In [2]:

```
import pandas as pd
```

In [3]:

```
df = pd.read_csv("https://raw.githubusercontent.com/AP-State-Skill-Development-Corporation/
```

In [4]:

```
df.head()
```

Out[4]:

	Unnamed: 0	TV	radio	newspaper	sales
0	1	230.1	37.8	69.2	22.1
1	2	44.5	39.3	45.1	10.4
2	3	17.2	45.9	69.3	9.3
3	4	151.5	41.3	58.5	18.5
4	5	180.8	10.8	58.4	12.9

In [7]:

```
df1 = pd.read_csv('Advertising.csv', index_col = 0)
df1.head()
```

Out[7]:

	TV	radio	newspaper	sales
1	230.1	37.8	69.2	22.1
2	44.5	39.3	45.1	10.4
3	17.2	45.9	69.3	9.3
4	151.5	41.3	58.5	18.5
5	180.8	10.8	58.4	12.9

In [8]:

```
len(dir(pd))
```

Out[8]:

139

In [9]:

```
len(dir(df))
```

Out[9]:

```
454
```

In [13]:

```
df1.shape
```

Out[13]:

```
(200, 4)
```

In [12]:

```
df1.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 200 entries, 1 to 200
Data columns (total 4 columns):
TV           200 non-null float64
radio        200 non-null float64
newspaper    200 non-null float64
sales        200 non-null float64
dtypes: float64(4)
memory usage: 7.8 KB
```

In [15]:

```
df1.describe()
```

Out[15]:

	TV	radio	newspaper	sales
count	200.000000	200.000000	200.000000	200.000000
mean	147.042500	23.264000	30.554000	14.022500
std	85.854236	14.846809	21.778621	5.217457
min	0.700000	0.000000	0.300000	1.600000
25%	74.375000	9.975000	12.750000	10.375000
50%	149.750000	22.900000	25.750000	12.900000
75%	218.825000	36.525000	45.100000	17.400000
max	296.400000	49.600000	114.000000	27.000000

In [17]:

```
df1
```

Out[17]:

	TV	radio	newspaper	sales
1	230.1	37.8	69.2	22.1
2	44.5	39.3	45.1	10.4
3	17.2	45.9	69.3	9.3
4	151.5	41.3	58.5	18.5
5	180.8	10.8	58.4	12.9
6	8.7	48.9	75.0	7.2
7	57.5	32.8	23.5	11.8
8	120.2	19.6	11.6	13.2
9	8.6	2.1	1.0	4.8
10	199.8	2.6	21.2	10.6
11	66.1	5.8	24.2	8.6
12	214.7	24.0	4.0	17.4
13	23.8	35.1	65.9	9.2
14	97.5	7.6	7.2	9.7
15	204.1	32.9	46.0	19.0
16	195.4	47.7	52.9	22.4
17	67.8	36.6	114.0	12.5
18	281.4	39.6	55.8	24.4
19	69.2	20.5	18.3	11.3
20	147.3	23.9	19.1	14.6
21	218.4	27.7	53.4	18.0
22	237.4	5.1	23.5	12.5
23	13.2	15.9	49.6	5.6
24	228.3	16.9	26.2	15.5
25	62.3	12.6	18.3	9.7
26	262.9	3.5	19.5	12.0
27	142.9	29.3	12.6	15.0
28	240.1	16.7	22.9	15.9
29	248.8	27.1	22.9	18.9
30	70.6	16.0	40.8	10.5
...	...	...	...	...
171	50.0	11.6	18.4	8.4
172	164.5	20.9	47.4	14.5
173	19.6	20.1	17.0	7.6

	TV	radio	newspaper	sales
174	168.4	7.1	12.8	11.7
175	222.4	3.4	13.1	11.5
176	276.9	48.9	41.8	27.0
177	248.4	30.2	20.3	20.2
178	170.2	7.8	35.2	11.7
179	276.7	2.3	23.7	11.8
180	165.6	10.0	17.6	12.6
181	156.6	2.6	8.3	10.5
182	218.5	5.4	27.4	12.2
183	56.2	5.7	29.7	8.7
184	287.6	43.0	71.8	26.2
185	253.8	21.3	30.0	17.6
186	205.0	45.1	19.6	22.6
187	139.5	2.1	26.6	10.3
188	191.1	28.7	18.2	17.3
189	286.0	13.9	3.7	15.9
190	18.7	12.1	23.4	6.7
191	39.5	41.1	5.8	10.8
192	75.5	10.8	6.0	9.9
193	17.2	4.1	31.6	5.9
194	166.8	42.0	3.6	19.6
195	149.7	35.6	6.0	17.3
196	38.2	3.7	13.8	7.6
197	94.2	4.9	8.1	9.7
198	177.0	9.3	6.4	12.8
199	283.6	42.0	66.2	25.5
200	232.1	8.6	8.7	13.4

200 rows × 4 columns

$$Z = \frac{X_i - mean(X)}{stdev(x)}$$

In [18]:

```
mean = df1['TV'].mean()

std = df1['TV'].std()
```

In [19]:

```
mean, std
```

Out[19]:

```
(147.0425, 85.8542363149081)
```

In [21]:

```
col200 = (231.1 - mean) / std

col200
```

Out[21]:

```
0.9790722462626331
```

pip install package_name

In [ ]:

```
pip install sklearn
```

In [25]:

```
from sklearn.preprocessing import scale
```

In [28]:

```
df1.head()
```

Out[28]:

	TV	radio	newspaper	sales
1	230.1	37.8	69.2	22.1
2	44.5	39.3	45.1	10.4
3	17.2	45.9	69.3	9.3
4	151.5	41.3	58.5	18.5
5	180.8	10.8	58.4	12.9

In [27]:

```
scl = scale(df1)

print(scl)
```

```
[[ 9.69852266e-01  9.81522472e-01  1.77894547e+00  1.55205313e+00]
 [-1.19737623e+00  1.08280781e+00  6.69578760e-01 -6.96046111e-01]
 [-1.51615499e+00  1.52846331e+00  1.78354865e+00 -9.07405869e-01]
 [ 5.20496822e-02  1.21785493e+00  1.28640506e+00  8.60330287e-01]
 [ 3.94182198e-01 -8.41613655e-01  1.28180188e+00 -2.15683025e-01]
 [-1.61540845e+00  1.73103399e+00  2.04592999e+00 -1.31091086e+00]
 [-1.04557682e+00  6.43904671e-01 -3.24708413e-01 -4.27042783e-01]
 [-3.13436589e-01 -2.47406325e-01 -8.72486994e-01 -1.58039455e-01]
 [-1.61657614e+00 -1.42906863e+00 -1.36042422e+00 -1.77205942e+00]
 [ 6.16042873e-01 -1.39530685e+00 -4.30581584e-01 -6.57617064e-01]
 [-9.45155670e-01 -1.17923146e+00 -2.92486143e-01 -1.04190753e+00]
 [ 7.90028350e-01  4.96973404e-02 -1.22232878e+00  6.48970529e-01]
 [-1.43908760e+00  7.99208859e-01  1.62704048e+00 -9.26620392e-01]
 [-5.78501712e-01 -1.05768905e+00 -1.07502697e+00 -8.30547775e-01]
 [ 6.66253447e-01  6.50657027e-01  7.11007392e-01  9.56402904e-01]
 [ 5.64664612e-01  1.65000572e+00  1.02862691e+00  1.60969670e+00]
 [-9.25304978e-01  9.00494200e-01  3.84117072e+00 -2.92541119e-01]
 [ 1.56887609e+00  1.10306488e+00  1.16211917e+00  1.99398717e+00]
 [-9.08957349e-01 -1.86635121e-01 -5.64073843e-01 -5.23115400e-01]
 [ 3.00679600e-03  4.29449843e-02 -5.27248393e-01  1.10963873e-01]
 [ 8.33232798e-01  2.99534513e-01  1.05164281e+00  7.64257669e-01]
 [ 1.05509347e+00 -1.22649795e+00 -3.24708413e-01 -2.92541119e-01]
 [-1.56286250e+00 -4.97243498e-01  8.76721921e-01 -1.61834324e+00]
 [ 9.48833887e-01 -4.29719938e-01 -2.00422516e-01  2.83894584e-01]
 [-9.89527805e-01 -7.20071247e-01 -5.64073843e-01 -8.30547775e-01]
 [ 1.35285385e+00 -1.33453565e+00 -5.08835667e-01 -3.88613736e-01]
 [-4.83714657e-02  4.07572210e-01 -8.26455181e-01  1.87821967e-01]
 [ 1.08662104e+00 -4.43224650e-01 -3.52327501e-01  3.60752677e-01]
 [ 1.18820988e+00  2.59020377e-01 -3.52327501e-01  9.37188380e-01]
 [-8.92609721e-01 -4.90491142e-01  4.71641962e-01 -6.76831588e-01]
 [ 1.70316018e+00  3.40048650e-01  5.82118314e-01  1.41755147e+00]
 [-3.98677796e-01 -3.95958157e-01  3.70371972e-01 -4.07828260e-01]
 [-5.82004775e-01 -1.46958277e+00 -2.55016247e-02 -8.49762299e-01]
 [ 1.38438142e+00 -2.20396901e-01 -1.39264649e+00  6.48970529e-01]
 [-5.99520091e-01 -1.47633512e+00 -1.06582061e+00 -8.68976822e-01]
 [ 1.67747105e+00 -1.29402151e+00 -1.01518562e+00 -2.34897549e-01]
 [ 1.39956136e+00  1.38666383e+00 -1.17629696e+00  2.18613240e+00]
 [-8.44734522e-01  1.76479577e+00  6.97197848e-01  1.30178396e-01]
 [-1.21372386e+00  2.32010953e-01  2.09260624e-01 -7.53689682e-01]
 [ 9.45330823e-01  9.74770116e-01  6.65620024e-02  1.43676599e+00]
 [ 6.47570443e-01 -6.50927121e-02  4.81492770e-02  4.95254341e-01]
 [ 3.49810063e-01  6.84418807e-01  3.74975153e-01  5.91326959e-01]
 [ 1.71133400e+00  2.99534513e-01 -1.32359877e+00  1.28304980e+00]
 [ 6.98948705e-01 -1.00367020e+00 -1.91216154e-01 -2.15683025e-01]
 [-1.42390765e+00  1.64487393e-01  5.86721496e-01 -1.06112206e+00]
 [ 3.27623995e-01 -5.15880000e-02  4.35460956e-02  1.68607443e-01]
 [-6.69581357e-01 -9.02384859e-01  2.36879713e-01 -6.57617064e-01]
 [ 1.08428567e+00  1.23135965e+00 -5.54867481e-01  1.76341289e+00]
 [ 9.35989321e-01 -5.03995854e-01  8.90531465e-01  1.49392920e-01]
 [-9.35814168e-01 -7.80842451e-01  2.87514708e-01 -8.30547775e-01]
 [ 6.16042873e-01 -1.36154507e+00  1.86244718e-01 -5.03900877e-01]
 [-5.44638766e-01 -9.22641928e-01 -1.24074150e+00 -6.38402541e-01]
 [ 8.09879042e-01  1.24486436e+00  4.16403786e-01  1.64812575e+00]
 [ 4.15200577e-01  1.54872038e+00  1.29561142e+00  1.37912242e+00]
```

```
[ 1.35051848e+00  3.73810430e-01 -6.74550196e-01  1.18697718e+00]
[ 6.05533683e-01  1.76479577e+00  1.35545278e+00  1.85948550e+00]
[-1.63175608e+00  3.26543937e-01  4.99261050e-01 -1.63755776e+00]
[-1.26606546e-01 -2.74415749e-01 -6.42327927e-01 -1.58039455e-01]
[ 7.44488528e-01  1.77830048e+00  3.28943340e-01  1.87870003e+00]
[ 7.43320840e-01  4.21076922e-01 -9.78360166e-01  8.41115763e-01]
[-1.09228433e+00 -1.43582099e+00 -4.21375221e-01 -1.13798015e+00]
[ 1.33417085e+00  1.31238792e+00  1.11148417e+00  1.95555812e+00]
[ 1.07727954e+00 -5.24252922e-01 -1.49787521e-01  3.22323631e-01]
[-5.17781948e-01  4.27829278e-01 -1.01978880e+00 -4.32326777e-03]
[-1.86158622e-01  1.31914027e+00 -7.61366196e-02  7.64257669e-01]
[-9.11292725e-01 -9.42898996e-01 -1.36502740e+00 -9.07405869e-01]
[-1.34917564e+00  9.02114765e-02 -1.30518604e+00 -8.68976822e-01]
[-9.04082253e-02 -5.91776482e-01 -9.36931533e-01 -1.19610408e-01]
[ 1.05509347e+00  2.86029801e-01 -9.00106083e-01  9.37188380e-01]
[ 8.14549794e-01  1.39341619e+00 -1.54390703e-01  1.59048218e+00]
[ 6.07869059e-01  4.95352838e-01  3.74975153e-01  8.21901240e-01]
[-4.34876116e-01 -6.05281194e-01  5.27524584e-02 -3.11755643e-01]
[-1.40405696e+00  6.57409383e-01 -5.18042030e-01 -1.00347849e+00]
[-2.06009314e-01 -1.18598381e+00  3.43397329e-02 -5.80758971e-01]
[ 7.74848409e-01  9.02114765e-02 -8.03439274e-01  5.72112435e-01]
[-1.51965805e+00  1.37991148e+00  2.70878810e+00 -1.02269301e+00]
[-1.39588315e+00 -1.46283041e+00 -4.53597491e-01 -1.36855443e+00]
[-3.09933525e-01  3.53553362e-01 -7.52804279e-01  3.41057791e-02]
[-1.65394214e+00  4.48086346e-01 -9.73756984e-01 -1.67598681e+00]
[-3.62479475e-01 -1.05093669e+00 -3.43121138e-01 -5.80758971e-01]
[-8.24883830e-01  2.32010953e-01 -3.79946589e-01 -4.27042783e-01]
[ 1.08311798e+00 -1.29402151e+00  2.92117889e-01 -3.30970166e-01]
[-8.37728396e-01 -2.00139833e-01  8.95779092e-02 -5.23115400e-01]
[-9.18298852e-01  1.43393033e+00  2.32276531e-01 -8.11813615e-02]
[ 7.76016097e-01  1.33264499e+00  1.49419267e-01  1.47519504e+00]
[ 5.38975481e-01 -3.28434597e-01  1.61783412e+00  2.26251013e-01]
[-8.26051518e-01  2.86029801e-01 -6.69947015e-01 -3.88613736e-01]
[-4.24366926e-01  1.17058844e+00  1.50275459e+00  3.79967201e-01]
[-6.85928986e-01  1.50982681e-01  1.97227908e+00 -2.15683025e-01]
[-4.34876116e-01  1.65675807e+00  9.59579186e-01  5.14468865e-01]
[-1.48792614e-01 -1.24000266e+00 -9.78360166e-01 -5.42329924e-01]
