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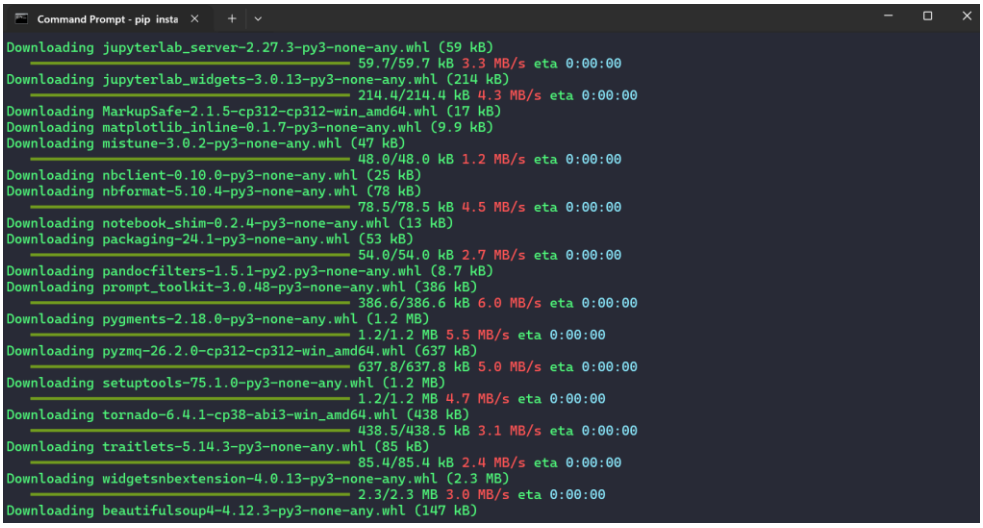
Kelas : INF A

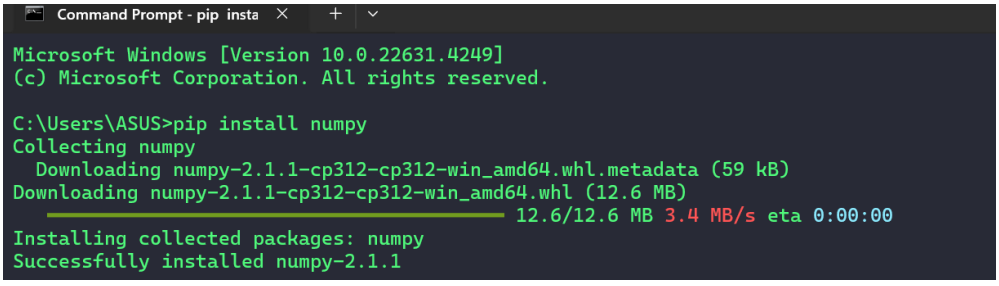
Mata Kuliah : Machine Learning

Tugas Pertemuan 1 Jawaban Nomor 1

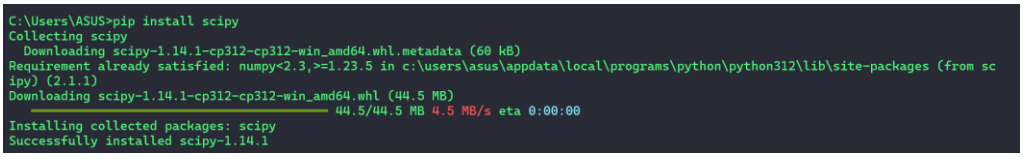
1. **Instalasi Jupyter Noterbook, Lakukan download dan instalasi:**
    - **Instalasi Jupyter Notebook**



    - **Download Library NumPy**



    - **Download Library SciPy**



- **Download Library Pandas**

```
C:\Users\ASUS>pip install pandas
Collecting pandas
  Downloading pandas-2.2.3-cp312-cp312-win_amd64.whl.metadata (19 kB)
Requirement already satisfied: numpy>=1.26.0 in c:\users\asus\appdata\local\programs\python\python312\lib\site-packages (from pandas)
 (2.1.1)
Requirement already satisfied: python-dateutil>=2.8.2 in c:\users\asus\appdata\local\programs\python\python312\lib\site-packages (fro
m pandas) (2.9.0.post0)
Collecting pytz>=2020.1 (from pandas)
  Downloading pytz-2024.2-py2.py3-none-any.whl.metadata (22 kB)
Collecting tzdata>=2022.7 (from pandas)
  Downloading tzdata-2024.2-py2.py3-none-any.whl.metadata (1.4 kB)
Requirement already satisfied: six>=1.5 in c:\users\asus\appdata\local\programs\python\python312\lib\site-packages (from python-dateu
til>=2.8.2->pandas) (1.16.0)
Downloading pandas-2.2.3-cp312-cp312-win_amd64.whl (11.5 MB)
   ---------------------------------------- 11.5/11.5 MB 2.6 MB/s eta 0:00:00
Downloading pytz-2024.2-py2.py3-none-any.whl (508 kB)
Downloading tzdata-2024.2-py2.py3-none-any.whl (346 kB)
Installing collected packages: pytz, tzdata, pandas
Successfully installed pandas-2.2.3 pytz-2024.2 tzdata-2024.2
```

- **Download Library Matplotlib**

```
C:\Users\ASUS>pip install -U matplotlib
Collecting matplotlib
  Downloading matplotlib-3.9.2-cp312-cp312-win_amd64.whl.metadata (11 kB)
Collecting contourpy>=1.0.1 (from matplotlib)
  Downloading contourpy-1.3.0-cp312-cp312-win_amd64.whl.metadata (5.4 kB)
Collecting cycler>=0.10 (from matplotlib)
  Downloading cycler-0.12.1-py3-none-any.whl.metadata (3.8 kB)
Collecting fonttools>=4.22.0 (from matplotlib)
  Downloading fonttools-4.54.1-cp312-cp312-win_amd64.whl.metadata (167 kB)
Collecting kiwisolver>=1.3.1 (from matplotlib)
  Downloading kiwisolver-1.4.7-cp312-cp312-win_amd64.whl.metadata (6.4 kB)
Requirement already satisfied: numpy>=1.23 in c:\users\asus\appdata\local\programs\python\python312\lib\site-packages (from matplotlib) (2.1.1)
Requirement already satisfied: packaging>=20.0 in c:\users\asus\appdata\local\programs\python\python312\lib\site-packages (from matplotlib) (24.
1)
Collecting pillow>=8 (from matplotlib)
  Downloading pillow-10.4.0-cp312-cp312-win_amd64.whl.metadata (9.3 kB)
Collecting pyparsing>=2.3.1 (from matplotlib)
  Downloading pyparsing-3.1.4-py3-none-any.whl.metadata (5.1 kB)
Requirement already satisfied: python-dateutil>=2.7 in c:\users\asus\appdata\local\programs\python\python312\lib\site-packages (from matplotlib)
 (2.9.0.post0)
Requirement already satisfied: six>=1.5 in c:\users\asus\appdata\local\programs\python\python312\lib\site-packages (from python-dateutil>=2.7->m
atplotlib) (1.16.0)
Downloading matplotlib-3.9.2-cp312-cp312-win_amd64.whl (7.8 MB)
   ---------------------------------------- 7.8/7.8 MB 4.1 MB/s eta 0:00:00
Downloading contourpy-1.3.0-cp312-cp312-win_amd64.whl (218 kB)
Downloading cycler-0.12.1-py3-none-any.whl (8.3 kB)
Downloading fonttools-4.54.1-cp312-cp312-win_amd64.whl (2.2 MB)
   ---------------------------------------- 2.2/2.2 MB 4.6 MB/s eta 0:00:00
Downloading kiwisolver-1.4.7-cp312-cp312-win_amd64.whl (55 kB)
Downloading pillow-10.4.0-cp312-cp312-win_amd64.whl (2.6 MB)
   ---------------------------------------- 2.6/2.6 MB 3.9 MB/s eta 0:00:00
Downloading pyparsing-3.1.4-py3-none-any.whl (104 kB)
Installing collected packages: pyparsing, pillow, kiwisolver, fonttools, cycler, contourpy, matplotlib
Successfully installed contourpy-1.3.0 cycler-0.12.1 fonttools-4.54.1 kiwisolver-1.4.7 matplotlib-3.9.2 pillow-10.4.0 pyparsing-3.1.4
```

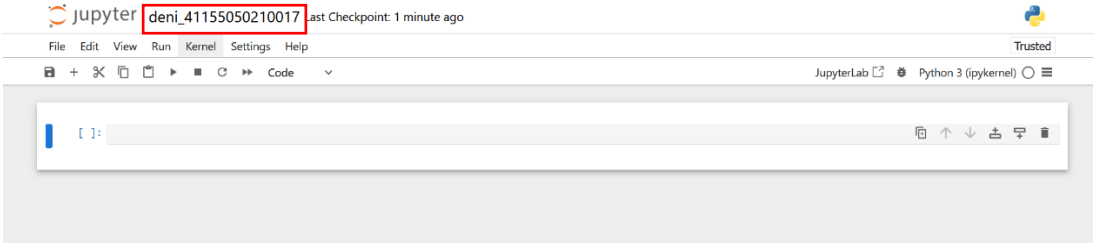
- **Download Library Seaborn**

```
C:\Users\ASUS>pip install seaborn
Collecting seaborn
  Downloading seaborn-0.13.2-py3-none-any.whl.metadata (5.4 kB)
Requirement already satisfied: numpy!=1.24.0,>=1.20 in c:\users\asus\appdata\local\programs\python\python312\lib\site-packages (from seaborn) (2
.1.1)
Requirement already satisfied: pandas>=1.2 in c:\users\asus\appdata\local\programs\python\python312\lib\site-packages (from seaborn) (2.2.3)
Requirement already satisfied: matplotlib!=3.6.1,>=3.4 in c:\users\asus\appdata\local\programs\python\python312\lib\site-packages (from seaborn)
 (3.9.2)
Requirement already satisfied: contourpy>=1.0.1 in c:\users\asus\appdata\local\programs\python\python312\lib\site-packages (from matplotlib!=3.6
.1,>=3.4->seaborn) (1.3.0)
Requirement already satisfied: cycler>=0.10 in c:\users\asus\appdata\local\programs\python\python312\lib\site-packages (from matplotlib!=3.6.1,>
=3.4->seaborn) (0.12.1)
Requirement already satisfied: fonttools>=4.22.0 in c:\users\asus\appdata\local\programs\python\python312\lib\site-packages (from matplotlib!=3.
6.1,>=3.4->seaborn) (4.54.1)
Requirement already satisfied: kiwisolver>=1.3.1 in c:\users\asus\appdata\local\programs\python\python312\lib\site-packages (from matplotlib!=3.
6.1,>=3.4->seaborn) (1.4.7)
Requirement already satisfied: packaging>=20.0 in c:\users\asus\appdata\local\programs\python\python312\lib\site-packages (from matplotlib!=3.6.
1,>=3.4->seaborn) (24.1)
Requirement already satisfied: pillow>=8 in c:\users\asus\appdata\local\programs\python\python312\lib\site-packages (from matplotlib!=3.6.1,>=3.
4->seaborn) (10.4.0)
Requirement already satisfied: pyparsing>=2.3.1 in c:\users\asus\appdata\local\programs\python\python312\lib\site-packages (from matplotlib!=3.6
.1,>=3.4->seaborn) (3.1.4)
Requirement already satisfied: python-dateutil>=2.7 in c:\users\asus\appdata\local\programs\python\python312\lib\site-packages (from matplotlib!
=3.6.1,>=3.4->seaborn) (2.9.0.post0)
Requirement already satisfied: pytz>=2020.1 in c:\users\asus\appdata\local\programs\python\python312\lib\site-packages (from pandas>=1.2->seabor
n) (2024.2)
Requirement already satisfied: tzdata>=2022.7 in c:\users\asus\appdata\local\programs\python\python312\lib\site-packages (from pandas>=1.2->seab
orn) (2024.2)
Requirement already satisfied: six>=1.5 in c:\users\asus\appdata\local\programs\python\python312\lib\site-packages (from python-dateutil>=2.7->m
atplotlib!=3.6.1,>=3.4->seaborn) (1.16.0)
Downloading seaborn-0.13.2-py3-none-any.whl (294 kB)
Installing collected packages: seaborn
Successfully installed seaborn-0.13.2
```

- **Download Library Scikit-Learn**

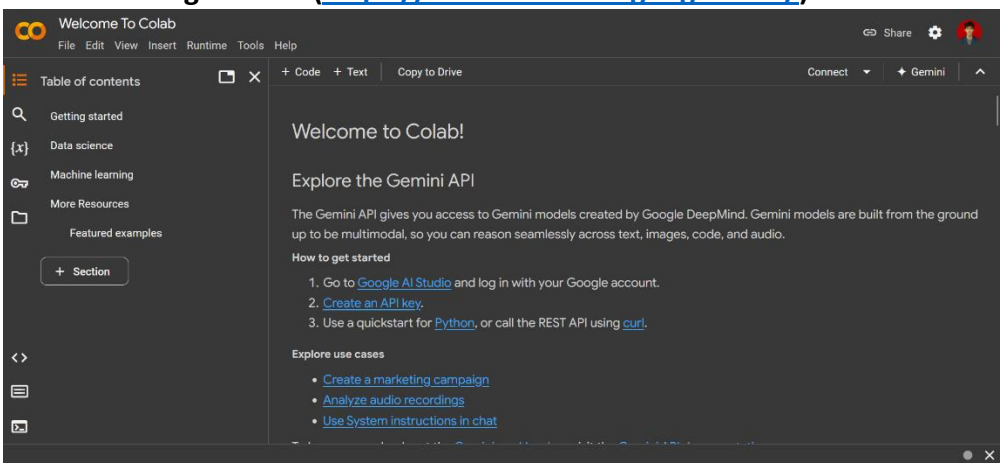
```
C:\Users\ASUS>pip install -U scikit-learn
Collecting scikit-learn
  Downloading scikit_learn-1.5.2-cp312-cp312-win_amd64.whl.metadata (13 kB)
Requirement already satisfied: numpy>=1.19.5 in c:\users\asus\appdata\local\programs\python\python312\lib\site-packages (from scikit-learn) (2.1
.1)
Requirement already satisfied: scipy>=1.6.0 in c:\users\asus\appdata\local\programs\python\python312\lib\site-packages (from scikit-learn) (1.14
.1)
Collecting joblib>=1.2.0 (from scikit-learn)
  Downloading joblib-1.4.2-py3-none-any.whl.metadata (5.4 kB)
Collecting threadpoolctl>=3.1.0 (from scikit-learn)
  Downloading threadpoolctl-3.5.0-py3-none-any.whl.metadata (13 kB)
Downloading scikit_learn-1.5.2-cp312-cp312-win_amd64.whl (11.0 MB)
   ---------------------------------------- 11.0/11.0 MB 2.1 MB/s eta 0:00:00
Downloading joblib-1.4.2-py3-none-any.whl (301 kB)
Downloading threadpoolctl-3.5.0-py3-none-any.whl (18 kB)
Installing collected packages: threadpoolctl, joblib, scikit-learn
Successfully installed joblib-1.4.2 scikit-learn-1.5.2 threadpoolctl-3.5.0
```

- **Tuliskan nama dan nomor NPM anda pada Jupiter Notebook.**

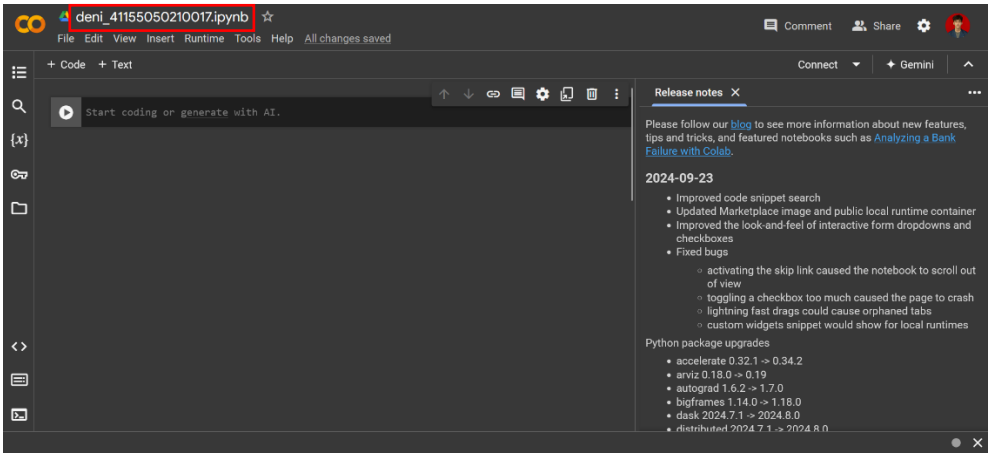


Tugas Pertemuan 1 Jawaban Nomor 2

2. **Menggunakan Google Collab**
   - **Gunakan Google Colab (https://colab.research.google.com/)**

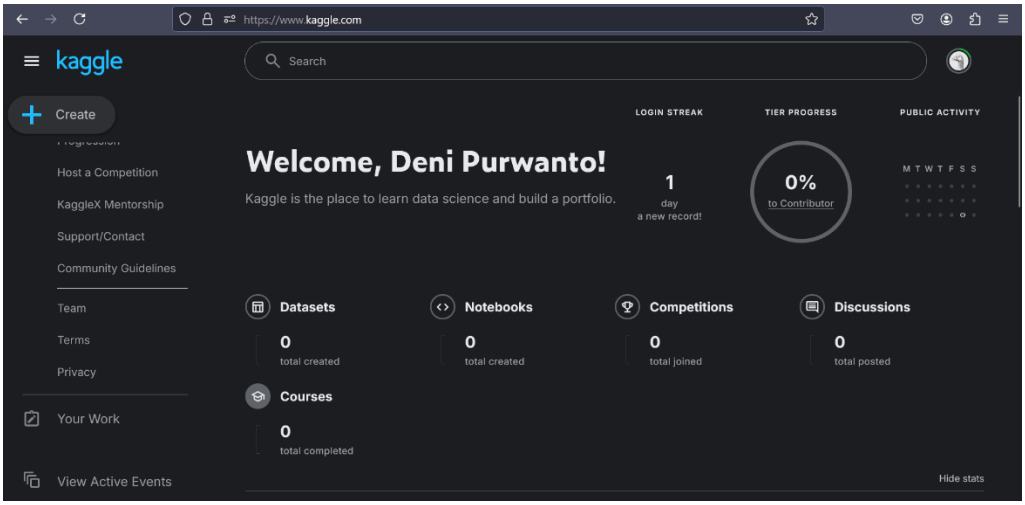


   - **Tuliskan nama dan nomor NPM anda pada Google Colab.**



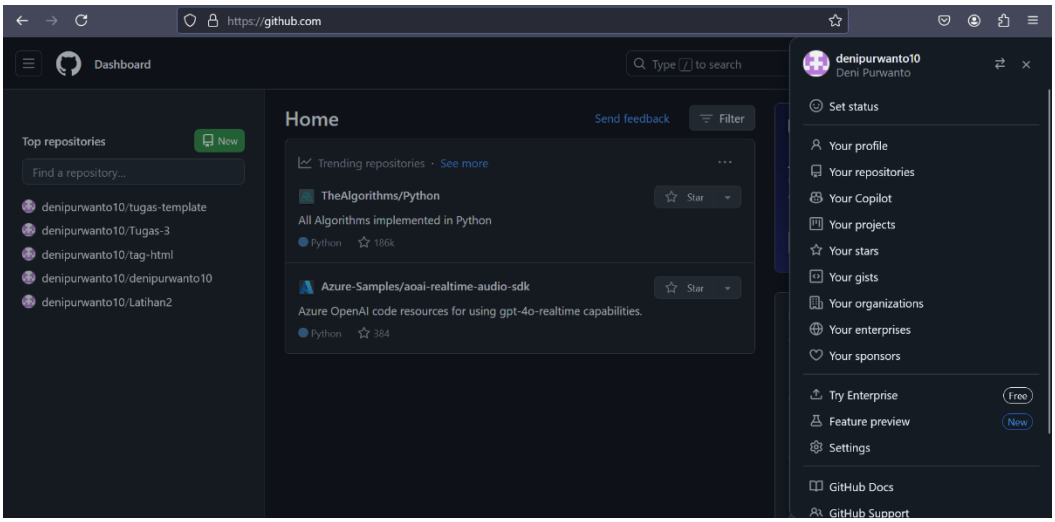
Tugas Pertemuan 1 Jawaban Nomor 3

3. **Buatlah akun di https://www.kaggle.com/**
    - **Buat screenshot sebagai jawaban nomor 3 di Tugas Pertemuan 1**



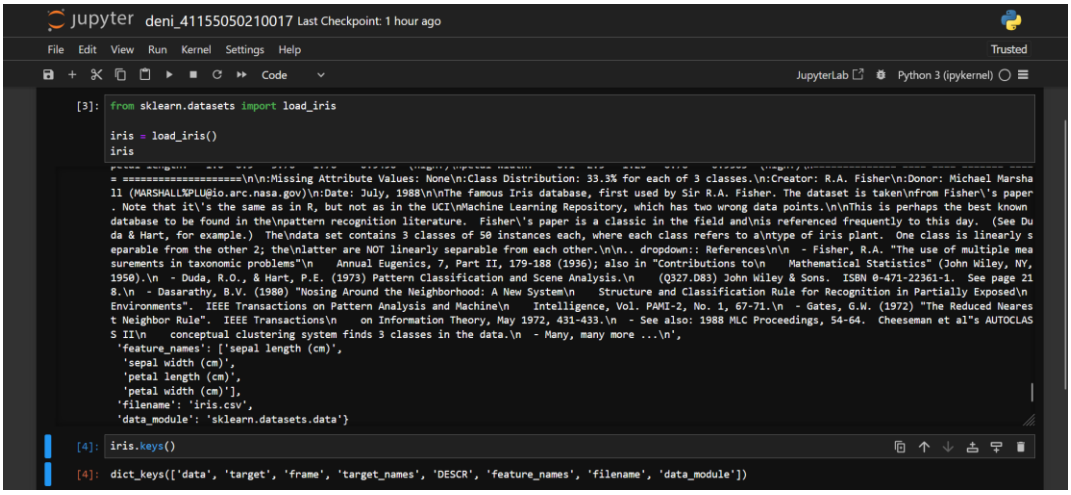
Tugas Pertemuan 1 Jawaban Nomor 4

4. **Buatlah akun di https://github.com/**
    - **Buat screenshot sebagai jawaban nomor 4 di Tugas Pertemuan 1**

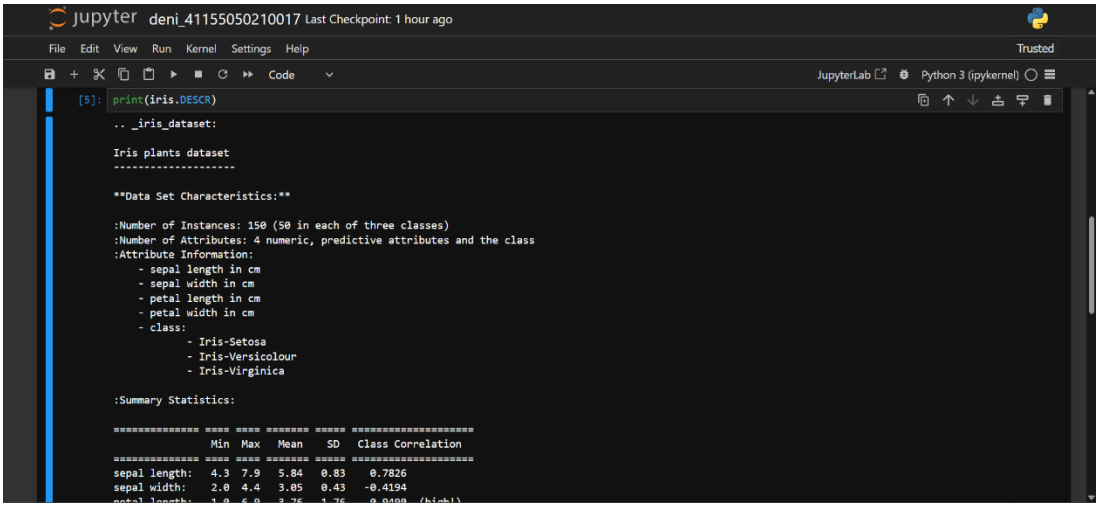


Tugas Pertemuan 1 Jawaban Nomor 5

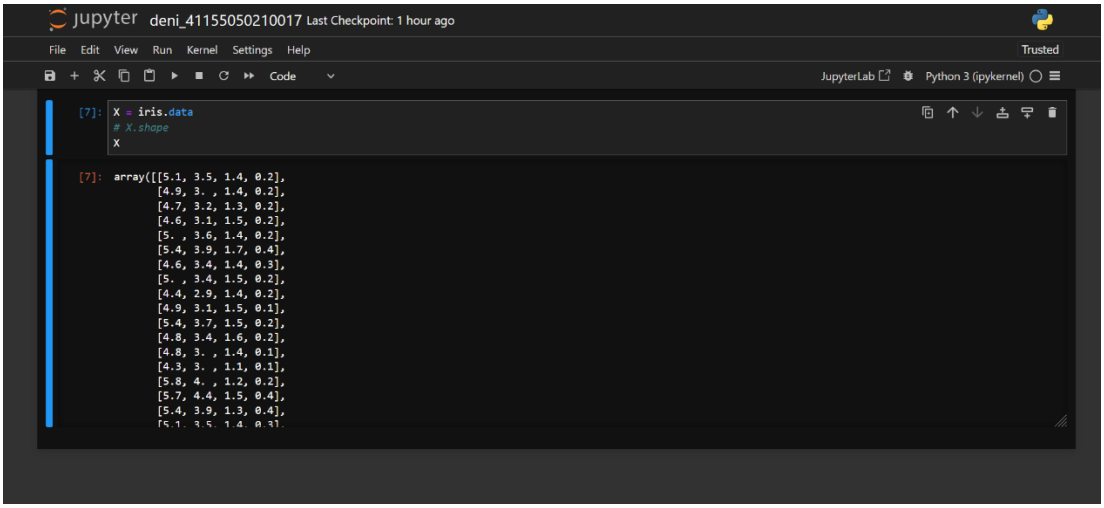
5. **Lakukan praktek dari https://youtu.be/mSO2hJln0OY?feature=shared**
    - **Load sample dataset**



- **Metadata | Deskripsi dari sample dataset**



- **Explanatory & Response Variables | Features & Target**



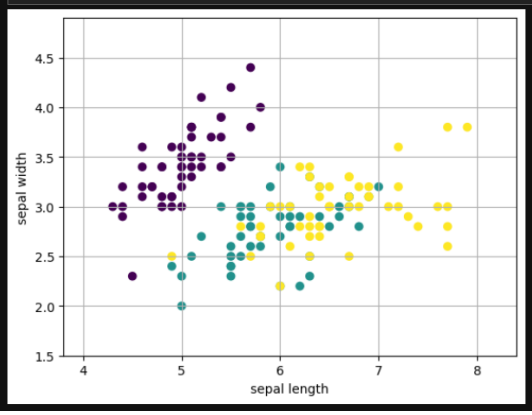
```
[8]: y = iris.target
     # y.shape
     y

[8]: array([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, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,
            1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,
            1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 2, 2, 2, 2, 2, 2, 2, 2,
            2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2,
            2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2])
```

- **Feature & Target Names**

```
[9]: feature_names = iris.feature_names
     feature_names

[9]: ['sepal length (cm)',
      'sepal width (cm)',
      'petal length (cm)',
      'petal width (cm)']

[10]: target_names = iris.target_names
      target_names

[10]: array(['setosa', 'versicolor', 'virginica'], dtype='<U10')
```

- **Visualisasi Data**

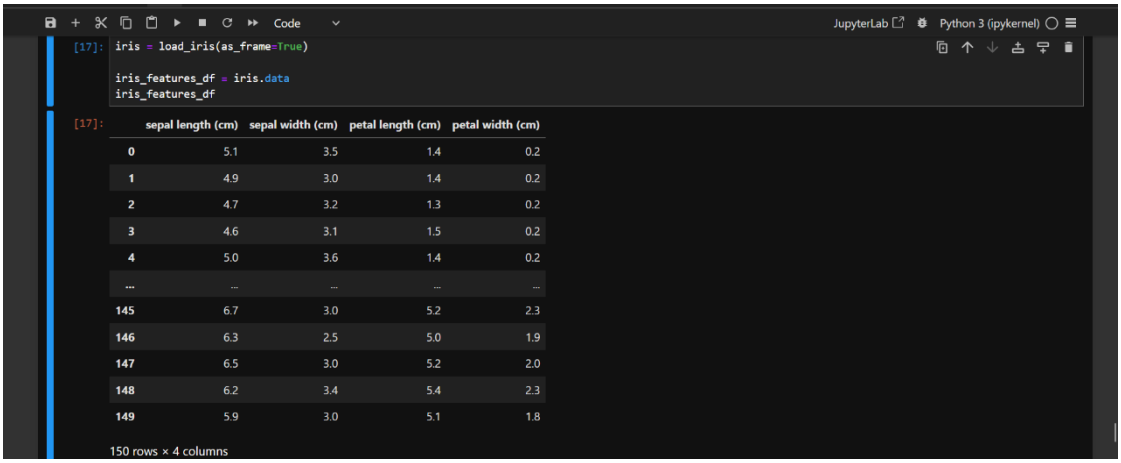
```
[13]: import matplotlib.pyplot as plt
      X = X[:, :2]

      x_min, x_max = X[:, 0].min() - 0.5, X[:, 0].max() + 0.5
      y_min, y_max = X[:, 1].min() - 0.5, X[:, 1].max() + 0.5

      plt.scatter(X[:, 0], X[:, 1], c=y)
      plt.xlabel('sepal length')
      plt.ylabel('sepal width')

      plt.xlim(x_min, x_max)
      plt.ylim(y_min, y_max)
      plt.grid(True)
      plt.show()
```



- **Training Set & Testing Set**

```
[15]: from sklearn.model_selection import train_test_split
      X_train, X_test, y_train, y_test = train_test_split(X,
                                                          y,
                                                          test_size=0.3,
                                                          random_state=1)

      print(f'X train: {X_train.shape}')
      print(f'X test: {X_test.shape}')
      print(f'y train: {y_train.shape}')
      print(f'y test: {y_test.shape}')

      X train: (105, 2)
      X test: (45, 2)
      y train: (105,)
      y test: (45,)
```

- **Load sample dataset sebagai Pandas Data Frame**



```
[17]: iris = load_iris(as_frame=True)

      iris_features_df = iris.data
      iris_features_df
```

[17]:

	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 × 4 columns

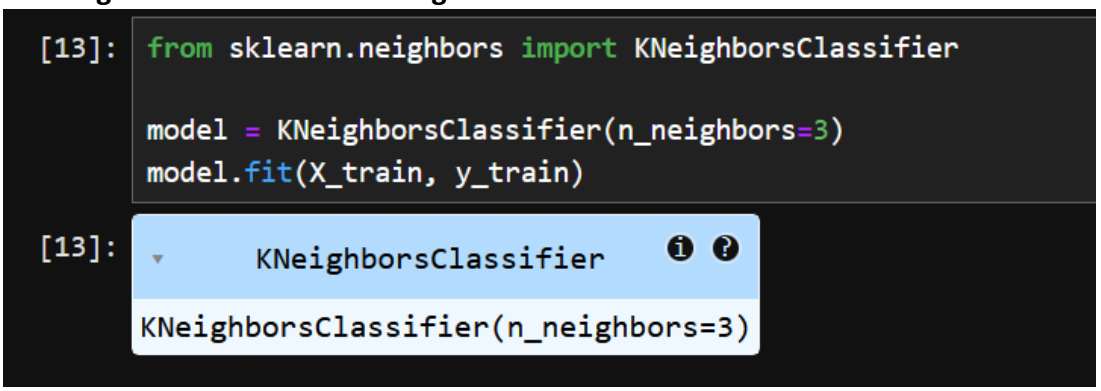
Tugas Pertemuan 1 Jawaban Nomor 6

6. **Lakukan praktek dari https://youtu.be/tiREcHrtDLo?feature=shared**
   - **Persiapan dataset | Loading & splitting dataset**

```
[6]: from sklearn.datasets import load_iris

     iris = load_iris()

     X = iris.data
     y = iris.target
```

```
[12]: from sklearn.model_selection import train_test_split

      X_train, X_test, y_train, y_test = train_test_split(X,
                                                          y,
                                                          test_size = 0.4,
                                                          random_state = 1)
```

   - **Training model Machine Learning**



```
[13]: from sklearn.neighbors import KNeighborsClassifier

      model = KNeighborsClassifier(n_neighbors=3)
      model.fit(X_train, y_train)
```

[13]:

```
KNeighborsClassifier
KNeighborsClassifier(n_neighbors=3)
```

   - **Evaluasi model Machine Learning**

```
[14]: from sklearn.metrics import accuracy_score

      y_pred = model.predict(X_test)
      acc = accuracy_score(y_test, y_pred)
      print(f'Accuracy: {acc}')

      Accuracy: 0.9833333333333333
```

- **Pemanfaatan trained model machine learning**

```
[15]: data_baru = [[5, 5, 3, 2],
                  [2, 4, 3, 5]]

      preds = model.predict(data_baru)
      preds

[15]: array([1, 2])

[16]: pred_species = [iris.target_names[p] for p in preds]
      print(f'Hasil Prediksi: {pred_species}')

      Hasil Prediksi: [np.str_('versicolor'), np.str_('virginica')]
```

- **Deploy model Machine Learning | Dumping dan Loading model Machine Learning**

```
[17]: import joblib

      joblib.dump(model, 'iris_classifier_knn.joblib')

[17]: ['iris_classifier_knn.joblib']

[19]: production_model = joblib.load('iris_classifier_knn.joblib')
```

Tugas Pertemuan 1 Jawaban Nomor 7

7. **Lakukan praktek dari https://youtu.be/smNnhEd26Ek?feature=shared**
    - **Persiapan sample dataset**

```
[23]: import numpy as np
      from sklearn import preprocessing

      sample_data = np.array([[2.1, -1.9, 5.5],
                              [-1.5, 2.4, 3.5],
                              [0.5, -7.9, 5.6],
                              [5.9, 2.3, -5.8]])
      sample_data

[23]: array([[ 2.1, -1.9,  5.5],
             [-1.5,  2.4,  3.5],
             [ 0.5, -7.9,  5.6],
             [ 5.9,  2.3, -5.8]])

[25]: sample_data.shape

[25]: (4, 3)
```

- **Teknik data preprocessing 1: binarization**

```
[26]: sample_data

[26]: array([[ 2.1, -1.9,  5.5],
             [-1.5,  2.4,  3.5],
             [ 0.5, -7.9,  5.6],
             [ 5.9,  2.3, -5.8]])

[27]: preprocessor = preprocessing.Binarizer(threshold=0.5)
      binarized_data = preprocessor.transform(sample_data)
      binarized_data

[27]: array([[1., 0., 1.],
             [0., 1., 1.],
             [0., 0., 1.],
             [1., 1., 0.]])
```

- **Teknik data preprocessing 2: scaling**

```
[28]: sample_data

[28]: array([[ 2.1, -1.9,  5.5],
             [-1.5,  2.4,  3.5],
             [ 0.5, -7.9,  5.6],
             [ 5.9,  2.3, -5.8]])

[31]: preprocessor = preprocessing.MinMaxScaler(feature_range=(0, 1))
      preprocessor.fit(sample_data)
      scaled_data = preprocessor.transform(sample_data)
      scaled_data

[31]: array([[0.48648649, 0.58252427, 0.99122807],
             [0.        , 1.        , 0.81578947],
             [0.27027027, 0.        , 1.        ],
             [1.        , 0.99029126, 0.        ]])

[32]: scaled_data = preprocessor.fit_transform(sample_data)
      scaled_data

[32]: array([[0.48648649, 0.58252427, 0.99122807],
             [0.        , 1.        , 0.81578947],
             [0.27027027, 0.        , 1.        ],
             [1.        , 0.99029126, 0.        ]])
```

- **Teknik data preprocessing 3: normalisation**

```
[33]: sample_data

[33]: array([[ 2.1, -1.9,  5.5],
             [-1.5,  2.4,  3.5],
             [ 0.5, -7.9,  5.6],
             [ 5.9,  2.3, -5.8]])

[34]: l1_normalised_data = preprocessing.normalize(sample_data, norm='l1')
      l1_normalised_data

[34]: array([[ 0.22105263, -0.2       ,  0.57894737],
             [-0.2027027 ,  0.32432432,  0.47297297],
             [ 0.03571429, -0.56428571,  0.4       ],
             [ 0.42142857,  0.16428571, -0.41428571]])

[35]: sample_data

[35]: array([[ 2.1, -1.9,  5.5],
             [-1.5,  2.4,  3.5],
             [ 0.5, -7.9,  5.6],
             [ 5.9,  2.3, -5.8]])

[36]: l2_normalised_data = preprocessing.normalize(sample_data, norm='l2')
      l2_normalised_data

[36]: array([[ 0.33946114, -0.30713151,  0.88906489],
             [-0.33325106,  0.53320169,  0.7775858 ],
             [ 0.05156558, -0.81473612,  0.57753446],
             [ 0.68706914,  0.26784051, -0.6754239 ]])
```