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1. **Data science is the scientific process of transforming data into insights that can support better decision-making.** Its goal is to generate actionable value from data through steps such as obtaining the data, exploring and understanding it, cleaning and preparing it for analysis, performing modeling and testing, drawing conclusions, and reporting the results to relevant stakeholders.

2. Data, Data Science, and Data Scientist
   - Data: Raw facts, numbers, text, images, or observations that on their own may not have meaning.
     Example: a list of sales transactions, sensor readings, or survey responses.
   - Data Science: The process or field that uses scientific methods, algorithms, and systems to analyze and extract insights from data to support decisions.
     Example: using statistical models to predict customer behavior from sales data.
   - Data Scientist: The professional or expert who applies data science techniques. They gather data, clean it, analyze it, build models, and communicate results to help solve problems or answer questions.
     Example: a data scientist working in healthcare might analyze patient data to improve treatment recommendations.

3. Explain about the four foundational aspects of data science?
   - **Mathematics**
     Covers key concepts like functions, relations, assumptions, conclusions, and abstraction to help understand data manipulation; also includes statistical tools like graphs, matrices, and machine learning.
   - **Technology**
     Builds on Python knowledge with advanced data handling, data cleaning, use of computational notebooks (like Jupyter), and tools like GitHub for version control and project sharing.
   - **Visualization**
     Focuses on learning different plot types for various data, understanding when and how to use visualizations, and creating interactive visual dashboards.
   - **Communication**
     Emphasizes writing clear code comments, documentation, and reports, explaining analysis results, and prioritizing clarity and conciseness for the target audience.

4. Here are the PyPI links for installing the requested libraries:
   - **Jupyter Notebook**:
     https://pypi.org/project/notebook/

- **Matplotlib**: https://pypi.org/project/matplotlib/
- **NumPy**: https://pypi.org/project/numpy/

5. Create a virtual environment, install some packages, and save information to requirements.txt, create other virtual environment and use requirements.txt. Show the screenshots for all processes.

```
In [1]: # Membuat virtual environment pertama
        !python -m venv venv1
```

```
In [2]: !venv1\Scripts\activate & pip install numpy pandas
```

```
Collecting numpy
  Downloading numpy-2.0.2-cp39-cp39-win_amd64.whl (15.9 MB)
Collecting pandas
  Downloading pandas-2.2.3-cp39-cp39-win_amd64.whl (11.6 MB)
Collecting python-dateutil>=2.8.2
  Downloading python_dateutil-2.9.0.post0-py2.py3-none-any.whl (229 kB)
Collecting pytz>=2020.1
  Downloading pytz-2025.2-py2.py3-none-any.whl (509 kB)
Collecting tzdata>=2022.7
  Downloading tzdata-2025.2-py2.py3-none-any.whl (347 kB)
Collecting six>=1.5
  Downloading six-1.17.0-py2.py3-none-any.whl (11 kB)
Installing collected packages: six, tzdata, pytz, python-dateutil, numpy, pandas
Successfully installed numpy-2.0.2 pandas-2.2.3 python-dateutil-2.9.0.post0 pytz-2025.2 six-1.17.0 tzdata-2025.2
```

```
In [3]: # Simpan informasi package yang sudah diinstall
        !venv1\Scripts\activate & pip freeze > requirements.txt
```

```
In [4]: # Buat virtual environment kedua
        !python -m venv venv2
```

```
In [5]: # Install semua dependensi dari requirements.txt ke environment kedua
        !venv2\Scripts\activate & pip install -r requirements.txt
```

```
Collecting numpy==2.0.2
  Using cached numpy-2.0.2-cp39-cp39-win_amd64.whl (15.9 MB)
Collecting pandas==2.2.3
  Using cached pandas-2.2.3-cp39-cp39-win_amd64.whl (11.6 MB)
Collecting python-dateutil==2.9.0.post0
  Using cached python_dateutil-2.9.0.post0-py2.py3-none-any.whl (229 kB)
Collecting pytz==2025.2
  Using cached pytz-2025.2-py2.py3-none-any.whl (509 kB)
Collecting six==1.17.0
  Using cached six-1.17.0-py2.py3-none-any.whl (11 kB)
Collecting tzdata==2025.2
  Using cached tzdata-2025.2-py2.py3-none-any.whl (347 kB)
Installing collected packages: six, tzdata, pytz, python-dateutil, numpy, pandas
Successfully installed numpy-2.0.2 pandas-2.2.3 python-dateutil-2.9.0.post0 pytz-2025.2 six-1.17.0 tzdata-2025.2
```

```
In [6]: !venv2\Scripts\activate & pip list
```

```
Package         Version
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numpy           2.0.2
pandas          2.2.3
pip             21.2.3
python-dateutil 2.9.0.post0
pytz            2025.2
setuptools      57.4.0
six             1.17.0
tzdata          2025.2
```