In [156]:
```
import pandas as pd
import warnings
warnings.filterwarnings('ignore')
data=pd.read_csv("/home/placement/Downloads/rainfall in india 1901-2015.csv")#read the data
```

In [157]:
```
data
```

Out[157]:

	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
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
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	1533.7	7.9	196.2	1013.0	3
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	1405.5	19.3	99.6	1119.5	1
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	1426.3	60.6	131.1	1057.0	1
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	1395.0	69.3	76.7	958.5	2
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	1642.9	2.7	223.9	860.9	5

4116 rows × 19 columns

In [158]:
```
data.describe()
```

Out[158]:

	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.(
mean	1958.218659	18.957320	21.805325	27.359197	43.127432	85.745417	230.234444	347.214334	290.263497	197.361922	95.5
std	33.140898	33.585371	35.909488	46.959424	67.831168	123.234904	234.710758	269.539667	188.770477	135.408345	99.5
min	1901.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.400000	0.000000	0.000000	0.100000	0.(
25%	1930.000000	0.600000	0.600000	1.000000	3.000000	8.600000	70.350000	175.600000	155.975000	100.525000	14.(
50%	1958.000000	6.000000	6.700000	7.800000	15.700000	36.600000	138.700000	284.800000	259.400000	173.900000	65.2
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	948.3

loc()

In [159]:
```
data1=data.loc[(data.SUBDIVISION=='COASTAL ANDHRA PRADESH')]
```

In [160]:
```
data1
```

Out[160]:

	SUBDIVISION	YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	Jan-Feb	Mar-May	Jun-Sep	Oct-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	993.8	99.7	104.6	449.7	339.8
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	1063.6	2.0	64.4	657.7	339.5
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	1316.2	14.2	79.8	877.1	345.1
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	860.2	1.3	144.7	462.6	251.6
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	795.2	17.8	173.8	530.1	73.4
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
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	861.9	17.9	131.2	628.4	84.4
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	1318.4	37.6	66.1	785.0	429.7
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	1120.5	31.7	76.4	545.0	467.4
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	874.9	1.5	128.0	519.7	225.7
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	1010.9	2.5	71.9	793.6	142.8

115 rows × 19 columns

groupby()

In [161]:
```
data2=data.groupby(['SUBDIVISION']).count()
```

In [162]:
```
data2
```

Out[162]:

SUBDIVISION	YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	Jan-Feb	Mar-May	Jun-Sep	Oct-Dec
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

SUBDIVISION	YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	Jan-Feb	Mar-May	Jun-Sep	Oct-Dec
NAGA MANI MIZO TRIPURA	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115
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	114	114	115	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 [163]:
```
data['SUBDIVISION'].count()
```

Out[163]: 4116

In [164]:
```
data.isna().sum()
```

Out[164]:
```
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 [165]:
```
data3=data.loc[(data.YEAR<=2015)]
```

In [166]:
```
data3.tail(10)
```

Out[166]:

	SUBDIVISION	YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	Jan-Feb	Mar-May	Jun-Sep	Oc De
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	288.
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	413.
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	450.
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	385.
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	438.
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	1533.7	7.9	196.2	1013.0	316.
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	1405.5	19.3	99.6	1119.5	167.
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	1426.3	60.6	131.1	1057.0	177.
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	1395.0	69.3	76.7	958.5	290.
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	1642.9	2.7	223.9	860.9	555.

In [167]:
```
data4=data3.drop(columns=["ANNUAL","Jan-Feb","Mar-May","Jun-Sep","Oct-Dec"])
```

In [168]:
```
data4
```

Out[168]:

	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 [169]:
```
data3.columns
```

Out[169]:
```
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')
```

In [170]:
```
data["SUBDIVISION"].unique()
```

Out[170]:
```
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 [171]:
```
data5=data4.loc[(data.SUBDIVISION=='JAMMU & KASHMIR')]
```

In [172]:
```
data5
```

Out[172]:

	SUBDIVISION	YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1702	JAMMU & KASHMIR	1901	66.4	69.3	69.6	132.2	105.8	53.4	171.7	181.3	101.8	24.1	0.0	4.4
1703	JAMMU & KASHMIR	1902	6.5	9.7	91.3	100.5	70.7	113.3	108.4	136.9	62.2	15.1	44.0	1.8
1704	JAMMU & KASHMIR	1903	96.2	21.5	238.6	58.7	57.3	18.9	332.5	218.6	176.9	10.7	15.0	41.8
1705	JAMMU & KASHMIR	1904	110.6	17.3	145.2	64.5	67.8	25.9	182.3	132.2	62.3	50.0	24.8	99.2
1706	JAMMU & KASHMIR	1905	146.7	76.3	161.4	71.7	65.2	43.3	145.2	111.5	239.7	5.8	0.6	90.2
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1812	JAMMU & KASHMIR	2011	43.4	211.6	97.8	89.0	32.4	72.5	81.6	131.2	72.0	19.4	12.9	23.8
1813	JAMMU & KASHMIR	2012	150.9	95.8	45.2	86.6	48.9	32.6	118.8	264.9	106.7	15.7	10.8	57.8
1814	JAMMU & KASHMIR	2013	52.2	136.4	41.9	47.4	47.4	80.5	125.1	219.1	41.2	34.4	13.4	20.3
1815	JAMMU & KASHMIR	2014	75.8	64.0	153.1	76.1	52.7	25.3	100.5	134.6	362.8	32.2	14.1	2.3
1816	JAMMU & KASHMIR	2015	27.9	187.2	341.4	173.3	64.6	121.4	233.2	129.2	130.2	87.1	38.1	39.3

115 rows × 14 columns

In [173]:
```
data5.isna().sum()
```

Out[173]:
```
SUBDIVISION    0
YEAR           0
JAN            0
FEB            0
MAR            0
APR            0
MAY            0
JUN            0
JUL            1
AUG            0
SEP            0
OCT            0
NOV            1
DEC            1
dtype: int64
```

In [174]:
```
data6=data5.fillna(data.mean())
```

In [175]:
```
data6.isna().sum()
```

Out[175]:
```
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 [176]:
```
data6
```

Out[176]:

	SUBDIVISION	YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1702	JAMMU & KASHMIR	1901	66.4	69.3	69.6	132.2	105.8	53.4	171.7	181.3	101.8	24.1	0.0	4.4
1703	JAMMU & KASHMIR	1902	6.5	9.7	91.3	100.5	70.7	113.3	108.4	136.9	62.2	15.1	44.0	1.8
1704	JAMMU & KASHMIR	1903	96.2	21.5	238.6	58.7	57.3	18.9	332.5	218.6	176.9	10.7	15.0	41.8
1705	JAMMU & KASHMIR	1904	110.6	17.3	145.2	64.5	67.8	25.9	182.3	132.2	62.3	50.0	24.8	99.2
1706	JAMMU & KASHMIR	1905	146.7	76.3	161.4	71.7	65.2	43.3	145.2	111.5	239.7	5.8	0.6	90.2
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1812	JAMMU & KASHMIR	2011	43.4	211.6	97.8	89.0	32.4	72.5	81.6	131.2	72.0	19.4	12.9	23.8
1813	JAMMU & KASHMIR	2012	150.9	95.8	45.2	86.6	48.9	32.6	118.8	264.9	106.7	15.7	10.8	57.8
1814	JAMMU & KASHMIR	2013	52.2	136.4	41.9	47.4	47.4	80.5	125.1	219.1	41.2	34.4	13.4	20.3
1815	JAMMU & KASHMIR	2014	75.8	64.0	153.1	76.1	52.7	25.3	100.5	134.6	362.8	32.2	14.1	2.3
1816	JAMMU & KASHMIR	2015	27.9	187.2	341.4	173.3	64.6	121.4	233.2	129.2	130.2	87.1	38.1	39.3

115 rows × 14 columns

Adding columns using lambda function

In [177]:
```
data6["ANNUAL_RAIN"]=data6.apply(lambda R:R.JAN+R.FEB+R.MAR+R.APR+R.MAY+R.JUN+R.JUL+R.AUG+R.SEP+R.OCT+R.NOV+
```

In [178]:
```
data6
```

Out[178]:

	SUBDIVISION	YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL_RAIN
1702	JAMMU & KASHMIR	1901	66.4	69.3	69.6	132.2	105.8	53.4	171.7	181.3	101.8	24.1	0.0	4.4	980.0
1703	JAMMU & KASHMIR	1902	6.5	9.7	91.3	100.5	70.7	113.3	108.4	136.9	62.2	15.1	44.0	1.8	760.4
1704	JAMMU & KASHMIR	1903	96.2	21.5	238.6	58.7	57.3	18.9	332.5	218.6	176.9	10.7	15.0	41.8	1286.7
1705	JAMMU & KASHMIR	1904	110.6	17.3	145.2	64.5	67.8	25.9	182.3	132.2	62.3	50.0	24.8	99.2	982.1
1706	JAMMU & KASHMIR	1905	146.7	76.3	161.4	71.7	65.2	43.3	145.2	111.5	239.7	5.8	0.6	90.2	1157.6
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1812	JAMMU & KASHMIR	2011	43.4	211.6	97.8	89.0	32.4	72.5	81.6	131.2	72.0	19.4	12.9	23.8	887.6
1813	JAMMU & KASHMIR	2012	150.9	95.8	45.2	86.6	48.9	32.6	118.8	264.9	106.7	15.7	10.8	57.8	1034.7
1814	JAMMU & KASHMIR	2013	52.2	136.4	41.9	47.4	47.4	80.5	125.1	219.1	41.2	34.4	13.4	20.3	859.3
1815	JAMMU & KASHMIR	2014	75.8	64.0	153.1	76.1	52.7	25.3	100.5	134.6	362.8	32.2	14.1	2.3	1093.5
1816	JAMMU & KASHMIR	2015	27.9	187.2	341.4	173.3	64.6	121.4	233.2	129.2	130.2	87.1	38.1	39.3	1572.9

115 rows × 15 columns

In [179]:
```
data6['total']=data6['JAN']+data6['FEB']+data6['MAR']+data6['APR']+data6['MAY']+data6['JUN']+data6['JUL']+da
data6
```

Out[179]:

	SUBDIVISION	YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL_RAIN	total
1702	JAMMU & KASHMIR	1901	66.4	69.3	69.6	132.2	105.8	53.4	171.7	181.3	101.8	24.1	0.0	4.4	980.0	980.0
1703	JAMMU & KASHMIR	1902	6.5	9.7	91.3	100.5	70.7	113.3	108.4	136.9	62.2	15.1	44.0	1.8	760.4	760.4
1704	JAMMU & KASHMIR	1903	96.2	21.5	238.6	58.7	57.3	18.9	332.5	218.6	176.9	10.7	15.0	41.8	1286.7	1286.7
1705	JAMMU & KASHMIR	1904	110.6	17.3	145.2	64.5	67.8	25.9	182.3	132.2	62.3	50.0	24.8	99.2	982.1	982.1
1706	JAMMU & KASHMIR	1905	146.7	76.3	161.4	71.7	65.2	43.3	145.2	111.5	239.7	5.8	0.6	90.2	1157.6	1157.6
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1812	JAMMU & KASHMIR	2011	43.4	211.6	97.8	89.0	32.4	72.5	81.6	131.2	72.0	19.4	12.9	23.8	887.6	887.6
1813	JAMMU & KASHMIR	2012	150.9	95.8	45.2	86.6	48.9	32.6	118.8	264.9	106.7	15.7	10.8	57.8	1034.7	1034.7
1814	JAMMU & KASHMIR	2013	52.2	136.4	41.9	47.4	47.4	80.5	125.1	219.1	41.2	34.4	13.4	20.3	859.3	859.3
1815	JAMMU & KASHMIR	2014	75.8	64.0	153.1	76.1	52.7	25.3	100.5	134.6	362.8	32.2	14.1	2.3	1093.5	1093.5
1816	JAMMU & KASHMIR	2015	27.9	187.2	341.4	173.3	64.6	121.4	233.2	129.2	130.2	87.1	38.1	39.3	1572.9	1572.9

115 rows × 16 columns

In [180]:
```
data6
```

Out[180]:

	SUBDIVISION	YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL_RAIN	total
1702	JAMMU & KASHMIR	1901	66.4	69.3	69.6	132.2	105.8	53.4	171.7	181.3	101.8	24.1	0.0	4.4	980.0	980.0
1703	JAMMU & KASHMIR	1902	6.5	9.7	91.3	100.5	70.7	113.3	108.4	136.9	62.2	15.1	44.0	1.8	760.4	760.4
1704	JAMMU & KASHMIR	1903	96.2	21.5	238.6	58.7	57.3	18.9	332.5	218.6	176.9	10.7	15.0	41.8	1286.7	1286.7
1705	JAMMU & KASHMIR	1904	110.6	17.3	145.2	64.5	67.8	25.9	182.3	132.2	62.3	50.0	24.8	99.2	982.1	982.1
1706	JAMMU & KASHMIR	1905	146.7	76.3	161.4	71.7	65.2	43.3	145.2	111.5	239.7	5.8	0.6	90.2	1157.6	1157.6
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1812	JAMMU & KASHMIR	2011	43.4	211.6	97.8	89.0	32.4	72.5	81.6	131.2	72.0	19.4	12.9	23.8	887.6	887.6
1813	JAMMU & KASHMIR	2012	150.9	95.8	45.2	86.6	48.9	32.6	118.8	264.9	106.7	15.7	10.8	57.8	1034.7	1034.7
1814	JAMMU & KASHMIR	2013	52.2	136.4	41.9	47.4	47.4	80.5	125.1	219.1	41.2	34.4	13.4	20.3	859.3	859.3
1815	JAMMU & KASHMIR	2014	75.8	64.0	153.1	76.1	52.7	25.3	100.5	134.6	362.8	32.2	14.1	2.3	1093.5	1093.5
1816	JAMMU & KASHMIR	2015	27.9	187.2	341.4	173.3	64.6	121.4	233.2	129.2	130.2	87.1	38.1	39.3	1572.9	1572.9

115 rows × 16 columns

In [181]:
```
data6=data6.drop(columns='total')
```

In [182]:
```
data6
```

Out[182]:

	SUBDIVISION	YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL_RAIN
1702	JAMMU & KASHMIR	1901	66.4	69.3	69.6	132.2	105.8	53.4	171.7	181.3	101.8	24.1	0.0	4.4	980.0
1703	JAMMU & KASHMIR	1902	6.5	9.7	91.3	100.5	70.7	113.3	108.4	136.9	62.2	15.1	44.0	1.8	760.4
1704	JAMMU & KASHMIR	1903	96.2	21.5	238.6	58.7	57.3	18.9	332.5	218.6	176.9	10.7	15.0	41.8	1286.7
1705	JAMMU & KASHMIR	1904	110.6	17.3	145.2	64.5	67.8	25.9	182.3	132.2	62.3	50.0	24.8	99.2	982.1
1706	JAMMU & KASHMIR	1905	146.7	76.3	161.4	71.7	65.2	43.3	145.2	111.5	239.7	5.8	0.6	90.2	1157.6
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1812	JAMMU & KASHMIR	2011	43.4	211.6	97.8	89.0	32.4	72.5	81.6	131.2	72.0	19.4	12.9	23.8	887.6
1813	JAMMU & KASHMIR	2012	150.9	95.8	45.2	86.6	48.9	32.6	118.8	264.9	106.7	15.7	10.8	57.8	1034.7
1814	JAMMU & KASHMIR	2013	52.2	136.4	41.9	47.4	47.4	80.5	125.1	219.1	41.2	34.4	13.4	20.3	859.3
1815	JAMMU & KASHMIR	2014	75.8	64.0	153.1	76.1	52.7	25.3	100.5	134.6	362.8	32.2	14.1	2.3	1093.5
1816	JAMMU & KASHMIR	2015	27.9	187.2	341.4	173.3	64.6	121.4	233.2	129.2	130.2	87.1	38.1	39.3	1572.9

115 rows × 15 columns

In [183]:
```
data7=data6.drop(columns='SUBDIVISION')
```

In [184]:
```
data7
```

Out[184]:

	YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL_RAIN
1702	1901	66.4	69.3	69.6	132.2	105.8	53.4	171.7	181.3	101.8	24.1	0.0	4.4	980.0
1703	1902	6.5	9.7	91.3	100.5	70.7	113.3	108.4	136.9	62.2	15.1	44.0	1.8	760.4
1704	1903	96.2	21.5	238.6	58.7	57.3	18.9	332.5	218.6	176.9	10.7	15.0	41.8	1286.7
1705	1904	110.6	17.3	145.2	64.5	67.8	25.9	182.3	132.2	62.3	50.0	24.8	99.2	982.1
1706	1905	146.7	76.3	161.4	71.7	65.2	43.3	145.2	111.5	239.7	5.8	0.6	90.2	1157.6
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1812	2011	43.4	211.6	97.8	89.0	32.4	72.5	81.6	131.2	72.0	19.4	12.9	23.8	887.6
1813	2012	150.9	95.8	45.2	86.6	48.9	32.6	118.8	264.9	106.7	15.7	10.8	57.8	1034.7
1814	2013	52.2	136.4	41.9	47.4	47.4	80.5	125.1	219.1	41.2	34.4	13.4	20.3	859.3
1815	2014	75.8	64.0	153.1	76.1	52.7	25.3	100.5	134.6	362.8	32.2	14.1	2.3	1093.5
1816	2015	27.9	187.2	341.4	173.3	64.6	121.4	233.2	129.2	130.2	87.1	38.1	39.3	1572.9

115 rows × 14 columns

creating new columns

In [185]:
```
data7['SWM']=data7['JUN']+data7['JUL']+data7['AUG']+data7['SEP']
data7['NEM']=data7['OCT']+data7['NOV']+data7['DEC']
```

In [186]:
```
data7
```

Out[186]:

	YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL_RAIN	SWM	NEM
1702	1901	66.4	69.3	69.6	132.2	105.8	53.4	171.7	181.3	101.8	24.1	0.0	4.4	980.0	508.2	28.5
1703	1902	6.5	9.7	91.3	100.5	70.7	113.3	108.4	136.9	62.2	15.1	44.0	1.8	760.4	420.8	60.9
1704	1903	96.2	21.5	238.6	58.7	57.3	18.9	332.5	218.6	176.9	10.7	15.0	41.8	1286.7	746.9	67.5
1705	1904	110.6	17.3	145.2	64.5	67.8	25.9	182.3	132.2	62.3	50.0	24.8	99.2	982.1	402.7	174.0
1706	1905	146.7	76.3	161.4	71.7	65.2	43.3	145.2	111.5	239.7	5.8	0.6	90.2	1157.6	539.7	96.6
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1812	2011	43.4	211.6	97.8	89.0	32.4	72.5	81.6	131.2	72.0	19.4	12.9	23.8	887.6	357.3	56.1
1813	2012	150.9	95.8	45.2	86.6	48.9	32.6	118.8	264.9	106.7	15.7	10.8	57.8	1034.7	523.0	84.3
1814	2013	52.2	136.4	41.9	47.4	47.4	80.5	125.1	219.1	41.2	34.4	13.4	20.3	859.3	465.9	68.1
1815	2014	75.8	64.0	153.1	76.1	52.7	25.3	100.5	134.6	362.8	32.2	14.1	2.3	1093.5	623.2	48.6
1816	2015	27.9	187.2	341.4	173.3	64.6	121.4	233.2	129.2	130.2	87.1	38.1	39.3	1572.9	614.0	164.5

115 rows × 16 columns

Drop the unwanted columns

In [187]:
```
data8=data7.drop(columns=['JAN','FEB','MAR','APR','MAY','JUN','JUL','AUG','SEP','OCT','NOV','DEC'])
```

In [188]:
```
data8
```

Out[188]:

	YEAR	ANNUAL_RAIN	SWM	NEM
1702	1901	980.0	508.2	28.5
1703	1902	760.4	420.8	60.9
1704	1903	1286.7	746.9	67.5
1705	1904	982.1	402.7	174.0
1706	1905	1157.6	539.7	96.6
...	...	...	...	...
1812	2011	887.6	357.3	56.1
1813	2012	1034.7	523.0	84.3
1814	2013	859.3	465.9	68.1
1815	2014	1093.5	623.2	48.6
1816	2015	1572.9	614.0	164.5

115 rows × 4 columns

correlation and Heatmap

In [189]:
```
cor=data8.corr()
```

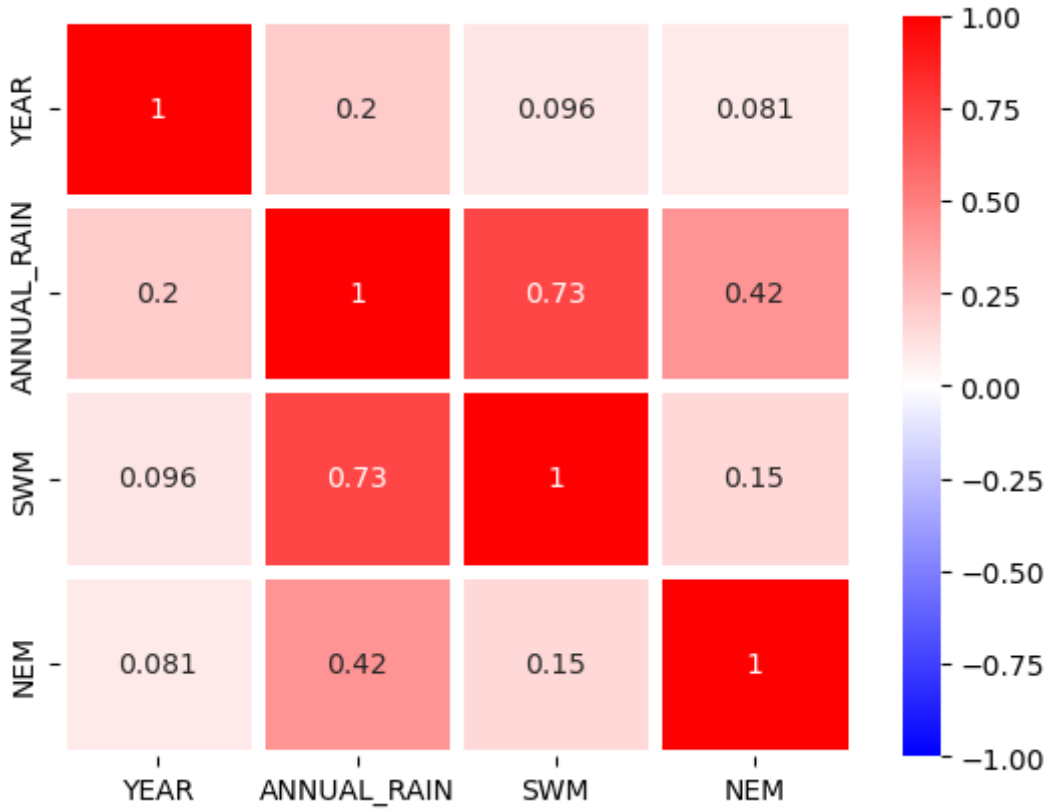
In [190]:
```
cor
```

Out[190]:

	YEAR	ANNUAL_RAIN	SWM	NEM
YEAR	1.000000	0.199310	0.096365	0.081159
ANNUAL_RAIN	0.199310	1.000000	0.725153	0.420021
SWM	0.096365	0.725153	1.000000	0.151091
NEM	0.081159	0.420021	0.151091	1.000000

In [191]:
```
import seaborn as sns
sns.heatmap(cor,vmax=1,vmin=-1,annot=True,linewidth=5,cmap='bwr')
```

Out[191]: <Axes: >



In [ ]: