```
from sklearn import datasets
import numpy as np
import pandas as pd
import numpy as np
diabetes=datasets.load_diabetes()
print(diabetes)
```

```
{'data': array([[ 0.03807591,  0.05068012,  0.06169621, ..., -
0.00259226,
         0.01990842, -0.01764613],
       [-0.00188202, -0.04464164, -0.05147406, ..., -0.03949338,
        -0.06832974, -0.09220405],
       [ 0.08529891,  0.05068012,  0.04445121, ..., -0.00259226,
         0.00286377, -0.02593034],
       ...,
       [ 0.04170844,  0.05068012, -0.01590626, ..., -0.01107952,
        -0.04687948,  0.01549073],
       [-0.04547248, -0.04464164,  0.03906215, ...,  0.02655962,
         0.04452837, -0.02593034],
       [-0.04547248, -0.04464164, -0.0730303 , ..., -0.03949338,
        -0.00421986,  0.00306441]]), 'target': array([151.,  75.,
141., 206., 135.,  97., 138.,  63., 110., 310., 101.,
        69., 179., 185., 118., 171., 166., 144.,  97., 168.,  68.,
49.,
        68., 245., 184., 202., 137.,  85., 131., 283., 129.,  59.,
341.,
        87.,  65., 102., 265., 276., 252.,  90., 100.,  55.,  61.,
92.,
       259.,  53., 190., 142.,  75., 142., 155., 225.,  59., 104.,
182.,
       128.,  52.,  37., 170., 170.,  61., 144.,  52., 128.,  71.,
163.,
       150.,  97., 160., 178.,  48., 270., 202., 111.,  85.,  42.,
170.,
       200., 252., 113., 143.,  51.,  52., 210.,  65., 141.,  55.,
134.,
        42., 111.,  98., 164.,  48.,  96.,  90., 162., 150., 279.,
92.,
        83., 128., 102., 302., 198.,  95.,  53., 134., 144., 232.,
81.,
       104.,  59., 246., 297., 258., 229., 275., 281., 179., 200.,
200.,
       173., 180.,  84., 121., 161.,  99., 109., 115., 268., 274.,
158.,
       107.,  83., 103., 272.,  85., 280., 336., 281., 118., 317.,
235.,
        60., 174., 259., 178., 128.,  96., 126., 288.,  88., 292.,
71.,
       197., 186.,  25.,  84.,  96., 195.,  53., 217., 172., 131.,
214.,
```

```
        59.,  70., 220., 268., 152.,  47.,  74., 295., 101., 151.,
127.,
       237., 225.,  81., 151., 107.,  64., 138., 185., 265., 101.,
137.,
       143., 141.,  79., 292., 178.,  91., 116.,  86., 122.,  72.,
129.,
       142.,  90., 158.,  39., 196., 222., 277.,  99., 196., 202.,
155.,
        77., 191.,  70.,  73.,  49.,  65., 263., 248., 296., 214.,
185.,
        78.,  93., 252., 150.,  77., 208.,  77., 108., 160.,  53.,
220.,
       154., 259.,  90., 246., 124.,  67.,  72., 257., 262., 275.,
177.,
        71.,  47., 187., 125.,  78.,  51., 258., 215., 303., 243.,
91.,
       150., 310., 153., 346.,  63.,  89.,  50.,  39., 103., 308.,
116.,
       145.,  74.,  45., 115., 264.,  87., 202., 127., 182., 241.,
66.,
        94., 283.,  64., 102., 200., 265.,  94., 230., 181., 156.,
233.,
        60., 219.,  80.,  68., 332., 248.,  84., 200.,  55.,  85.,
89.,
        31., 129.,  83., 275.,  65., 198., 236., 253., 124.,  44.,
172.,
       114., 142., 109., 180., 144., 163., 147.,  97., 220., 190.,
109.,
       191., 122., 230., 242., 248., 249., 192., 131., 237.,  78.,
135.,
       244., 199., 270., 164.,  72.,  96., 306.,  91., 214.,  95.,
216.,
       263., 178., 113., 200., 139., 139.,  88., 148.,  88., 243.,
71.,
        77., 109., 272.,  60.,  54., 221.,  90., 311., 281., 182.,
321.,
        58., 262., 206., 233., 242., 123., 167.,  63., 197.,  71.,
168.,
       140., 217., 121., 235., 245.,  40.,  52., 104., 132.,  88.,
69.,
       219.,  72., 201., 110.,  51., 277.,  63., 118.,  69., 273.,
258.,
        43., 198., 242., 232., 175.,  93., 168., 275., 293., 281.,
72.,
       140., 189., 181., 209., 136., 261., 113., 131., 174., 257.,
55.,
        84.,  42., 146., 212., 233.,  91., 111., 152., 120.,  67.,
310.,
        94., 183.,  66., 173.,  72.,  49.,  64.,  48., 178., 104.,
```

```
132.,
       220.,  57.]), 'frame': None, 'DESCR': '.. _diabetes_dataset:\n\
nDiabetes dataset\n----------------\n\nTen baseline variables, age,
sex, body mass index, average blood\npressure, and six blood serum
measurements were obtained for each of n =\n442 diabetes patients, as
well as the response of interest, a\nquantitative measure of disease
progression one year after baseline.\n\n**Data Set Characteristics:**\
n\n  :Number of Instances: 442\n\n  :Number of Attributes: First 10
columns are numeric predictive values\n\n  :Target: Column 11 is a
quantitative measure of disease progression one year after baseline\n\
n  :Attribute Information:\n      - age     age in years\n      - sex\
n      - bmi     body mass index\n      - bp      average blood
pressure\n      - s1      tc, total serum cholesterol\n      - s2
ldl, low-density lipoproteins\n      - s3      hdl, high-density
lipoproteins\n      - s4      tch, total cholesterol / HDL\n      - s5
ltg, possibly log of serum triglycerides level\n      - s6      glu,
blood sugar level\n\nNote: Each of these 10 feature variables have
been mean centered and scaled by the standard deviation times
`n_samples` (i.e. the sum of squares of each column totals 1).\n\
nSource
URL:\nhttps://www4.stat.ncsu.edu/~boos/var.select/diabetes.html\n\nFor
more information see:\nBradley Efron, Trevor Hastie, Iain Johnstone
and Robert Tibshirani (2004) "Least Angle Regression," Annals of
Statistics (with discussion),
407-499.\n(https://web.stanford.edu/~hastie/Papers/LARS/LeastAngle_200
2.pdf)', 'feature_names': ['age', 'sex', 'bmi', 'bp', 's1', 's2',
's3', 's4', 's5', 's6'], 'data_filename': 'diabetes_data.csv.gz',
'target_filename': 'diabetes_target.csv.gz', 'data_module':
'sklearn.datasets.data'}
```

```
print(type(diabetes))
```

```
<class 'sklearn.utils.Bunch'>
```

```
print(type(diabetes.data))
```

```
<class 'numpy.ndarray'>
```

```
print(type(diabetes.target))
```

```
<class 'numpy.ndarray'>
```

```
print(diabetes.keys())
```

```
dict_keys(['data', 'target', 'frame', 'DESCR', 'feature_names',
'data_filename', 'target_filename', 'data_module'])
```

```
print(diabetes.data.shape)
```

```
(442, 10)
```

```
print(diabetes.target_names)
```

```
---------------------------------------------------------------------------
KeyError                                  Traceback (most recent call last)
File ~\anaconda3\lib\site-packages\sklearn\utils\__init__.py:117, in Bunch.__getattr__(self, key)
    116 try:
--> 117     return self[key]
    118 except KeyError:

KeyError: 'target_names'

During handling of the above exception, another exception occurred:

AttributeError                            Traceback (most recent call last)
Input In [13], in <cell line: 1>()
----> 1 print(diabetes.target_names)

File ~\anaconda3\lib\site-packages\sklearn\utils\__init__.py:119, in Bunch.__getattr__(self, key)
    117     return self[key]
    118 except KeyError:
--> 119     raise AttributeError(key)

AttributeError: target_names
```

```
x=diabetes.data
y=diabetes.target
print(x)
print(y)
```

```
[[ 0.03807591  0.05068012  0.06169621 ... -0.00259226  0.01990842
  -0.01764613]
 [-0.00188202 -0.04464164 -0.05147406 ... -0.03949338 -0.06832974
  -0.09220405]
 [ 0.08529891  0.05068012  0.04445121 ... -0.00259226  0.00286377
  -0.02593034]
 ...
 [ 0.04170844  0.05068012 -0.01590626 ... -0.01107952 -0.04687948
   0.01549073]
 [-0.04547248 -0.04464164  0.03906215 ...  0.02655962  0.04452837
  -0.02593034]
 [-0.04547248 -0.04464164 -0.0730303  ... -0.03949338 -0.00421986
   0.00306441]]
[151.  75. 141. 206. 135.  97. 138.  63. 110. 310. 101.  69. 179. 185.
 118. 171. 166. 144.  97. 168.  68.  49.  68. 245. 184. 202. 137.  85.
 131. 283. 129.  59. 341.  87.  65. 102. 265. 276. 252.  90. 100.  55.
  61.  92. 259.  53. 190. 142.  75. 142. 155. 225.  59. 104. 182. 128.
  52.  37. 170. 170.  61. 144.  52. 128.  71. 163. 150.  97. 160. 178.
```

```
 48. 270. 202. 111.  85.  42. 170. 200. 252. 113. 143.  51.  52. 210.
 65. 141.  55. 134.  42. 111.  98. 164.  48.  96.  90. 162. 150. 279.
 92.  83. 128. 102. 302. 198.  95.  53. 134. 144. 232.  81. 104.  59.
246. 297. 258. 229. 275. 281. 179. 200. 200. 173. 180.  84. 121. 161.
 99. 109. 115. 268. 274. 158. 107.  83. 103. 272.  85. 280. 336. 281.
118. 317. 235.  60. 174. 259. 178. 128.  96. 126. 288.  88. 292.  71.
197. 186.  25.  84.  96. 195.  53. 217. 172. 131. 214.  59.  70. 220.
268. 152.  47.  74. 295. 101. 151. 127. 237. 225.  81. 151. 107.  64.
138. 185. 265. 101. 137. 143. 141.  79. 292. 178.  91. 116.  86. 122.
 72. 129. 142.  90. 158.  39. 196. 222. 277.  99. 196. 202. 155.  77.
191.  70.  73.  49.  65. 263. 248. 296. 214. 185.  78.  93. 252. 150.
 77. 208.  77. 108. 160.  53. 220. 154. 259.  90. 246. 124.  67.  72.
257. 262. 275. 177.  71.  47. 187. 125.  78.  51. 258. 215. 303. 243.
 91. 150. 310. 153. 346.  63.  89.  50.  39. 103. 308. 116. 145.  74.
 45. 115. 264.  87. 202. 127. 182. 241.  66.  94. 283.  64. 102. 200.
265.  94. 230. 181. 156. 233.  60. 219.  80.  68. 332. 248.  84. 200.
 55.  85.  89.  31. 129.  83. 275.  65. 198. 236. 253. 124.  44. 172.
114. 142. 109. 180. 144. 163. 147.  97. 220. 190. 109. 191. 122. 230.
242. 248. 249. 192. 131. 237.  78. 135. 244. 199. 270. 164.  72.  96.
306.  91. 214.  95. 216. 263. 178. 113. 200. 139. 139.  88. 148.  88.
243.  71.  77. 109. 272.  60.  54. 221.  90. 311. 281. 182. 321.  58.
262. 206. 233. 242. 123. 167.  63. 197.  71. 168. 140. 217. 121. 235.
245.  40.  52. 104. 132.  88.  69. 219.  72. 201. 110.  51. 277.  63.
118.  69. 273. 258.  43. 198. 242. 232. 175.  93. 168. 275. 293. 281.
 72. 140. 189. 181. 209. 136. 261. 113. 131. 174. 257.  55.  84.  42.
146. 212. 233.  91. 111. 152. 120.  67. 310.  94. 183.  66. 173.  72.
 49.  64.  48. 178. 104. 132. 220.  57.]
```

```
#convert dataset to dataframe
df=pd.DataFrame(x,columns=diabetes.feature_names)
print(df)
```

```
          age       sex       bmi        bp        s1        s2
s3  \
0    0.038076  0.050680  0.061696  0.021872 -0.044223 -0.034821 -
0.043401
1   -0.001882 -0.044642 -0.051474 -0.026328 -0.008449 -0.019163
0.074412
2    0.085299  0.050680  0.044451 -0.005671 -0.045599 -0.034194 -
0.032356
3   -0.089063 -0.044642 -0.011595 -0.036656  0.012191  0.024991 -
0.036038
4    0.005383 -0.044642 -0.036385  0.021872  0.003935  0.015596
0.008142
..        ...       ...       ...       ...       ...       ...
...
437  0.041708  0.050680  0.019662  0.059744 -0.005697 -0.002566 -
0.028674
438 -0.005515  0.050680 -0.015906 -0.067642  0.049341  0.079165 -
0.028674
```

```
439  0.041708  0.050680 -0.015906  0.017282 -0.037344 -0.013840 -
0.024993
440 -0.045472 -0.044642  0.039062  0.001215  0.016318  0.015283 -
0.028674
441 -0.045472 -0.044642 -0.073030 -0.081414  0.083740  0.027809
0.173816

           s4        s5        s6
0   -0.002592  0.019908 -0.017646
1   -0.039493 -0.068330 -0.092204
2   -0.002592  0.002864 -0.025930
3    0.034309  0.022692 -0.009362
4   -0.002592 -0.031991 -0.046641
..        ...       ...       ...
437 -0.002592  0.031193  0.007207
438  0.034309 -0.018118  0.044485
439 -0.011080 -0.046879  0.015491
440  0.026560  0.044528 -0.025930
441 -0.039493 -0.004220  0.003064

[442 rows x 10 columns]
```

```
print(df.head()) #printing first 5 rows
```

```
        age       sex       bmi        bp        s1        s2
s3  \
0  0.038076  0.050680  0.061696  0.021872 -0.044223 -0.034821 -
0.043401
1 -0.001882 -0.044642 -0.051474 -0.026328 -0.008449 -0.019163
0.074412
2  0.085299  0.050680  0.044451 -0.005671 -0.045599 -0.034194 -
0.032356
3 -0.089063 -0.044642 -0.011595 -0.036656  0.012191  0.024991 -
0.036038
4  0.005383 -0.044642 -0.036385  0.021872  0.003935  0.015596
0.008142

         s4        s5        s6
0 -0.002592  0.019908 -0.017646
1 -0.039493 -0.068330 -0.092204
2 -0.002592  0.002864 -0.025930
3  0.034309  0.022692 -0.009362
4 -0.002592 -0.031991 -0.046641
```

```
print(df.tail())#printing last 5 rows
```

```
          age       sex       bmi        bp        s1        s2
s3  \
437  0.041708  0.050680  0.019662  0.059744 -0.005697 -0.002566 -
0.028674
```

```
438 -0.005515  0.050680 -0.015906 -0.067642  0.049341  0.079165 -
0.028674
439  0.041708  0.050680 -0.015906  0.017282 -0.037344 -0.013840 -
0.024993
440 -0.045472 -0.044642  0.039062  0.001215  0.016318  0.015283 -
0.028674
441 -0.045472 -0.044642 -0.073030 -0.081414  0.083740  0.027809
0.173816

           s4        s5        s6
437 -0.002592  0.031193  0.007207
438  0.034309 -0.018118  0.044485
439 -0.011080 -0.046879  0.015491
440  0.026560  0.044528 -0.025930
441 -0.039493 -0.004220  0.003064
```

```
print(df.describe())
```

```
                age           sex           bmi            bp
s1  \
count  4.420000e+02  4.420000e+02  4.420000e+02  4.420000e+02
4.420000e+02
mean  -3.634285e-16  1.308343e-16 -8.045349e-16  1.281655e-16 -
8.835316e-17
std    4.761905e-02  4.761905e-02  4.761905e-02  4.761905e-02
4.761905e-02
min   -1.072256e-01 -4.464164e-02 -9.027530e-02 -1.123996e-01 -
1.267807e-01
25%   -3.729927e-02 -4.464164e-02 -3.422907e-02 -3.665645e-02 -
3.424784e-02
50%    5.383060e-03 -4.464164e-02 -7.283766e-03 -5.670611e-03 -
4.320866e-03
75%    3.807591e-02  5.068012e-02  3.124802e-02  3.564384e-02
2.835801e-02
max    1.107267e-01  5.068012e-02  1.705552e-01  1.320442e-01
1.539137e-01

                s2            s3            s4            s5
s6
count  4.420000e+02  4.420000e+02  4.420000e+02  4.420000e+02
4.420000e+02
mean   1.327024e-16 -4.574646e-16  3.777301e-16 -3.830854e-16 -
3.412882e-16
std    4.761905e-02  4.761905e-02  4.761905e-02  4.761905e-02
4.761905e-02
min   -1.156131e-01 -1.023071e-01 -7.639450e-02 -1.260974e-01 -
1.377672e-01
25%   -3.035840e-02 -3.511716e-02 -3.949338e-02 -3.324879e-02 -
3.317903e-02
50%   -3.819065e-03 -6.584468e-03 -2.592262e-03 -1.947634e-03 -
```

```
1.077698e-03
75%    2.984439e-02  2.931150e-02  3.430886e-02  3.243323e-02
2.791705e-02
max    1.987880e-01  1.811791e-01  1.852344e-01  1.335990e-01
1.356118e-01
```

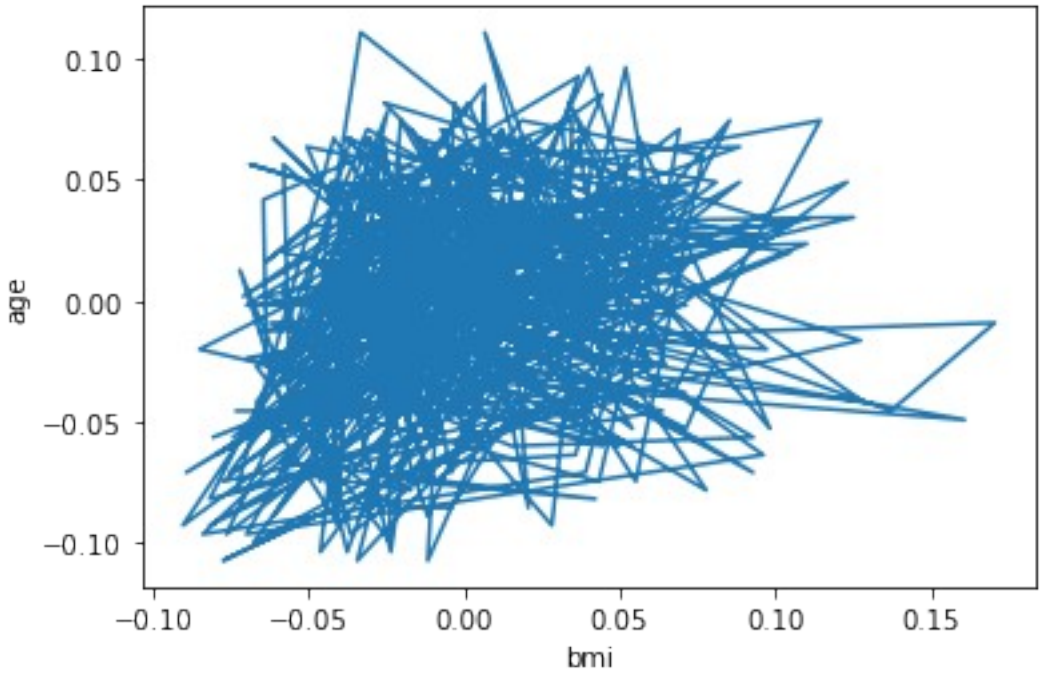
```
print(df.shape)
```

```
(442, 10)
```

```
a=df["bmi"] #accessing df columns for plotting
b=df["age"]
print(a,b)
```

```
0      0.061696
1     -0.051474
2      0.044451
3     -0.011595
4     -0.036385
         ...
437    0.019662
438   -0.015906
439   -0.015906
440    0.039062
441   -0.073030
Name: bmi, Length: 442, dtype: float64 0      0.038076
1     -0.001882
2      0.085299
3     -0.089063
4      0.005383
         ...
437    0.041708
438   -0.005515
439    0.041708
440   -0.045472
441   -0.045472
Name: age, Length: 442, dtype: float64
```

```
import matplotlib.pyplot as plt
plt.plot(a,b)
plt.xlabel("bmi")
plt.ylabel("age")
plt.show()
```


0.10
0.05
0.00
−0.05
−0.10
age
−0.10
−0.05
0.00
0.05
0.10
0.15
bmi