Type *Markdown* and LaTeX: α^2

In [15]:
```
import pandas as pd
import numpy as np
df=pd.DataFrame(np.random.randn(5,3),index=['a','c','e','f','h'],columns=['
print(df)
```

```
        one       two     three
a -1.417411 -0.366846 -1.947782
c -1.688598  0.795150 -1.598514
e -0.057151  0.188724 -0.549276
f -0.778126 -0.391546  0.237263
h  1.493284 -0.469932 -0.742576
```

In [16]:
```
df=df.reindex(['a','b','c','d','e','f','g','h'])
print(df)
```

```
        one       two     three
a -1.417411 -0.366846 -1.947782
b       NaN       NaN       NaN
c -1.688598  0.795150 -1.598514
d       NaN       NaN       NaN
e -0.057151  0.188724 -0.549276
f -0.778126 -0.391546  0.237263
g       NaN       NaN       NaN
h  1.493284 -0.469932 -0.742576
```

In [17]:
```
print(df.dropna())
```

```
        one       two     three
a -1.417411 -0.366846 -1.947782
c -1.688598  0.795150 -1.598514
e -0.057151  0.188724 -0.549276
f -0.778126 -0.391546  0.237263
h  1.493284 -0.469932 -0.742576
```

In [18]:
```
b=df
print(df)
```

```
        one       two     three
a -1.417411 -0.366846 -1.947782
b       NaN       NaN       NaN
c -1.688598  0.795150 -1.598514
d       NaN       NaN       NaN
e -0.057151  0.188724 -0.549276
f -0.778126 -0.391546  0.237263
g       NaN       NaN       NaN
h  1.493284 -0.469932 -0.742576
```

In [19]:
```
df2=b
print(b)
```

```
        one       two     three
a -1.417411 -0.366846 -1.947782
b       NaN       NaN       NaN
c -1.688598  0.795150 -1.598514
d       NaN       NaN       NaN
e -0.057151  0.188724 -0.549276
f -0.778126 -0.391546  0.237263
g       NaN       NaN       NaN
h  1.493284 -0.469932 -0.742576
```

In [20]:
```
print(df2.fillna(method='pad'))
```

```
        one       two     three
a -1.417411 -0.366846 -1.947782
b -1.417411 -0.366846 -1.947782
c -1.688598  0.795150 -1.598514
d -1.688598  0.795150 -1.598514
e -0.057151  0.188724 -0.549276
f -0.778126 -0.391546  0.237263
g -0.778126 -0.391546  0.237263
h  1.493284 -0.469932 -0.742576
```

In [22]:
```
df4=df2
print(df4.fillna(method='bfill'))
```

```
        one       two     three
a -1.417411 -0.366846 -1.947782
b -1.688598  0.795150 -1.598514
c -1.688598  0.795150 -1.598514
d -0.057151  0.188724 -0.549276
e -0.057151  0.188724 -0.549276
f -0.778126 -0.391546  0.237263
g  1.493284 -0.469932 -0.742576
h  1.493284 -0.469932 -0.742576
```

In [23]:
```
print(df['one'].notnull())
```

```
a     True
b    False
c     True
d    False
e     True
f     True
g    False
h     True
Name: one, dtype: bool
```

In [24]:
```
print(df['one'].isnull())
```

```
a    False
b     True
c    False
d     True
e    False
f    False
g     True
h    False
Name: one, dtype: bool
```

In [25]:
```
a1=pd.DataFrame([['ajay',18],['arun',19],['ashwin',21]],columns=['name','age
print(a1)
```

```
     name  age
0    ajay   18
1    arun   19
2  ashwin   21
```

In [26]:
```
print(a1.replace({18:15,19:17,21:20}))
```

```
     name  age
0    ajay   15
1    arun   17
2  ashwin   20
```

In [6]:
```
import pandas as pd
import numpy as np
a1=pd.DataFrame([['lion',300],['leapord',190],['tiger',211],['lion',298],['t
print(a1)
```

```
    animal  speed
0     lion    300
1  leapord    190
2    tiger    211
3     lion    298
4    tiger    255
```

In [7]:
```
a2=a1.groupby(['animal']).mean()
print(a2)
```

```
         speed
animal
leapord  190.0
lion     299.0
tiger    233.0
```

In [8]:
```
a2=a1.groupby(['animal']).sum()
print(a2)
```

```
         speed
animal
leapord    190
lion       598
tiger      466
```

In [9]:
```
a2=a1.groupby(['animal']).count()
print(a2)
```

```
         speed
animal
leapord      1
lion         2
tiger        2
```

In [10]:
```
a2=a1.groupby(['animal']).first()
print(a2)
```

```
         speed
animal
leapord    190
lion       300
tiger      211
```

In [11]:
```
a2=a1.groupby(['animal']).last()
print(a2)
```

```
         speed
animal
leapord    190
lion       298
tiger      255
```

In [2]:
```
import datetime as d
r=d.datetime.now()
print(r)
```

```
2024-08-21 10:42:02.877264
```

In [3]:
```
import datetime as d
r=d.datetime.today()
print(r)
```

```
2024-08-21 10:43:01.811434
```

In [5]:
```
import datetime as d
r1=d.datetime(2020,6,8,23,10,25,404040)
print(r1)
```

```
2020-06-08 23:10:25.404040
```

In [6]:
```
print(r1.replace(day=10))
```

```
2020-06-10 23:10:25.404040
```

In [7]:
```
print(r1.replace(month=11))
```

```
2020-11-08 23:10:25.404040
```

In [8]:
```
print(r1.replace(year=2004))
```

```
2004-06-08 23:10:25.404040
```

In [9]:
```
print(r1.replace(day=10,month=11,year=2004))
```

```
2004-11-10 23:10:25.404040
```

In [10]:
```
from datetime import date
print(date(2004,11,10))
```

```
2004-11-10
```

In [11]:
```
from datetime import date
print(date(2004,11,10).ctime())
```

```
Wed Nov 10 00:00:00 2004
```

In [16]:
```
print(r.strftime("%Y"))
```

```
2024
```

In [15]:
```
print(r.strftime("%y"))
```

```
24
```

In [17]:
```
print(r.strftime("%m"))
```

```
08
```

In [18]:
```
print(r.strftime("%b"))
```

```
Aug
```

In [19]:
```
print(r.strftime("%B"))
```

```
August
```

In [20]:
```
print(r.strftime("%j"))
```

```
234
```

In [21]:
```
print(r.strftime("%D"))
```

```
08/21/24
```

In [22]:
```
print(r.strftime("%d"))
```

```
21
```

In [23]:
```
print(r.strftime("%a"))
```

```
Wed
```

In [24]:
```
print(r.strftime("%A"))
```

```
Wednesday
```

In [25]:
```
print(r.strftime("%H"))
```

```
10
```

In [26]:
```
print(r.strftime("%S"))
```

```
01
```

In [27]:
```
print(r.strftime("%C"))
```

```
20
```

In [28]:
```
print(r.strftime("%c"))
```

```
Wed Aug 21 10:43:01 2024
```

In [29]:
```
print(r.strftime("%F"))
```

```
2024-08-21
```

In [30]:
```
print(r.strftime("%f"))
```

```
811434
```

In [31]:
```
pri nt(r.strftime("%p"))
```

```
AM
```

In [32]:
```
print(r.strftime("%x"))
```

```
08/21/24
```

In [33]:
```
print(r.strftime("%X"))
```

```
10:43:01
```

In [34]:
```
print(r.strftime("%r"))
```

```
10:43:01 AM
```

In [36]:
```
print(r.strftime("%T"))
```

```
10:43:01
```

In [2]:
```
from sklearn import datasets
import pandas as pd
iris=datasets.load_iris()
print(iris)
```

```
{'data': array([[5.1, 3.5, 1.4, 0.2],
       [4.9, 3. , 1.4, 0.2],
       [4.7, 3.2, 1.3, 0.2],
       [4.6, 3.1, 1.5, 0.2],
       [5. , 3.6, 1.4, 0.2],
       [5.4, 3.9, 1.7, 0.4],
       [4.6, 3.4, 1.4, 0.3],
       [5. , 3.4, 1.5, 0.2],
       [4.4, 2.9, 1.4, 0.2],
       [4.9, 3.1, 1.5, 0.1],
       [5.4, 3.7, 1.5, 0.2],
       [4.8, 3.4, 1.6, 0.2],
       [4.8, 3. , 1.4, 0.1],
       [4.3, 3. , 1.1, 0.1],
       [5.8, 4. , 1.2, 0.2],
       [5.7, 4.4, 1.5, 0.4],
       [5.4, 3.9, 1.3, 0.4],
       [5.1, 3.5, 1.4, 0.3],
       [5.7, 3.8, 1.7, 0.3],
```

In [3]:
```
print(type(iris))
```

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

In [4]:
```
print(iris.keys())
```

```
dict_keys(['data', 'target', 'frame', 'target_names', 'DESCR', 'feature_na
mes', 'filename', 'data_module'])
```

In [5]:
```
print(type(object))
```

```
<class 'type'>
```

In [6]:
```
print(type(iris.data))
```

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

In [7]:
```
print(type(iris.target))
```

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

In [8]:
```
print(iris.data.shape)
```

```
(150, 4)
```

In [9]:
```
print(iris.target_names)
```

```
['setosa' 'versicolor' 'virginica']
```

In [10]:
```
x=iris.data
y=iris.target
print(x)
print(y)
```

```
[[5.1 3.5 1.4 0.2]
 [4.9 3.  1.4 0.2]
 [4.7 3.2 1.3 0.2]
 [4.6 3.1 1.5 0.2]
 [5.  3.6 1.4 0.2]
 [5.4 3.9 1.7 0.4]
 [4.6 3.4 1.4 0.3]
 [5.  3.4 1.5 0.2]
 [4.4 2.9 1.4 0.2]
 [4.9 3.1 1.5 0.1]
 [5.4 3.7 1.5 0.2]
 [4.8 3.4 1.6 0.2]
 [4.8 3.  1.4 0.1]
 [4.3 3.  1.1 0.1]
 [5.8 4.  1.2 0.2]
 [5.7 4.4 1.5 0.4]
 [5.4 3.9 1.3 0.4]
 [5.1 3.5 1.4 0.3]
 [5.7 3.8 1.7 0.3]
```

In [19]:
```
df=pd.DataFrame(x,columns=iris.feature_names)
print(df)
```

```
     sepal length (cm)  sepal width (cm)  petal length (cm)  petal width
(cm)
0                  5.1               3.5                1.4
0.2
1                  4.9               3.0                1.4
0.2
2                  4.7               3.2                1.3
0.2
3                  4.6               3.1                1.5
0.2
4                  5.0               3.6                1.4
0.2
..                 ...               ...                ...
...
145                6.7               3.0                5.2
2.3
146                6.3               2.5                5.0
1.9
147                6.5               3.0                5.2
2.0
148                6.2               3.4                5.4
2.3
149                5.9               3.0                5.1
1.8

[150 rows x 4 columns]
```

In [20]:
```
print(df.head())
```

```
   sepal length (cm)  sepal width (cm)  petal length (cm)  petal width (c
m)
0                5.1               3.5                1.4               0.
2
1                4.9               3.0                1.4               0.
2
2                4.7               3.2                1.3               0.
2
3                4.6               3.1                1.5               0.
2
4                5.0               3.6                1.4               0.
2
```

In [21]:
```
print(df.tail())
```

```
     sepal length (cm)  sepal width (cm)  petal length (cm)  petal width
(cm)
145                6.7               3.0                5.2
2.3
146                6.3               2.5                5.0
1.9
147                6.5               3.0                5.2
2.0
148                6.2               3.4                5.4
2.3
149                5.9               3.0                5.1
1.8
```

In [22]:
```
print(df.describe())
```

```
       sepal length (cm)  sepal width (cm)  petal length (cm)  \
count         150.000000        150.000000         150.000000
mean            5.843333          3.057333           3.758000
std             0.828066          0.435866           1.765298
min             4.300000          2.000000           1.000000
25%             5.100000          2.800000           1.600000
50%             5.800000          3.000000           4.350000
75%             6.400000          3.300000           5.100000
max             7.900000          4.400000           6.900000

       petal width (cm)
count        150.000000
mean           1.199333
std            0.762238
min            0.100000
25%            0.300000
50%            1.300000
75%            1.800000
max            2.500000
```

In [24]:
```
print(df.min())
```

```
sepal length (cm)    4.3
sepal width (cm)     2.0
petal length (cm)    1.0
petal width (cm)     0.1
dtype: float64
```

In [25]:
```
print(df.max())
```

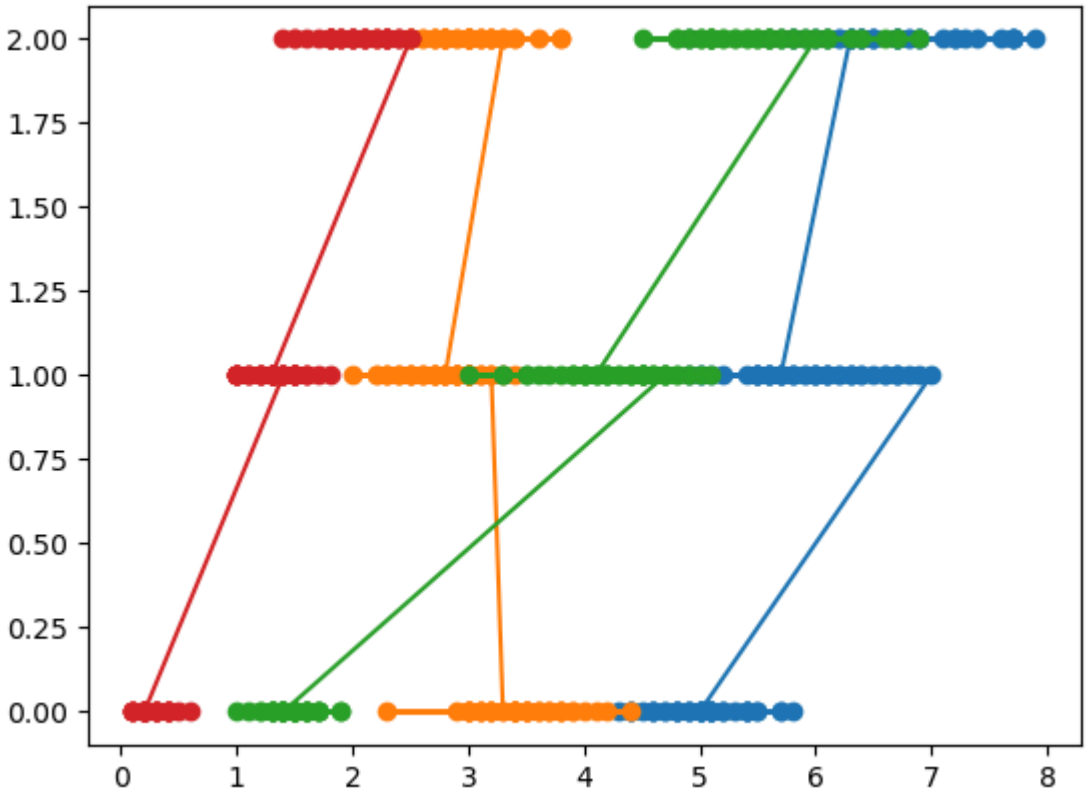
```
sepal length (cm)    7.9
sepal width (cm)     4.4
petal length (cm)    6.9
petal width (cm)     2.5
dtype: float64
```

In [26]:
```
from sklearn import datasets
import pandas as pd
dia=datasets.load_diabetes()
print(dia)
```

{'data': 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]]), '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 the square root of `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_2002.pdf)\n', 'feature_names': ['age', 'sex', 'bmi', 'bp', 's1', 's2', 's3', 's4', 's5', 's6'], 'data_filename': 'diabetes_data_raw.csv.gz', 'target_filename': 'diabetes_target.csv.gz', 'data_module': 'sklearn.datasets.data'}

In [28]:
```
import matplotlib.pyplot
import matplotlib.pyplot as pl
pl.plot(x,y,marker='o')
pl.show()
```



In [29]:
```
from sklearn import datasets
import pandas as pd
bc=datasets.load_breast_cancer()
print(bc)
```

{'data': array([[1.799e+01, 1.038e+01, 1.228e+02, ..., 2.654e-01, 4.601e-01,
        1.189e-01],
       [2.057e+01, 1.777e+01, 1.329e+02, ..., 1.860e-01, 2.750e-01,
        8.902e-02],
       [1.969e+01, 2.125e+01, 1.300e+02, ..., 2.430e-01, 3.613e-01,
        8.758e-02],
       ...,
       [1.660e+01, 2.808e+01, 1.083e+02, ..., 1.418e-01, 2.218e-01,
        7.820e-02],
       [2.060e+01, 2.933e+01, 1.401e+02, ..., 2.650e-01, 4.087e-01,
        1.240e-01],
       [7.760e+00, 2.454e+01, 4.792e+01, ..., 0.000e+00, 2.871e-01,
        7.039e-02]]), 'target': array([0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 1, 1, 1,
       0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 1, 0, 0, 0, 0, 0, 0,
       0, 0, 1, 0, 1, 1, 1, 1, 1, 0, 0, 1, 0, 0, 1, 1, 1, 1, 0, 1, 0, 0,
       1, 1, 1, 1, 0, 1, 0, 0, 1, 0, 1, 0, 0, 1, 1, 1, 0, 0, 1, 0, 0, 0,
       1, 1, 1, 0, 1, 1, 0, 0, 1, 1, 1, 0, 0, 1, 1, 1, 1, 0, 1, 1, 0, 1,
       1, 1, 1, 1, 1, 1, 1, 0, 0, 0, 1, 0, 0, 1, 1, 1, 0, 0, 1, 0, 1, 0,
       0, 1, 0, 0, 1, 1, 0, 1, 1, 0, 1, 1, 1, 1, 0, 1, 1, 1, 1, 1, 1, 1,
       1, 1, 0, 1, 1, 1, 1, 0, 0, 1, 0, 1, 1, 0, 0, 1, 1, 0, 0, 1, 1, 1,
       1, 0, 1, 1, 0, 0, 0, 1, 0, 1, 0, 1, 1, 1, 0, 1, 1, 0, 0, 1, 0, 0,
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area (mean): 143.5 2501.0\n smoothness (mea
n): 0.053 0.163\n compactness (mean):
0.019 0.345\n concavity (mean): 0.0 0.427\n
concave points (mean): 0.0 0.201\n symmetry (mean):
0.106 0.304\n fractal dimension (mean): 0.05 0.097\n
radius (standard error): 0.112 2.873\n texture (standard
error): 0.36 4.885\n perimeter (standard error):
0.757 21.98\n area (standard error): 6.802 542.2\n
smoothness (standard error): 0.002 0.031\n compactness (stand
ard error): 0.002 0.135\n concavity (standard error):
0.0 0.396\n concave points (standard error): 0.0 0.053\n
symmetry (standard error): 0.008 0.079\n fractal dimension
(standard error): 0.001 0.03\n radius (worst):
7.93 36.04\n texture (worst): 12.02 49.54\n
perimeter (worst): 50.41 251.2\n area (worst):
185.2 4254.0\n smoothness (worst): 0.071 0.223\n
compactness (worst): 0.027 1.058\n concavity (worst):
0.0 1.252\n concave points (worst): 0.0 0.291\n
symmetry (worst): 0.156 0.664\n fractal dimension
(worst): 0.055 0.208\n ==========
= ====== ======\n\n :Missing Attribute Values: None\n\n :Class Distr
ibution: 212 - Malignant, 357 - Benign\n\n :Creator: Dr. William H. Wo
lberg, W. Nick Street, Olvi L. Mangasarian\n\n :Donor: Nick Street\n\n
:Date: November, 1995\n\nThis is a copy of UCI ML Breast Cancer Wisconsin
(Diagnostic) datasets.\nhttps://goo.gl/U2Uwz2\n\nFeatures are computed fro
m a digitized image of a fine needle\naspirate (FNA) of a breast mass. Th
ey describe\ncharacteristics of the cell nuclei present in the image.\n\nS
eparating plane described above was obtained using\nMultisurface Method-Tr
ee (MSM-T) [K. P. Bennett, "Decision Tree\nConstruction Via Linear Program
ming." Proceedings of the 4th\nMidwest Artificial Intelligence and Cogniti
ve Science Society,\npp. 97-101, 1992], a classification method which uses
linear\nprogramming to construct a decision tree. Relevant features\nwere
selected using an exhaustive search in the space of 1-4\nfeatures and 1-3
separating planes.\n\nThe actual linear program used to obtain the separat
ing plane\nin the 3-dimensional space is that described in:\n[K. P. Bennet
t and O. L. Mangasarian: "Robust Linear\nProgramming Discrimination of Two
Linearly Inseparable Sets",\nOptimization Methods and Software 1, 1992, 23
-34].\n\nThis database is also available through the UW CS ftp server:\n\n
ftp ftp.cs.wisc.edu\ncd math-prog/cpo-dataset/machine-learn/WDBC/\n\n.. to
pic:: References\n\n - W.N. Street, W.H. Wolberg and O.L. Mangasarian. N
uclear feature extraction \n for breast tumor diagnosis. IS&T/SPIE 199
3 International Symposium on \n Electronic Imaging: Science and Techno
logy, volume 1905, pages 861-870,\n San Jose, CA, 1993.\n - O.L. Man
gasarian, W.N. Street and W.H. Wolberg. Breast cancer diagnosis and \n
prognosis via linear programming. Operations Research, 43(4), pages 570-57
7, \n July-August 1995.\n - W.H. Wolberg, W.N. Street, and O.L. Mang
asarian. Machine learning techniques\n to diagnose breast cancer from
fine-needle aspirates. Cancer Letters 77 (1994) \n 163-171.', 'feature
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In [ ]: