

Nama : Aulia Defitri Wulandari

NIM : 20224001

Assignment :

1. Explain in brief about data science.

Data science is an interdisciplinary field that uses scientific methods, algorithms, processes, and systems to extract knowledge and insights from structured and unstructured data. It involves techniques from statistics, machine learning, and data analysis to make decisions and predictions.

2. What are the differences between data, data science, and data scientist?

Concept	Description
Data	Raw facts, numbers, or text that by themselves may not have meaning (e.g., temperatures, sales, survey results).
Data Science	The field concerned with extracting actionable insights from data using various tools and methods such as statistics, machine learning, and visualization.
Data Scientist	A professional who applies data science techniques to solve real-world problems. They clean, analyze, and interpret data to help make strategic decisions.

3. Explain about the four foundational aspects of data science?

- Domain Knowledge: Understanding the context and the problem to be solved using data.
- Mathematics and Statistics: Core to modeling, hypothesis testing, and deriving insights from data.
- Computer Science: Programming and algorithmic skills to manipulate data and build models.
- Data Visualization and Communication: Skills to present data findings in an understandable and actionable way.

4. List link on PyPI for installing Jupyter Notebook, Matplotlib, NumPy:

- <https://pypi.org/project/notebook/>
- <https://pypi.org/project/matplotlib/>
- <https://pypi.org/project/numpy/>

5. Create a virtual environment, install some packages, and save information to requirements.txt; then create another virtual environment and use that requirements.txt.

- Virtual Environment Pertama

```
Microsoft Windows [Version 10.0.26100.4061]
(c) Microsoft Corporation. All rights reserved.

C:\Users\Aulia>python -m venv env1
```

- Aktifkan environment

```
C:\Users\Aulia>env1\Scripts\activate
```

- Install package

```
(env1) C:\Users\Aulia>pip install numpy pandas matplotlib
Requirement already satisfied: numpy in c:\users\aulia\env1\lib\site-packages (2.2.6)
Requirement already satisfied: pandas in c:\users\aulia\env1\lib\site-packages (2.2.3)
Requirement already satisfied: matplotlib in c:\users\aulia\env1\lib\site-packages (3.10.3)
Requirement already satisfied: python-dateutil<=2.8.2 in c:\users\aulia\env1\lib\site-packages (from pandas) (2.9.0.post0)
Requirement already satisfied: pytz>=2020.1 in c:\users\aulia\env1\lib\site-packages (from pandas) (2025.2)
Requirement already satisfied: tzdata>=2022.7 in c:\users\aulia\env1\lib\site-packages (from pandas) (2025.2)
Requirement already satisfied: contourpy>=1.0.1 in c:\users\aulia\env1\lib\site-packages (from matplotlib) (1.3.2)
Requirement already satisfied: cyclor>=0.10 in c:\users\aulia\env1\lib\site-packages (from matplotlib) (0.12.1)
Requirement already satisfied: fonttools>=4.22.0 in c:\users\aulia\env1\lib\site-packages (from matplotlib) (4.58.0)
Requirement already satisfied: kiwisolver>=1.3.1 in c:\users\aulia\env1\lib\site-packages (from matplotlib) (1.4.8)
Requirement already satisfied: packaging>=20.0 in c:\users\aulia\env1\lib\site-packages (from matplotlib) (25.0)
Requirement already satisfied: pillow>=8 in c:\users\aulia\env1\lib\site-packages (from matplotlib) (11.2.1)
Requirement already satisfied: pyparsing>=2.3.1 in c:\users\aulia\env1\lib\site-packages (from matplotlib) (3.2.3)
Requirement already satisfied: six>=1.5 in c:\users\aulia\env1\lib\site-packages (from python-dateutil>=2.8.2->pandas) (1.17.0)

[notice] A new release of pip is available: 24.3.1 -> 25.1.1
[notice] To update, run: python.exe -m pip install --upgrade pip
```

- Simpan ke requirements.txt

```
(env1) C:\Users\Aulia>pip freeze > requirements.txt
```

- Buat Virtual Environment Kedua

```
(env1) C:\Users\Aulia>python -m venv env2
```

- Aktifkan environment kedua

```
(env1) C:\Users\Aulia>env2\Scripts\activate
```

- Install dari requirements.txt

```
(env2) C:\Users\Aulia>pip install -r requirements.txt
Collecting contourpy==1.3.2 (from -r requirements.txt (line 1))
  Using cached contourpy-1.3.2-cp313-cp313-win_amd64.whl.metadata (5.5 kB)
Collecting cyclor==0.12.1 (from -r requirements.txt (line 2))
  Using cached cyclor-0.12.1-py3-none-any.whl.metadata (9.8 kB)
Collecting fonttools==4.58.0 (from -r requirements.txt (line 3))
  Using cached fonttools-4.58.0-cp313-cp313-win_amd64.whl.metadata (106 kB)
Collecting kiwisolver==1.4.8 (from -r requirements.txt (line 4))
  Using cached kiwisolver-1.4.8-cp313-cp313-win_amd64.whl.metadata (6.3 kB)
Collecting matplotlib==3.10.3 (from -r requirements.txt (line 5))
  Using cached matplotlib-3.10.3-cp313-cp313-win_amd64.whl.metadata (11 kB)
Collecting numpy==2.2.6 (from -r requirements.txt (line 6))
  Using cached numpy-2.2.6-cp313-cp313-win_amd64.whl.metadata (60 kB)
Collecting packaging==25.0 (from -r requirements.txt (line 7))
  Using cached packaging-25.0-py3-none-any.whl.metadata (3.3 kB)
Collecting pandas==2.2.3 (from -r requirements.txt (line 8))
  Using cached pandas-2.2.3-cp313-cp313-win_amd64.whl.metadata (19 kB)
Collecting pillow==11.2.1 (from -r requirements.txt (line 9))
  Using cached pillow-11.2.1-cp313-cp313-win_amd64.whl.metadata (9.1 kB)
Collecting pyparsing==3.2.3 (from -r requirements.txt (line 10))
  Using cached pyparsing-3.2.3-py3-none-any.whl.metadata (5.0 kB)
Collecting python-dateutil==2.9.0.post0 (from -r requirements.txt (line 11))
  Using cached python_dateutil-2.9.0.post0-py2.py3-none-any.whl.metadata (8.4 kB)
Collecting pytz==2025.2 (from -r requirements.txt (line 12))
  Using cached pytz-2025.2-py2.py3-none-any.whl.metadata (22 kB)
Collecting six==1.17.0 (from -r requirements.txt (line 13))
  Using cached six-1.17.0-py2.py3-none-any.whl.metadata (1.7 kB)
Collecting tzdata==2025.2 (from -r requirements.txt (line 14))
  Using cached tzdata-2025.2-py2.py3-none-any.whl.metadata (1.4 kB)
Using cached contourpy-1.3.2-cp313-cp313-win_amd64.whl (223 kB)
Using cached cyclor-0.12.1-py3-none-any.whl (8.3 kB)
Using cached fonttools-4.58.0-cp313-cp313-win_amd64.whl (2.2 MB)
Using cached kiwisolver-1.4.8-cp313-cp313-win_amd64.whl (71 kB)
Using cached matplotlib-3.10.3-cp313-cp313-win_amd64.whl (8.1 MB)
Using cached numpy-2.2.6-cp313-cp313-win_amd64.whl (12.6 MB)
Using cached packaging-25.0-py3-none-any.whl (66 kB)
Using cached pandas-2.2.3-cp313-cp313-win_amd64.whl (11.5 MB)
Using cached pillow-11.2.1-cp313-cp313-win_amd64.whl (2.7 MB)
Using cached pyparsing-3.2.3-py3-none-any.whl (111 kB)
Using cached python_dateutil-2.9.0.post0-py2.py3-none-any.whl (229 kB)
Using cached pytz-2025.2-py2.py3-none-any.whl (509 kB)
Using cached six-1.17.0-py2.py3-none-any.whl (11 kB)
Using cached tzdata-2025.2-py2.py3-none-any.whl (347 kB)
Installing collected packages: pytz, tzdata, six, pyparsing, pillow, packaging, numpy, kiwisolver, fonttools, cyclor, python-dateutil, contourpy, pandas, matplotlib
Successfully installed contourpy-1.3.2 cyclor-0.12.1 fonttools-4.58.0 kiwisolver-1.4.8 matplotlib-3.10.3 numpy-2.2.6 packaging-25.0 pandas-2.2.3 pillow-11.2.1 pyparsing-3.2.3 python-dateutil-2.9.0.post0 pytz-2025.2 six-1.17.0 tzdata-2025.2

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