Aim : Implementation of lasso regression

In [1]:
```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
from sklearn.linear_model import Lasso
from sklearn.datasets import make_regression
```

In [17]:
```
x,y = make_regression(n_samples=100,n_features=5,n_informative=3,n_targets=1,n
```

In [18]:
```
y
```

Out[18]:
```
array([ 1.78437461e+01, -3.00082902e+01,  3.79738537e+01, -9.10974090e+01,
        9.95367781e+01, -6.15253942e+00,  3.75413906e+01,  1.34990298e+02,
        8.70969658e+01,  5.74060199e+01,  1.48478707e+02,  2.10540823e+01,
        7.09457345e+01, -3.71305572e+00,  4.37209565e+01,  3.21633846e-02,
        8.59605796e+01,  2.33377233e+01, -7.14030750e+01,  4.01716768e+01,
       -1.20739623e+02,  2.40537337e+01, -4.43944432e+01,  6.98723257e+01,
        3.14735050e+00,  1.35001508e+02, -4.54404023e+01, -6.40627501e+01,
        8.90224760e+01, -1.96529900e+01, -1.06668427e+02,  1.15181299e+02,
       -1.38360013e+01, -5.39881124e+01,  1.87816069e+02,  1.06058621e+01,
        1.20654176e+02, -7.80502624e+01,  2.38098269e+02, -7.05544185e+01,
        4.57814519e+01, -6.65031657e+00,  4.92808593e+01, -2.74716257e+01,
        2.28250238e+02,  2.28329390e+01,  6.16109973e+01, -8.14933053e-01,
       -1.32840507e+02,  1.67418674e+02,  3.06611346e+01, -1.43010928e+01,
        8.54364024e+01,  2.30354603e+01, -1.54847299e+02, -1.28385311e+01,
       -3.41717468e+01, -8.22269227e+01, -2.13295462e+02, -6.57256837e+01,
        6.34711188e+01,  5.59616959e+01, -4.38574706e+01, -1.12205582e+01,
       -2.50762392e+01,  3.15131836e+01, -1.01991689e+01, -1.28103581e+02,
        1.93701126e+01,  1.56620048e+01,  9.60091014e+01,  1.22950555e+01,
       -1.28702691e+01, -1.42638230e+02,  1.82146685e+00,  1.23265900e+01,
       -5.93416171e+00,  6.90000408e+01,  1.21733759e+02,  1.79458793e+01,
       -8.18257903e+01,  2.49317352e+01,  1.25492111e+01,  6.48624878e+01,
        3.51183783e+00,  5.54201711e+01, -3.12602036e+01,  3.10755841e+00,
        6.17177712e+01, -7.17076597e+01,  3.57602632e+01,  1.71442321e+02,
        2.57441949e+01,  9.45763155e+01,  1.11134593e+02, -4.47666650e+01,
        4.10995505e+00, -9.80947025e+01,  8.19682881e+00, -8.43585967e+01])
```

In [19]:
```
l = Lasso(alpha=3)
```

In [20]:
```
l.fit(x,y)
```

Out[20]:
```
Lasso(alpha=3)
```

In [22]:
```
alphas = [0.001,0.01,0.1,1,2,3,4,5,6,10,20,40,50,80]
for i in alphas:
    l=Lasso(alpha=i)
    l.fit(x,y)
    print(l.coef_)
```

```
[11.63257703 66.91107333 -0.28846809 51.67414714  1.49916141]
[11.620707   66.89846925 -0.2773561  51.66332888  1.48966108]
[11.50188649 66.77270749 -0.16643586 51.55522691  1.39460136]
[10.31701326 65.62422604 -0.         50.63918135  0.2907946 ]
[ 9.15472895 64.34866536  0.         49.59663235  0.        ]
[ 8.03847846 63.06738278  0.         48.53697133  0.        ]
[ 6.92222957 61.78610038  0.         47.4773104   0.        ]
[ 5.80598069 60.50481799  0.         46.41764947  0.        ]
[ 4.6897318  59.22353559  0.         45.35798854  0.        ]
[ 0.22471727 54.09842305  0.         41.11934522  0.        ]
[ 0.         40.66201878  0.         30.97219176  0.        ]
[ 0.         13.76362292  0.         10.69635566  0.        ]
[0.         0.31442499 0.         0.55843761 0.        ]
[0. 0. 0. 0. 0.]
```

In [27]:
```
from sklearn.datasets import load_diabetes
```

In [40]:
```
data=load_diabetes()
data.keys()
```

Out[40]:
```
dict_keys(['data', 'target', 'frame', 'DESCR', 'feature_names', 'data_filenam
e', 'target_filename', 'data_module'])
```

In [41]:
```
x = data['data']
y=data['target']
```

In [42]:
```
x
```

Out[42]:
```
array([[ 0.03807591,  0.05068012,  0.06169621, ..., -0.00259226,
         0.01990749, -0.01764613],
       [-0.00188202, -0.04464164, -0.05147406, ..., -0.03949338,
        -0.06833155, -0.09220405],
       [ 0.08529891,  0.05068012,  0.04445121, ..., -0.00259226,
         0.00286131, -0.02593034],
       ...,
       [ 0.04170844,  0.05068012, -0.01590626, ..., -0.01107952,
        -0.04688253,  0.01549073],
       [-0.04547248, -0.04464164,  0.03906215, ...,  0.02655962,
         0.04452873, -0.02593034],
       [-0.04547248, -0.04464164, -0.0730303 , ..., -0.03949338,
        -0.00422151,  0.00306441]])
```

In [43]:
```
x.shape
```

Out[43]:
```
(442, 10)
```

In [44]:
```
df = pd.DataFrame(x,columns=data.feature_names)
df
```

Out[44]:

	age	sex	bmi	bp	s1	s2	s3	s4	
0	0.038076	0.050680	0.061696	0.021872	-0.044223	-0.034821	-0.043401	-0.002592	0.019
1	-0.001882	-0.044642	-0.051474	-0.026328	-0.008449	-0.019163	0.074412	-0.039493	-0.068
2	0.085299	0.050680	0.044451	-0.005670	-0.045599	-0.034194	-0.032356	-0.002592	0.002
3	-0.089063	-0.044642	-0.011595	-0.036656	0.012191	0.024991	-0.036038	0.034309	0.022
4	0.005383	-0.044642	-0.036385	0.021872	0.003935	0.015596	0.008142	-0.002592	-0.031
...	...	...	...	...	...	...	...	...	
437	0.041708	0.050680	0.019662	0.059744	-0.005697	-0.002566	-0.028674	-0.002592	0.031
438	-0.005515	0.050680	-0.015906	-0.067642	0.049341	0.079165	-0.028674	0.034309	-0.018
439	0.041708	0.050680	-0.015906	0.017293	-0.037344	-0.013840	-0.024993	-0.011080	-0.046
440	-0.045472	-0.044642	0.039062	0.001215	0.016318	0.015283	-0.028674	0.026560	0.044
441	-0.045472	-0.044642	-0.073030	-0.081413	0.083740	0.027809	0.173816	-0.039493	-0.004

442 rows × 10 columns

In [45]:
```
alphas = [0.001,0.01,0.1,1,2,3,4,5,6,10,20,40,50,80]
for i in alphas:
    l=Lasso(alpha=i)
    l.fit(x,y)
    print(l.coef_)
```

```
[  -8.99617741 -238.89632766  520.26740319  323.42359592 -720.24482811
  421.39975285   66.73350259  164.44802215  725.33555818   67.47681002]
[  -1.30466161 -228.81912876  525.56612994  316.1688337  -307.01621149
   89.32464741 -105.07836939  119.5976163   571.33035562   65.00838312]
[  -0.         -155.3599757   517.18679544  275.07723537  -52.53936509
   -0.         -210.1579914     0.          483.91264753   33.67396468]
[  0.           -0.          367.70385976    6.29885756    0.
   0.           -0.            0.          307.6054181     0.        ]
[ 0.          0.         63.79640656  0.          0.          0.
 -0.          0.          3.67419063  0.        ]
[ 0.  0.  0.  0.  0.  0. -0.  0.  0.  0.]
[ 0.  0.  0.  0.  0.  0. -0.  0.  0.  0.]
[ 0.  0.  0.  0.  0.  0. -0.  0.  0.  0.]
[ 0.  0.  0.  0.  0.  0. -0.  0.  0.  0.]
[ 0.  0.  0.  0.  0.  0. -0.  0.  0.  0.]
[ 0.  0.  0.  0.  0.  0. -0.  0.  0.  0.]
[ 0.  0.  0.  0.  0.  0. -0.  0.  0.  0.]
[ 0.  0.  0.  0.  0.  0. -0.  0.  0.  0.]
[ 0.  0.  0.  0.  0.  0. -0.  0.  0.  0.]
```

In [ ]: