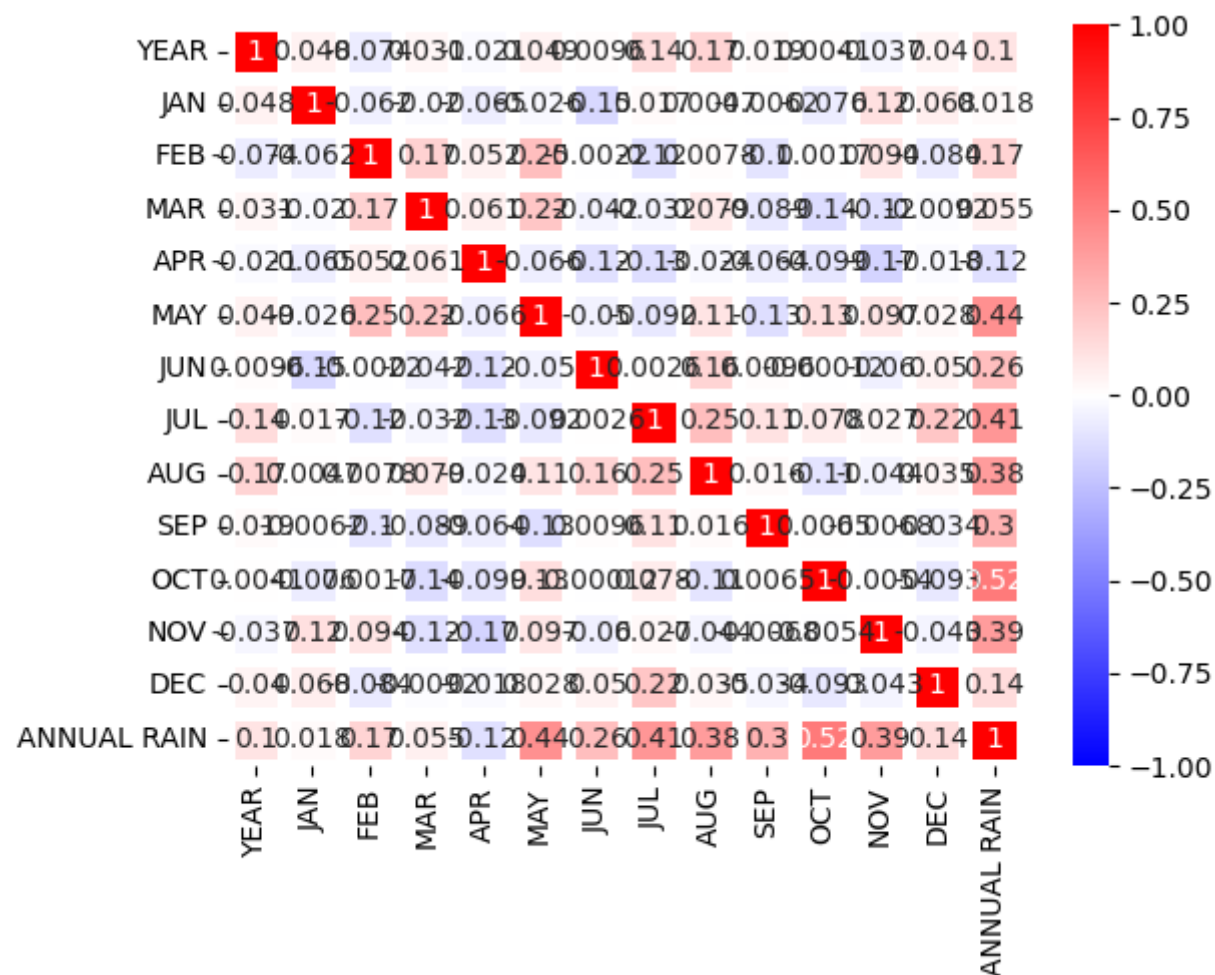
```
In [106]: cor=data4.corr()  
cor
```

Out[106]:

	YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
YEAR	1.000000	0.048132	-0.073781	0.031480	-0.020721	0.049330	0.009624	0.139075	0.168372	0.019305	0.004070	-0.037462	0.039762
JAN	0.048132	1.000000	-0.062433	-0.019689	-0.065377	-0.025647	-0.148502	0.016738	0.004698	-0.006220	-0.076399	0.124096	0.067973
FEB	-0.073781	-0.062433	1.000000	0.173153	0.051741	0.252374	-0.002180	-0.123334	0.007815	-0.104363	0.001682	0.094418	-0.083679
MAR	0.031480	-0.019689	0.173153	1.000000	0.061019	0.222856	-0.041628	-0.031694	0.078904	-0.088769	-0.135138	-0.124286	-0.009163
APR	-0.020721	-0.065377	0.051741	0.061019	1.000000	-0.066308	-0.122411	-0.125468	-0.024127	-0.063572	-0.098969	-0.168154	-0.017865
MAY	0.049330	-0.025647	0.252374	0.222856	-0.066308	1.000000	-0.049903	-0.092140	0.106612	-0.127919	0.132451	0.096951	0.028204
JUN	0.009624	-0.148502	-0.002180	-0.041628	-0.122411	-0.049903	1.000000	0.002577	0.164741	0.009614	-0.000123	-0.059916	0.050498
JUL	0.139075	0.016738	-0.123334	-0.031694	-0.125468	-0.092140	0.002577	1.000000	0.250009	0.110985	0.077776	0.027248	0.221725
AUG	0.168372	0.004698	0.007815	0.078904	-0.024127	0.106612	0.164741	0.250009	1.000000	0.016081	-0.105192	-0.044359	0.034882
SEP	0.019305	-0.006220	-0.104363	-0.088769	-0.063572	-0.127919	0.009614	0.110985	0.016081	1.000000	0.006472	-0.006844	-0.034046
OCT	0.004070	-0.076399	0.001682	-0.135138	-0.098969	0.132451	-0.000123	0.077776	-0.105192	0.006472	1.000000	-0.005399	-0.092516
NOV	-0.037462	0.124096	0.094418	-0.124286	-0.168154	0.096951	-0.059916	0.027248	-0.044359	-0.006844	-0.005399	1.000000	-0.042718
DEC	0.039762	0.067973	-0.083679	-0.009163	-0.017865	0.028204	0.050498	0.221725	0.034882	-0.034046	-0.092516	-0.042718	1.000000
ANNUAL RAIN	0.102054	0.018285	0.170007	0.054817	-0.120243	0.437042	0.255896	0.412431	0.383989	0.297122	0.522709	0.386031	0.135204

```
In [110]: import seaborn as hh
hh.heatmap(cor,vmax=1,vmin=-1,annot=True,linewidth=5,cmap='bwr')
```

Out[110]: <Axes: >



```
In [133]: data5=data3.drop(['JAN', 'FEB', 'MAR', 'APR', 'MAY'],axis=1)
```

```
In [134]: data5
```

```
Out[134]:
```

	SUBDIVISION	YEAR	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL RAIN
3082	COASTAL ANDHRA PRADESH	1901	77.7	113.0	133.7	125.3	173.4	164.8	1.5	993.7
3083	COASTAL ANDHRA PRADESH	1902	72.6	144.5	236.1	204.5	262.0	50.4	27.1	1063.5
3084	COASTAL ANDHRA PRADESH	1903	154.0	248.6	258.0	216.5	159.1	173.9	12.1	1316.1
3085	COASTAL ANDHRA PRADESH	1904	107.8	120.2	117.7	116.8	240.9	0.0	10.7	860.1
3086	COASTAL ANDHRA PRADESH	1905	84.4	64.6	210.8	170.2	66.0	7.4	0.0	795.0
...
3192	COASTAL ANDHRA PRADESH	2011	86.8	196.0	215.8	129.7	74.6	4.9	5.0	861.8
3193	COASTAL ANDHRA PRADESH	2012	95.4	221.9	221.2	246.5	140.0	289.7	0.0	1318.3
3194	COASTAL ANDHRA PRADESH	2013	127.5	162.4	123.1	132.0	411.5	53.1	2.8	1120.4
3195	COASTAL ANDHRA PRADESH	2014	45.7	151.8	177.8	144.5	195.6	23.7	6.4	875.1
3196	COASTAL ANDHRA PRADESH	2015	283.8	116.0	192.0	201.8	59.7	81.2	2.0	1011.0

115 rows × 10 columns

```
In [135]: data5['SWM']=data5.apply(lambda row:row.JUN + row.JUL + row.AUG + row.SEP,axis=1)
```


In [136]: data5

Out[136]:

	SUBDIVISION	YEAR	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL RAIN	SWM
3082	COASTAL ANDHRA PRADESH	1901	77.7	113.0	133.7	125.3	173.4	164.8	1.5	993.7	449.7
3083	COASTAL ANDHRA PRADESH	1902	72.6	144.5	236.1	204.5	262.0	50.4	27.1	1063.5	657.7
3084	COASTAL ANDHRA PRADESH	1903	154.0	248.6	258.0	216.5	159.1	173.9	12.1	1316.1	877.1
3085	COASTAL ANDHRA PRADESH	1904	107.8	120.2	117.7	116.8	240.9	0.0	10.7	860.1	462.5
3086	COASTAL ANDHRA PRADESH	1905	84.4	64.6	210.8	170.2	66.0	7.4	0.0	795.0	530.0
...
3192	COASTAL ANDHRA PRADESH	2011	86.8	196.0	215.8	129.7	74.6	4.9	5.0	861.8	628.3
3193	COASTAL ANDHRA PRADESH	2012	95.4	221.9	221.2	246.5	140.0	289.7	0.0	1318.3	785.0
3194	COASTAL ANDHRA PRADESH	2013	127.5	162.4	123.1	132.0	411.5	53.1	2.8	1120.4	545.0
3195	COASTAL ANDHRA PRADESH	2014	45.7	151.8	177.8	144.5	195.6	23.7	6.4	875.1	519.8
3196	COASTAL ANDHRA PRADESH	2015	283.8	116.0	192.0	201.8	59.7	81.2	2.0	1011.0	793.6

115 rows × 11 columns

In [137]: data5['NEM']=data5.apply(lambda row:row.OCT + row.NOV + row.DEC,axis=1)

In [138]: data5

Out[138]:

	SUBDIVISION	YEAR	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL RAIN	SWM	NEM
3082	COASTAL ANDHRA PRADESH	1901	77.7	113.0	133.7	125.3	173.4	164.8	1.5	993.7	449.7	339.7
3083	COASTAL ANDHRA PRADESH	1902	72.6	144.5	236.1	204.5	262.0	50.4	27.1	1063.5	657.7	339.5
3084	COASTAL ANDHRA PRADESH	1903	154.0	248.6	258.0	216.5	159.1	173.9	12.1	1316.1	877.1	345.1
3085	COASTAL ANDHRA PRADESH	1904	107.8	120.2	117.7	116.8	240.9	0.0	10.7	860.1	462.5	251.6
3086	COASTAL ANDHRA PRADESH	1905	84.4	64.6	210.8	170.2	66.0	7.4	0.0	795.0	530.0	73.4
...
3192	COASTAL ANDHRA PRADESH	2011	86.8	196.0	215.8	129.7	74.6	4.9	5.0	861.8	628.3	84.5
3193	COASTAL ANDHRA PRADESH	2012	95.4	221.9	221.2	246.5	140.0	289.7	0.0	1318.3	785.0	429.7
3194	COASTAL ANDHRA PRADESH	2013	127.5	162.4	123.1	132.0	411.5	53.1	2.8	1120.4	545.0	467.4
3195	COASTAL ANDHRA PRADESH	2014	45.7	151.8	177.8	144.5	195.6	23.7	6.4	875.1	519.8	225.7
3196	COASTAL ANDHRA PRADESH	2015	283.8	116.0	192.0	201.8	59.7	81.2	2.0	1011.0	793.6	142.9

115 rows × 12 columns

In [139]: data6=data5.drop(['SUBDIVISION'],axis=1)

In [140]: data6

Out[140]:

	YEAR	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL RAIN	SWM	NEM
3082	1901	77.7	113.0	133.7	125.3	173.4	164.8	1.5	993.7	449.7	339.7
3083	1902	72.6	144.5	236.1	204.5	262.0	50.4	27.1	1063.5	657.7	339.5
3084	1903	154.0	248.6	258.0	216.5	159.1	173.9	12.1	1316.1	877.1	345.1
3085	1904	107.8	120.2	117.7	116.8	240.9	0.0	10.7	860.1	462.5	251.6
3086	1905	84.4	64.6	210.8	170.2	66.0	7.4	0.0	795.0	530.0	73.4
...
3192	2011	86.8	196.0	215.8	129.7	74.6	4.9	5.0	861.8	628.3	84.5
3193	2012	95.4	221.9	221.2	246.5	140.0	289.7	0.0	1318.3	785.0	429.7
3194	2013	127.5	162.4	123.1	132.0	411.5	53.1	2.8	1120.4	545.0	467.4
3195	2014	45.7	151.8	177.8	144.5	195.6	23.7	6.4	875.1	519.8	225.7
3196	2015	283.8	116.0	192.0	201.8	59.7	81.2	2.0	1011.0	793.6	142.9

115 rows × 11 columns

In [145]: data7=data6.drop(['JUN', 'JUL', 'AUG', 'SEP', 'OCT', 'NOV', 'DEC'],axis=1)

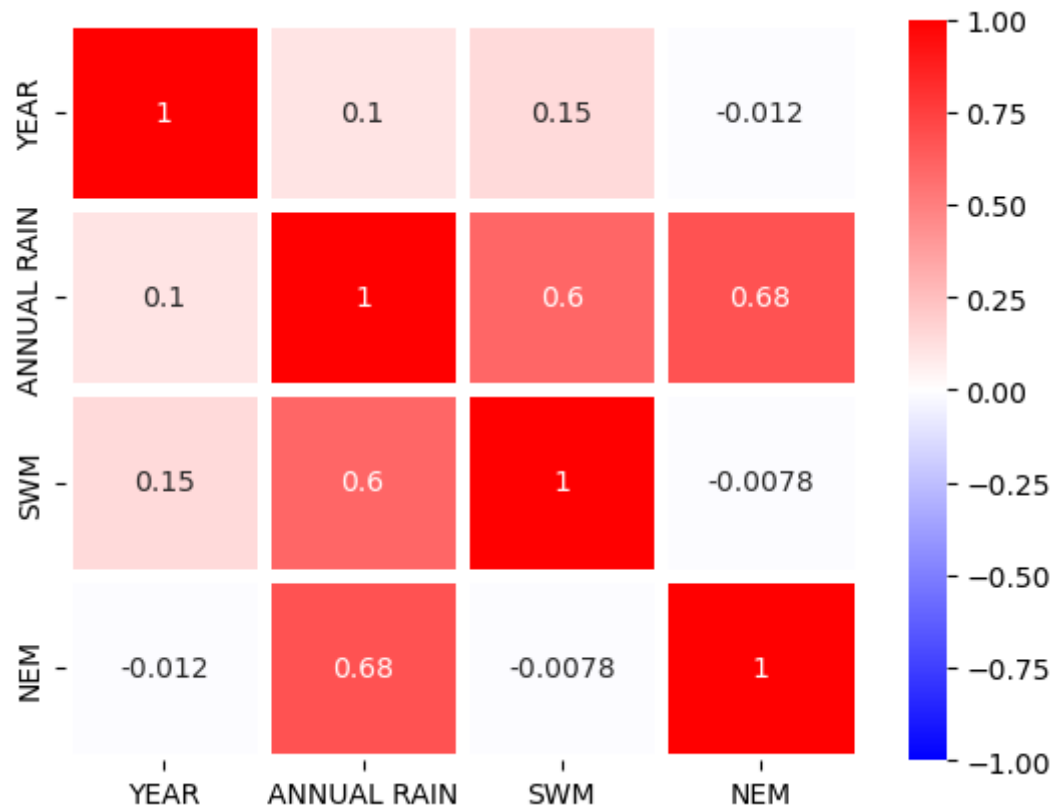
In [146]: cor=data7.corr()
cor

Out[146]:

	YEAR	ANNUAL RAIN	SWM	NEM
YEAR	1.000000	0.102054	0.146870	-0.011896
ANNUAL RAIN	0.102054	1.000000	0.596706	0.677796
SWM	0.146870	0.596706	1.000000	-0.007822
NEM	-0.011896	0.677796	-0.007822	1.000000

```
In [147]: import seaborn as hh  
hh.heatmap(cor,vmax=1,vmin=-1,annot=True,linewidth=5,cmap='bwr')
```

Out[147]: <Axes: >



In []:

