```
print("hello")
```

```
hello
```

```
pip install ucimlrepo
```

```
Collecting ucimlrepo
  Downloading ucimlrepo-0.0.7-py3-none-any.whl.metadata (5.5 kB)
Requirement already satisfied: pandas>=1.0.0 in /usr/local/lib/python3.10/dist-packages (from ucimlrepo) (2.1.4)
Requirement already satisfied: certifi>=2020.12.5 in /usr/local/lib/python3.10/dist-packages (from ucimlrepo) (2024.7.4)
Requirement already satisfied: numpy<2,>=1.22.4 in /usr/local/lib/python3.10/dist-packages (from pandas>=1.0.0->ucimlrepo) (1.
Requirement already satisfied: python-dateutil>=2.8.2 in /usr/local/lib/python3.10/dist-packages (from pandas>=1.0.0->ucimlrep
Requirement already satisfied: pytz>=2020.1 in /usr/local/lib/python3.10/dist-packages (from pandas>=1.0.0->ucimlrepo) (2024.1
Requirement already satisfied: tzdata>=2022.1 in /usr/local/lib/python3.10/dist-packages (from pandas>=1.0.0->ucimlrepo) (2024
Requirement already satisfied: six>=1.5 in /usr/local/lib/python3.10/dist-packages (from python-dateutil>=2.8.2->pandas>=1.0.0
Downloading ucimlrepo-0.0.7-py3-none-any.whl (8.0 kB)
Installing collected packages: ucimlrepo
Successfully installed ucimlrepo-0.0.7
```

```
import pandas as pd
import numpy as np
```

```
from ucimlrepo import fetch_ucirepo

# fetch dataset
iris = fetch_ucirepo(id=53)

# data (as pandas dataframes)
X = iris.data.features
y = iris.data.targets

# metadata
print(iris.metadata)

# variable information
print(iris.variables)
```

```
{'uci_id': 53, 'name': 'Iris', 'repository_url': 'https://archive.ics.uci.edu/dataset/53/iris', 'data_url': 'https://archive.i
            name     role         type demographic  \
0  sepal length  Feature   Continuous        None
1   sepal width  Feature   Continuous        None
2  petal length  Feature   Continuous        None
3   petal width  Feature   Continuous        None
4         class   Target  Categorical        None

                                    description units missing_values
0                                          None    cm             no
1                                          None    cm             no
2                                          None    cm             no
3                                          None    cm             no
4  class of iris plant: Iris Setosa, Iris Versico...  None             no
```

```
iris
```

```
{'data': {'ids': None,
  'features':      sepal length  sepal width  petal length  petal width
  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],
  'targets':                class
  0         Iris-setosa
  1         Iris-setosa
  2         Iris-setosa
  3         Iris-setosa
  4         Iris-setosa
  ..                ...
  145   Iris-virginica
  146   Iris-virginica
  147   Iris-virginica
  148   Iris-virginica
```

```
  149  Iris-virginica

  [150 rows x 1 columns],
  'original':      sepal length  sepal width  petal length  petal width          class
  0              5.1          3.5           1.4          0.2     Iris-setosa
  1              4.9          3.0           1.4          0.2     Iris-setosa
  2              4.7          3.2           1.3          0.2     Iris-setosa
  3              4.6          3.1           1.5          0.2     Iris-setosa
  4              5.0          3.6           1.4          0.2     Iris-setosa
  ..             ...          ...           ...          ...             ...
  145            6.7          3.0           5.2          2.3  Iris-virginica
  146            6.3          2.5           5.0          1.9  Iris-virginica
  147            6.5          3.0           5.2          2.0  Iris-virginica
  148            6.2          3.4           5.4          2.3  Iris-virginica
  149            5.9          3.0           5.1          1.8  Iris-virginica

  [150 rows x 5 columns],
  'headers': Index(['sepal length', 'sepal width', 'petal length', 'petal width', 'class'], dtype='object')},
 'metadata': {'uci_id': 53,
  'name': 'Iris',
  'repository_url': 'https://archive.ics.uci.edu/dataset/53/iris',
  'data_url': 'https://archive.ics.uci.edu/static/public/53/data.csv',
  'abstract': 'A small classic dataset from Fisher, 1936. One of the earliest known datasets used for evaluating
classification methods.\n',
  'area': 'Biology',
  'tasks': ['Classification'],
  'characteristics': ['Tabular'],
  'num_instances': 150,
  'num_features': 4,
  'feature_types': ['Real'],
  'demographics': [],
  'target_col': ['class'],
```

```
X
```

	sepal length	sepal width	petal length	petal width
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 × 4 columns

```
X.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 150 entries, 0 to 149
Data columns (total 4 columns):
 #   Column        Non-Null Count  Dtype
---  ------        --------------  -----
 0   sepal length  150 non-null    float64
 1   sepal width   150 non-null    float64
 2   petal length  150 non-null    float64
 3   petal width   150 non-null    float64
dtypes: float64(4)
memory usage: 4.8 KB
```

```
X.describe()
```

	sepal length	sepal width	petal length	petal width
count	150.000000	150.000000	150.000000	150.000000
mean	5.843333	3.054000	3.758667	1.198667
std	0.828066	0.433594	1.764420	0.763161
min	4.300000	2.000000	1.000000	0.100000
25%	5.100000	2.800000	1.600000	0.300000
50%	5.800000	3.000000	4.350000	1.300000
75%	6.400000	3.300000	5.100000	1.800000
max	7.900000	4.400000	6.900000	2.500000

```
np.std(X,axis = 0)
```

	0
sepal length	0.825301
sepal width	0.432147
petal length	1.758529
petal width	0.760613

dtype: float64

```
#classifier
np.mean(X,axis = 0)
```

	0
sepal length	5.843333
sepal width	3.054000
petal length	3.758667
petal width	1.198667

dtype: float64

```
y['class'].value_counts()
```

class	count
Iris-setosa	50
Iris-versicolor	50
Iris-virginica	50

dtype: int64

```
df = pd.concat([X,y], axis = 1)
df
```

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

150 rows × 5 columns

```
df.shape
```

```
(150, 5)
```

```
df.iloc[:,:-1]
```

	sepal length	sepal width	petal length	petal width
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 × 4 columns

```
df.iloc[:3]
```

	sepal length	sepal width	petal length	petal width	class
0	5.1	3.5	1.4	0.2	Iris-setosa
1	4.9	3.0	1.4	0.2	Iris-setosa
2	4.7	3.2	1.3	0.2	Iris-setosa

```
df.iloc[:,:3]
```

	sepal length	sepal width	petal length
0	5.1	3.5	1.4
1	4.9	3.0	1.4

```
df.iloc[:,1:3]
```

	sepal width	petal length
0	3.5	1.4
1	3.0	1.4
2	3.2	1.3
3	3.1	1.5
4	3.6	1.4
...	...	...
145	3.0	5.2
146	2.5	5.0
147	3.0	5.2
148	3.4	5.4
149	3.0	5.1

150 rows × 2 columns

```
import matplotlib.pyplot as plt
```