📄 CSV (Comma-Separated Values) Data Format

📄 Overview

CSV is a simple, widely-used data format for storing **tabular data** (data structured in rows and columns). Each line in a CSV file corresponds to a **row**, and each value within that line corresponds to a **column**, separated by a **delimiter**, typically a comma (`,`).

CSV is popular because it is:

- **Human-readable**
- **Lightweight**
- **Easily parsed** by programming languages and spreadsheet software (e.g., Excel, Google Sheets, Python, R)

📐 Structure

A typical CSV file has:

1. **Header row** (optional): Names of the columns.
2. **Data rows**: Each row contains values corresponding to the columns.

Basic Example

```
Name,Age,Major
Alice,21,Computer Science
Bob,22,Mathematics
Charlie,20,Physics
```

This represents a table like:

Name	Age	Major
Alice	21	Computer Science
Bob	22	Mathematics
Charlie	20	Physics

🌸 Key Concepts

1. Delimiters

While commas are standard, other delimiters like semicolons (`;`) or tabs (`\t`) may be used, especially in regions where commas are used as decimal points.

2. Quoting

Fields containing commas, newlines, or quotes must be enclosed in **double quotes** (`"`). Quotes inside fields are escaped by doubling them.

```
Name,Comment
Alice,"Loves ""data"", math, and science"
```

3. Missing Values

Empty fields represent missing data.

```
Name,Age,Major
Alice,21,
Bob,,Mathematics
```

🛠️ Use Cases

- **Data exchange** between systems (e.g., exporting from a database to Excel)
- **Data ingestion** in data science and machine learning workflows
- **Configuration files** for simple applications

⚠️ Limitations

- No support for nested or hierarchical data
- No data types (everything is a string)
- Ambiguity in delimiters and quoting rules across implementations

---

🎯 Quiz!

Here's a short quiz on the topic: quiz

![Footer Separator]

🔭 Markdown Viewer

How to view the markdown files in a browser…

- Markdown Viewer

🌸 Lecture Practices

Here are the lecture Practices…

- Day 10
- Day 11

🔍 Lecture Quizzes

Here are the lecture quizzes…

- Day 10
- Day 11

Weekly Topics

Here are the topics for the week…

- CSV
- Writing CSV
- Reading CSV
- Serializing
- Deserializing