[-1.38303858e+00 -1.46958277e+00  1.12593816e-01 -1.29169634e+00]
[ 8.25058983e-01  6.91171163e-01  1.30942097e+00  1.03326100e+00]
[ 1.21273132e+00  8.93741844e-01  1.92164409e+00  1.57126765e+00]
[-4.62900623e-01 -6.25538262e-01 -9.04709264e-01 -4.84686354e-01]
[ 1.89836839e-01  5.62876398e-01  1.02862691e+00  5.52897912e-01]
[ 5.90353742e-01 -1.33453565e+00 -1.13486833e+00 -4.46257307e-01]
[ 4.42057396e-01 -1.52873340e-01 -3.93756133e-01  2.83894584e-01]
[ 1.66579418e+00  1.28537849e+00  9.50372823e-01  2.18613240e+00]
[-1.38283424e-01  1.24486436e+00  7.06404211e-01  6.10541482e-01]
[ 8.79940308e-01 -1.28051680e+00  8.85928284e-01 -4.46257307e-01]
[ 1.74402926e+00  8.80237132e-01  3.23815396e+00  1.87870003e+00]
[ 1.55486384e+00 -8.88880147e-01 -4.21375221e-01  1.49392920e-01]
[ 4.77088029e-01 -4.09462869e-01 -5.82486569e-01  1.30178396e-01]
[ 1.06443498e+00  7.45190011e-01 -1.16248742e+00  1.28304980e+00]
[-1.06755854e-01  1.56222509e+00  1.30942097e+00  9.94831951e-01]
[-1.42507534e+00 -8.28108943e-01 -3.93111688e-02 -1.31091086e+00]
[-6.61407543e-01 -1.55061104e+00 -3.38517957e-01 -1.02269301e+00]
[-1.56403019e+00 -1.54385868e+00 -2.28041604e-01 -1.67598681e+00]
[ 1.26527727e+00  2.45515665e-01 -1.15328106e+00  1.11011909e+00]
[ 9.19641692e-01 -1.01717491e+00  1.19434143e+00 -1.19610408e-01]
[ 1.10530405e+00  9.95027184e-01 -3.38517957e-01  1.49440956e+00]
[ 3.34630122e-01 -5.31005278e-01 -1.29597968e+00  1.48912557e-02]
[ 7.30476274e-01 -1.79882765e-01 -9.13915627e-01  3.60752677e-01]
[-8.03865450e-01  1.58923451e+00  1.81641536e-01  1.10963873e-01]
```

```
[-8.40063771e-01  7.92456503e-01  1.01942054e+00 -2.73326596e-01]
[-9.15759131e-02 -6.05281194e-01 -2.28041604e-01 -3.50184689e-01]
[-8.24883830e-01 -1.51684926e+00 -7.25185191e-01 -8.88191346e-01]
[-2.49213762e-01  9.20751268e-01  2.23926360e+00  3.60752677e-01]
[-1.49046586e+00 -4.90491142e-01 -3.79946589e-01 -1.42619800e+00]
[-6.70544700e-02  2.38763309e-01  7.20213755e-01  2.83894584e-01]
[-1.49747198e+00 -1.05606848e-01  9.13547372e-01 -1.34933991e+00]
[ 8.98623313e-01 -1.40881156e+00 -6.88359740e-01 -4.65471830e-01]
[-2.79573643e-01  7.65447079e-01 -8.35661544e-01  2.26251013e-01]
[ 9.62846140e-01  6.10142891e-01  2.00910454e+00  1.09090457e+00]
[-6.98773552e-01 -7.74090095e-01 -2.14232060e-01 -6.57617064e-01]
[-1.62591764e+00  1.05579839e+00  9.22753735e-01 -1.42619800e+00]
[-7.80511695e-01 -1.57086811e+00 -9.82963347e-01 -1.00347849e+00]
[ 8.55418865e-01  1.73778635e+00 -1.25915423e+00  2.05163074e+00]
[-1.02105537e+00 -7.60585383e-01  5.77515133e-01 -8.30547775e-01]
[-1.70882347e+00  1.10306488e+00 -1.00597925e+00 -2.38692417e+00]
[ 1.37971067e+00 -1.37504978e+00  5.72911952e-01 -2.54112072e-01]
[-1.61891151e+00  2.65772733e-01 -1.30978922e+00 -1.59912871e+00]
[ 8.49580427e-01  6.91171163e-01  6.69578760e-01  1.07169004e+00]
[-1.28612050e+00  1.03554132e+00  1.61323094e+00 -6.19188018e-01]
[-1.15300409e+00  1.60273923e+00 -1.01518562e+00 -4.65471830e-01]
[-1.41806922e+00  1.06255074e+00 -9.78360166e-01 -8.68976822e-01]
[ 1.47896413e+00  3.80562786e-01  1.34164324e+00  1.30226433e+00]
[-1.21489154e+00  1.77992105e-01 -4.62803854e-01 -8.49762299e-01]
[ 4.42057396e-01  1.39341619e+00 -1.32820195e+00  1.28304980e+00]
[-8.59914463e-01 -4.22967582e-01 -8.12645637e-01 -5.99973494e-01]
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```

```
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 [ 6.76762637e-01  1.47444446e+00 -5.04232486e-01  1.64812575e+00]
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 [-1.25576062e+00  1.20435022e+00 -1.13947151e+00 -6.19188018e-01]
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 [-1.51615499e+00 -1.29402151e+00  4.81492770e-02 -1.56069967e+00]
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 [ 3.10313024e-02  8.32970639e-01 -1.13026515e+00  6.29756005e-01]
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 [ 9.93206022e-01 -9.90165488e-01 -1.00597925e+00 -1.19610408e-01]]
```

In [36]:

```
scl.mean(axis = 0).round(decimals=3)
```

Out[36]:

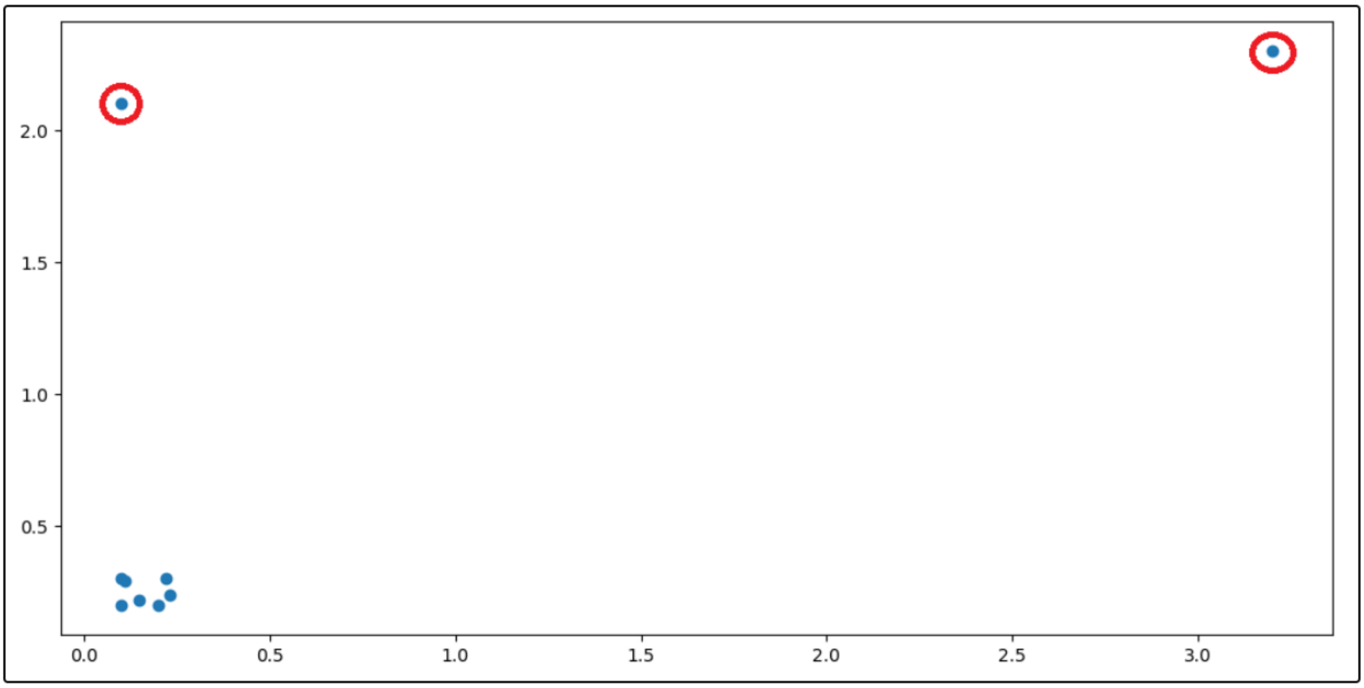
```
array([ 0., -0.,  0., -0.])
```

In [37]:

```
scl.std(axis = 0).round(decimals=3)
```

Out[37]:

```
array([1., 1., 1., 1.])
```



In [41]:

```
import numpy as np
stock1 = np.array([5, 6, 5.5, 28, 1, 5, 5.5, 6.5, 5])
stock2 = np.array([5, 6, 5.5, 5.2, 5.5, 5, 5.5, 6.5, 5])
```

In [42]:

```
stock1.mean(), stock2.mean()
```

Out[42]:

```
(7.5, 5.466666666666667)
```

In [43]:

```
np.median(stock1), np.median(stock2)
```

Out[43]:

```
(5.5, 5.5)
```

$$Z = \frac{X_i - median(X)}{stdev(x)}$$

In [44]:

```
from sklearn.preprocessing import RobustScaler
```

In [45]:

```
rsc = RobustScaler()

rsc.fit_transform(df1)
```

Out[45]:

```
array([[ 5.56247837e-01,  5.61205273e-01,  1.34312210e+00,
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       [-7.28625822e-01,  6.17702448e-01,  5.98145286e-01,
        -3.55871886e-01],
       [-9.17618553e-01,  8.66290019e-01,  1.34621329e+00,
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       [ 1.21149187e-02,  6.93032015e-01,  1.01236476e+00,
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       [ 2.14953271e-01, -4.55743879e-01,  1.00927357e+00,
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       [-6.38629283e-01,  3.72881356e-01, -6.95517774e-02,
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       [-3.61716857e-01, -5.76271186e-01, -5.73415765e-01,
        -4.55516014e-01],
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```

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```

In [48]:

```python
arr = np.array([1, 0, 500, 501])
arr2 = arr/1000

print(arr, arr2)
```

```
[  1   0 500 501] [0.001 0.    0.5   0.501]
```

$$x_P = \frac{x - d_{min}}{d_{max} - d_{min}}$$

In [53]:

```python
x = df1['TV'].iloc[0]

minmax = (x - df1['TV'].min()) / (df1['TV'].max() - df1['TV'].min())

x, minmax
```

Out[53]:

```
(230.1, 0.7757862698681096)
```

In [54]:

```python
from sklearn.preprocessing import MinMaxScaler
```

In [55]:

```
obj = MinMaxScaler()


obj.fit_transform(df1)
```

Out[55]:

```
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```

$$X_{L2} = \left[\frac{x_1}{\ell}, \frac{x_2}{\ell}, \ldots, \frac{x_m}{\ell}\right], \text{where } \ell = \sqrt{\sum_{i=1}^{m} x_i^2}$$

In [56]:

```
from sklearn.preprocessing import Normalizer
```

In [57]:

```
nor = Normalizer()


nor.fit_transform(df1)
```

Out[57]:

```
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```

In [59]:

```
sq = df1['TV'] ** 2

l = sq.sum() ** 0.5

230.1/l
```

Out[59]:

```
0.09561706240078917
```

In [61]:

```
arr = np.array([[1, 2, 3, np.nan], [2, 5, np.nan, 5],
               [2, np.nan, 2, 3]])
```

1. Mean()
2. Median()
3. most frequent value
4. constant

In [62]:

```
from sklearn.impute import SimpleImputer
```

In [63]:

```
imp = SimpleImputer(strategy='median')
```

In [64]:

```
imp.fit_transform(arr)
```

Out[64]:

```
array([[1. , 2. , 3. , 4. ],
       [2. , 5. , 2.5, 5. ],
       [2. , 3.5, 2. , 3. ]])
```

In [66]:

```
imp = SimpleImputer(strategy='mean')
imp.fit_transform(arr)
```

Out[66]:

```
array([[1. , 2. , 3. , 4. ],
       [2. , 5. , 2.5, 5. ],
       [2. , 3.5, 2. , 3. ]])
```

In [67]:

```
arr
```

Out[67]:

```
array([[ 1.,  2.,  3., nan],
       [ 2.,  5., nan,  5.],
       [ 2., nan,  2.,  3.]])
```

In [80]:

```
imp = SimpleImputer(strategy='most_frequent')
imp.fit_transform(arr)
```

Out[80]:

```
array([[1., 2., 3., 3.],
       [2., 5., 3., 5.],
       [2., 2., 2., 3.],
       [1., 2., 3., 4.]])
```

In [69]:

```
help(imp)
```

```
Help on SimpleImputer in module sklearn.impute object:

class SimpleImputer(sklearn.base.BaseEstimator, sklearn.base.TransformerMixi
n)
 |  SimpleImputer(missing_values=nan, strategy='mean', fill_value=None, verb
ose=0, copy=True)
 |
 |  Imputation transformer for completing missing values.
 |
 |  Read more in the :ref:`User Guide <impute>`.
 |
 |  Parameters
 |  ----------
 |  missing_values : number, string, np.nan (default) or None
 |      The placeholder for the missing values. All occurrences of
 |      `missing_values` will be imputed.
 |
 |  strategy : string, optional (default="mean")
 |      The imputation strategy.
 |
 |      - If "mean", then replace missing values using the mean along
 |        each column. Can only be used with numeric data.
 |      - If "median", then replace missing values using the median along
 |        each column. Can only be used with numeric data.
 |      - If "most_frequent", then replace missing using the most frequent
 |        value along each column. Can be used with strings or numeric data.
 |      - If "constant", then replace missing values with fill_value. Can be
 |        used with strings or numeric data.
 |
 |      .. versionadded:: 0.20
 |         strategy="constant" for fixed value imputation.
 |
 |  fill_value : string or numerical value, optional (default=None)
 |      When strategy == "constant", fill_value is used to replace all
 |      occurrences of missing_values.
 |      If left to the default, fill_value will be 0 when imputing numerical
 |      data and "missing_value" for strings or object data types.
 |
 |  verbose : integer, optional (default=0)
 |      Controls the verbosity of the imputer.
 |
 |  copy : boolean, optional (default=True)
 |      If True, a copy of X will be created. If False, imputation will
 |      be done in-place whenever possible. Note that, in the following case
s,
 |      a new copy will always be made, even if `copy=False`:
 |
 |      - If X is not an array of floating values;
 |      - If X is encoded as a CSR matrix.
 |
 |  Attributes
 |  ----------
 |  statistics_ : array of shape (n_features,)
 |      The imputation fill value for each feature.
 |
 |  Examples
```

```
 |  --------
 |  >>> import numpy as np
 |  >>> from sklearn.impute import SimpleImputer
 |  >>> imp_mean = SimpleImputer(missing_values=np.nan, strategy='mean')
 |  >>> imp_mean.fit([[7, 2, 3], [4, np.nan, 6], [10, 5, 9]])
 |  ... # doctest: +NORMALIZE_WHITESPACE
 |  SimpleImputer(copy=True, fill_value=None, missing_values=nan,
 |         strategy='mean', verbose=0)
 |  >>> X = [[np.nan, 2, 3], [4, np.nan, 6], [10, np.nan, 9]]
 |  >>> print(imp_mean.transform(X))
 |  ... # doctest: +NORMALIZE_WHITESPACE
 |  [[ 7.   2.   3. ]
 |   [ 4.   3.5  6. ]
 |   [10.   3.5  9. ]]
 |
 |  Notes
 |  -----
 |  Columns which only contained missing values at `fit` are discarded upon
 |  `transform` if strategy is not "constant".
 |
 |  Method resolution order:
 |      SimpleImputer
 |      sklearn.base.BaseEstimator
 |      sklearn.base.TransformerMixin
 |      builtins.object
 |
 |  Methods defined here:
 |
 |  __init__(self, missing_values=nan, strategy='mean', fill_value=None, ver
bose=0, copy=True)
 |      Initialize self.  See help(type(self)) for accurate signature.
 |
 |  fit(self, X, y=None)
 |      Fit the imputer on X.
 |
 |      Parameters
 |      ----------
 |      X : {array-like, sparse matrix}, shape (n_samples, n_features)
 |          Input data, where ``n_samples`` is the number of samples and
 |          ``n_features`` is the number of features.
 |
 |      Returns
 |      -------
 |      self : SimpleImputer
 |
 |  transform(self, X)
 |      Impute all missing values in X.
 |
 |      Parameters
 |      ----------
 |      X : {array-like, sparse matrix}, shape (n_samples, n_features)
 |          The input data to complete.
 |
 |  ----------------------------------------------------------------------
 |  Methods inherited from sklearn.base.BaseEstimator:
 |
 |  __getstate__(self)
 |
 |  __repr__(self)
 |      Return repr(self).
 |
```

```
 |  __setstate__(self, state)
 |  
 |  get_params(self, deep=True)
 |      Get parameters for this estimator.
 |      
 |      Parameters
 |      ----------
 |      deep : boolean, optional
 |          If True, will return the parameters for this estimator and
 |          contained subobjects that are estimators.
 |      
 |      Returns
 |      -------
 |      params : mapping of string to any
 |          Parameter names mapped to their values.
 |  
 |  set_params(self, **params)
 |      Set the parameters of this estimator.
 |      
 |      The method works on simple estimators as well as on nested objects
 |      (such as pipelines). The latter have parameters of the form
 |      ``<component>__<parameter>`` so that it's possible to update each
 |      component of a nested object.
 |      
 |      Returns
 |      -------
 |      self
 |  
 |  ----------------------------------------------------------------------
 |  Data descriptors inherited from sklearn.base.BaseEstimator:
 |  
 |  __dict__
 |      dictionary for instance variables (if defined)
 |  
 |  __weakref__
 |      list of weak references to the object (if defined)
 |  
 |  ----------------------------------------------------------------------
 |  Methods inherited from sklearn.base.TransformerMixin:
 |  
 |  fit_transform(self, X, y=None, **fit_params)
 |      Fit to data, then transform it.
 |      
 |      Fits transformer to X and y with optional parameters fit_params
 |      and returns a transformed version of X.
 |      
 |      Parameters
 |      ----------
 |      X : numpy array of shape [n_samples, n_features]
 |          Training set.
 |      
 |      y : numpy array of shape [n_samples]
 |          Target values.
 |      
 |      Returns
 |      -------
 |      X_new : numpy array of shape [n_samples, n_features_new]
 |          Transformed array.
```

In [70]:

```
arr
```

Out[70]:

```
array([[ 1.,  2.,  3., nan],
       [ 2.,  5., nan,  5.],
       [ 2., nan,  2.,  3.]])
```

In [74]:

```
arr = pd.DataFrame([[1, 2, 3, np.nan], [2, 5, np.nan, 5],
               [2, np.nan, 2, 3], [1,2,3,4]])
```

In [75]:

```
arr.dropna()
```

Out[75]:

	0	1	2	3
3	1	2.0	3.0	4.0

In [ ]:

```

```