

```
In [243]: import pandas as pd
import numpy as np
```

```
In [244]: data=pd.read_csv('/home/placement/Desktop/rainfall.csv')
```

```
In [245]: data
```

```
Out[245]:
```

| | SUBDIVISION | YEAR | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | ANNUAL | Jan-Feb | Mar-May | Jun-Sep | C |
|------|---------------------------|------|------|-------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|---------|---------|---------|-----|
| 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 | 98 |
| 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 | 71 |
| 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 | 69 |
| 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 | 57 |
| 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 | 63 |
| ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 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 | 31 |
| 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 | 16 |
| 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 | 17 |
| 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 | 29 |
| 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 | 55 |

4116 rows × 19 columns



In [246]: `data.describe()`

Out[246]:

| | 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 |
| std | 33.140898 | 33.585371 | 35.909488 | 46.959424 | 67.831168 | 123.234904 | 234.710758 | 269.539667 | 188.770477 | 135.408345 | 99 |
| 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 |
| 75% | 1987.000000 | 22.200000 | 26.800000 | 31.300000 | 49.950000 | 97.200000 | 305.150000 | 418.400000 | 377.800000 | 265.800000 | 148 |
| max | 2015.000000 | 583.700000 | 403.500000 | 605.600000 | 595.100000 | 1168.600000 | 1609.900000 | 2362.800000 | 1664.600000 | 1222.000000 | 948 |

groupby()

In [247]: `data1=data.groupby(['SUBDIVISION']).count()`

In [248]:

```
data1
```

Out[248]:

| | 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 |

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

isna()

```
In [249]: data.isna().sum()
```

```
Out[249]: 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
```

using loc and separating data that are <= 2010

```
In [250]: data3=data.loc[(data.YEAR<=2015)]
```

In [251]: data3

Out[251]:

| | SUBDIVISION | YEAR | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | ANNUAL | Jan-Feb | Mar-May | Jun-Sep | Oct-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 | 3373.2 | 136.3 | 560.3 | 1696.3 | 98.1 |
| 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 | 71.0 |
| 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 | 69.2 |
| 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 | 57.8 |
| 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 | 63.1 |
| ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 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 | 31.1 |
| 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 | 16.1 |
| 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 | 17.1 |
| 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 | 29.1 |
| 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 | 55.1 |

4116 rows × 19 columns



removing the unwanted columns from the data

In [252]: data4=data3.drop(columns=['ANNUAL', 'Jan-Feb', 'Mar-May', 'Jun-Sep', 'Oct-Dec'])

In [253]: data4

Out[253]:

| | 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 [254]: data3.columns

```
Out[254]: 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 [255]: data['SUBDIVISION'].unique()
```

```
Out[255]: 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)
```

using loc function and seperating the arunachal pradesh from the data

```
In [256]: data5=data4.loc[(data.SUBDIVISION=='COASTAL ANDHRA PRADESH')]
```

In [257]: data5

Out[257]:

| | 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 [258]: data5.isna().sum()

```
Out[258]: 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
```

fillna()

median

In [259]: `data6=data5.fillna(data.median())`

/tmp/ipykernel_8462/1028230497.py:1: FutureWarning: The default value of numeric_only in DataFrame.median is deprecated. In a future version, it will default to False. In addition, specifying 'numeric_only=None' is deprecated. Select only valid columns or specify the value of numeric_only to silence this warning.
`data6=data5.fillna(data.median())`

In [260]: `data6`

Out[260]:

| | 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

fillna- mean

In [261]: `data7=data5.fillna(data.mean())`

/tmp/ipykernel_8462/2103754088.py:1: FutureWarning: The default value of numeric_only in DataFrame.mean is deprecated. In a future version, it will default to False. In addition, specifying 'numeric_only=None' is deprecated. Select only valid columns or specify the value of numeric_only to silence this warning.
`data7=data5.fillna(data.mean())`

In [262]: `data7`

Out[262]:

| | 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 [263]: `data8=data5.fillna(data.mode()) # mode not possible`

In [264]: data8

Out[264]:

| | 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 [265]: data8.isna().sum()

```
Out[265]: 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 [266]: data6.isna().sum()
```

```
Out[266]: 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 [267]: data7.isna().sum()
```

```
Out[267]: 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 [268]: data6

Out[268]:

| | 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 [269]: `cor=data6.corr()
cor`

/tmp/ipykernel_8462/806258792.py:1: FutureWarning: The default value of numeric_only in DataFrame.corr is deprecated. In a future version, it will default to False. Select only valid columns or specify the value of numeric_only to silence this warning.

`cor=data6.corr()`

Out[269]:

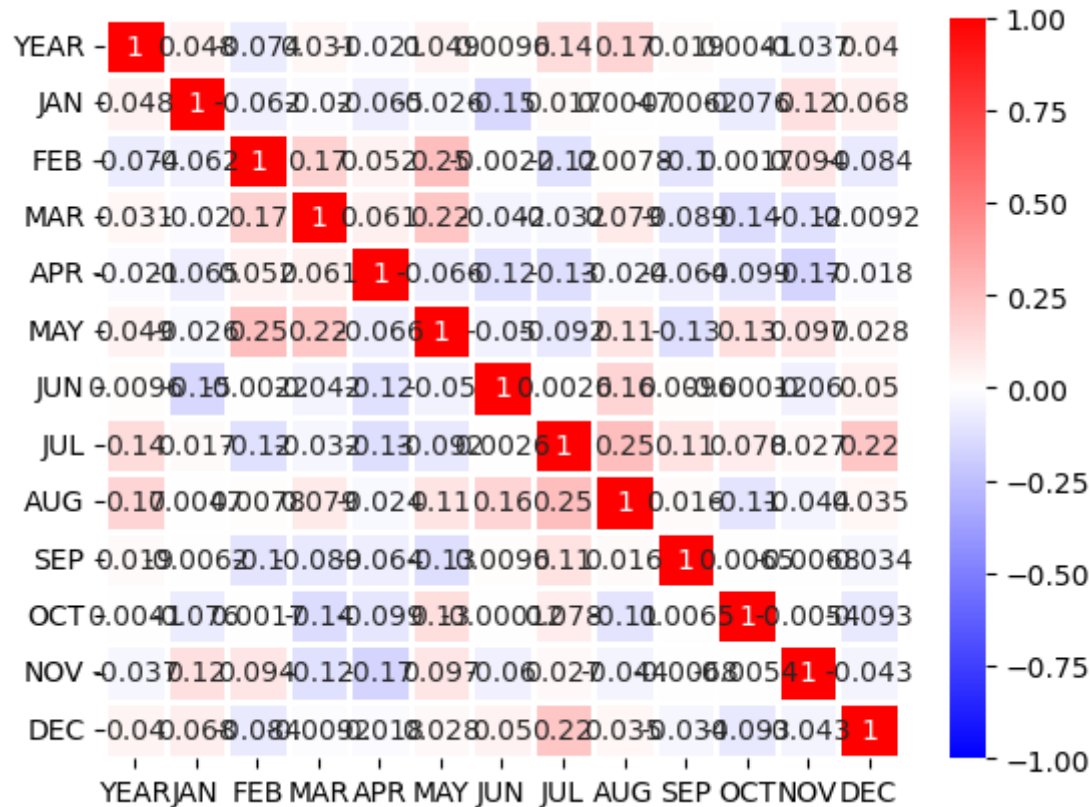
| | YEAR | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC |
|------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| YEAR | 1.000000 | 0.048132 | -0.073781 | 0.031480 | -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 |

getting heatmap from the correlation data

In [270]: `import seaborn as sns`


```
In [271]: sns.heatmap(cor, vmax=1, vmin=-1, annot=True, linewidth=1, cmap='bwr')
```

```
Out[271]: <Axes: >
```



```
In [272]: data10=data6.loc[(data.SUBDIVISION=='COASTAL ANDHRA PRADESH')] ##extracting data only of andhra pradesh
```

creating new column and adding the data using the lambda function

```
In [273]: data10['ANNUAL_RAIN']=data6.apply(lambda row:row.JAN+row.FEB+row.MAR+row.APR+row.MAY+row.JUN+row.JUL+row.AUG+row.SEP+row.OCT+row.NOV+row.DEC,axis=1)
```

In [274]: data10

Out[274]:

| | 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 []:

creating new column swmonsoon by adding some months

In [275]: data10['SWMONSOON']=data6.apply(lambda row:row.JUN+row.JUL+row.AUG+row.SEP,axis=1)

In [276]: data10

Out[276]:

| | SUBDIVISION | YEAR | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | ANNUAL_RAIN | SWMONSOON |
|------|------------------------|------|------|------|------|------|-------|-------|-------|-------|-------|-------|-------|------|-------------|-----------|
| 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 | 449.7 |
| 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 | 657.7 |
| 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 | 877.1 |
| 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 | 462.5 |
| 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 | 530.0 |
| ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 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 | 628.3 |
| 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 | 785.0 |
| 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 | 1120.4 | 545.0 |
| 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 | 519.8 |
| 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 | 793.6 |

115 rows × 16 columns

creating new column nwmonsoon by adding some months

In [277]: data10['NWMONSOON']=data6.apply(lambda row:row.OCT+row.NOV+row.DEC ,axis=1)

In [278]: data10

Out[278]:

| | SUBDIVISION | YEAR | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | ANNUAL_RAIN | SWMONSOON | NWMO |
|------|------------------------------|------|------|------|------|------|-------|-------|-------|-------|-------|-------|-------|------|-------------|-----------|------|
| 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 | 449.7 | |
| 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 | 657.7 | |
| 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 | 877.1 | |
| 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 | 462.5 | |
| 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 | 530.0 | |
| ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 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 | 628.3 | |
| 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 | 785.0 | |
| 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 | 1120.4 | 545.0 | |
| 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 | 519.8 | |
| 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 | 793.6 | |

115 rows × 17 columns



dropping the unwanted columns

In [279]: `data9=data10.drop(columns=['JAN', 'FEB', 'MAR', 'APR', 'MAY', 'JUN', 'JUL', 'AUG', 'SEP', 'OCT', 'NOV', 'DEC'])`

In [280]: `data9`

Out[280]:

| | SUBDIVISION | YEAR | ANNUAL_RAIN | SWMONSOON | NWMONSOON |
|------|------------------------|------|-------------|-----------|-----------|
| 3082 | COASTAL ANDHRA PRADESH | 1901 | 993.7 | 449.7 | 339.7 |
| 3083 | COASTAL ANDHRA PRADESH | 1902 | 1063.5 | 657.7 | 339.5 |
| 3084 | COASTAL ANDHRA PRADESH | 1903 | 1316.1 | 877.1 | 345.1 |
| 3085 | COASTAL ANDHRA PRADESH | 1904 | 860.1 | 462.5 | 251.6 |
| 3086 | COASTAL ANDHRA PRADESH | 1905 | 795.0 | 530.0 | 73.4 |
| ... | ... | ... | ... | ... | ... |
| 3192 | COASTAL ANDHRA PRADESH | 2011 | 861.8 | 628.3 | 84.5 |
| 3193 | COASTAL ANDHRA PRADESH | 2012 | 1318.3 | 785.0 | 429.7 |
| 3194 | COASTAL ANDHRA PRADESH | 2013 | 1120.4 | 545.0 | 467.4 |
| 3195 | COASTAL ANDHRA PRADESH | 2014 | 875.1 | 519.8 | 225.7 |
| 3196 | COASTAL ANDHRA PRADESH | 2015 | 1011.0 | 793.6 | 142.9 |

115 rows × 5 columns

calculating correlation

```
In [281]: corr=data9.corr()  
corr
```

/tmp/ipykernel_8462/107006413.py:1: FutureWarning: The default value of numeric_only in DataFrame.corr is deprecated. In a future version, it will default to False. Select only valid columns or specify the value of numeric_only to silence this warning.

```
corr=data9.corr()
```

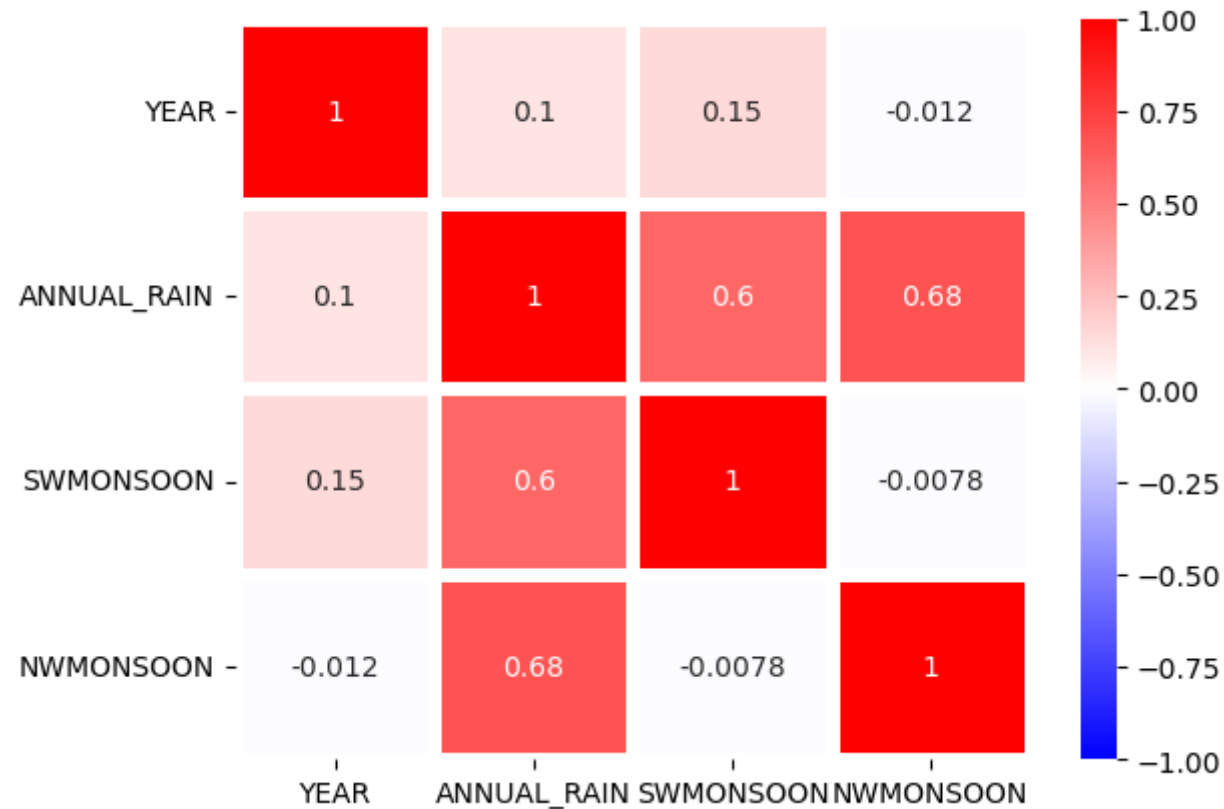
Out[281]:

| | YEAR | ANNUAL_RAIN | SWMONSOON | NWMONSOON |
|-------------|-----------|-------------|-----------|-----------|
| YEAR | 1.000000 | 0.102054 | 0.146870 | -0.011896 |
| ANNUAL_RAIN | 0.102054 | 1.000000 | 0.596706 | 0.677796 |
| SWMONSOON | 0.146870 | 0.596706 | 1.000000 | -0.007822 |
| NWMONSOON | -0.011896 | 0.677796 | -0.007822 | 1.000000 |

getting heatmap from the correalted data

```
In [282]: sns.heatmap(corr,vmax=1,vmin=-1,annot=True,linewidth=5,cmap='bwr')
```

```
Out[282]: <Axes: >
```



```
In [ ]:
```

