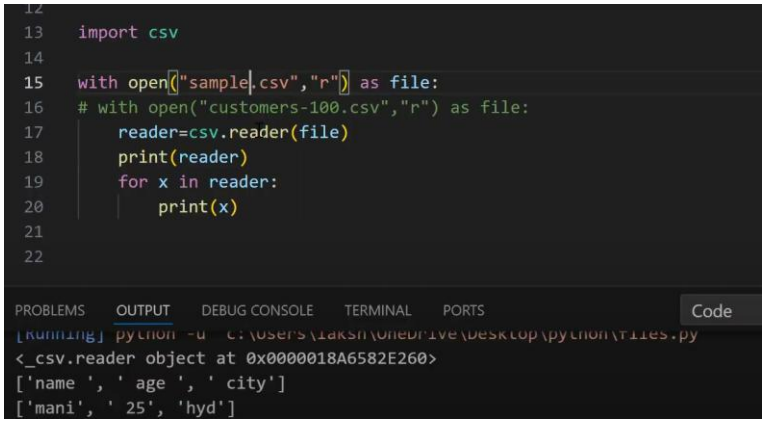
# CSV Files

- A simple way to store big data sets is to use CSV files (comma separated files).
- CSV files contains plain text and is a well know format that can be read by everyone including Pandas.
- In Python, We can work with CSV (Comma Separated Values) files using the built-in csv module or the popular Pandas library. The csv module provides tools for reading and writing CSV files, while Pandas offers a more user-friendly approach with its read_csv() and to_csv() functions.




## 1. Importing the csv Module

Before working with CSV files, you need to import Python's built-in csv module.

**import csv**

## 2. Reading a CSV File

You can read a CSV file using the csv.reader() method.

**Example: Reading a CSV File**

Assume **data.csv** contains:

```
Name,Age,City
Alice,25,New York
Bob,30,London
Charlie,22,Sydney
```

**Code:**

```
import csv
with open("data.csv", "r") as file:
   reader = csv.reader(file)  # Read file
   for row in reader:
      print(row)  # Each row is a list
```

**✓ Output:**

```
['Name', 'Age', 'City']
['Alice', '25', 'New York']
['Bob', '30', 'London']
['Charlie', '22', 'Sydney']
```

**Skipping Headers while Reading**

```
with open("data.csv", "r") as file:
   reader = csv.reader(file)
   next(reader)  # Skip header
   for row in reader:
      print(row)
```

✓ **Output (Without Headers):**

```
['Alice', '25', 'New York']
['Bob', '30', 'London']
['Charlie', '22', 'Sydney']
```

---

## 3. Writing to a CSV File

You can write data to a CSV file using csv.writer().

### Example: Writing Data to a CSV File

```
import csv
data = [
    ["Name", "Age", "City"],
    ["David", 28, "Berlin"],
    ["Emma", 24, "Paris"]
]

with open("output.csv", "w", newline="") as file:
    writer = csv.writer(file)  # Create writer object
    writer.writerows(data)  # Write all rows at once
```

✓ **Creates output.csv with:**

```
Name,Age,City
David,28,Berlin
Emma,24,Paris
```

**Writing One Row at a Time**

```
with open("output.csv", "w", newline="") as file:
    writer = csv.writer(file)
    writer.writerow(["Name", "Age", "City"])  # Write header
    writer.writerow(["John", 29, "New York"])  # Write single row
```

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## 4. Appending to a CSV File

Use "a" mode to append data **without overwriting**.

**Example: Appending Data**

```
with open("output.csv", "a", newline="") as file:
    writer = csv.writer(file)
    writer.writerow(["Sophia", 27, "Toronto"])
```

✓ **Adds new row to output.csv:**

```
Name,Age,City
John,35,Chicago
Anna,28,Los Angeles
Sophia,27,Toronto
```

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## 5. Reading CSV as Dictionary

Instead of lists, you can read CSV files as **dictionaries** using csv.DictReader().

### Example: Using DictReader

```
import csv

with open("data.csv", "r") as file:
    reader = csv.DictReader(file)
    for row in reader:
        print(row)  # Each row is an OrderedDict
```

✓ **Output:**

```
{'Name': 'Alice', 'Age': '25', 'City': 'New York'}
```

{'Name': 'Bob', 'Age': '30', 'City': 'London'}
{'Name': 'Charlie', 'Age': '22', 'City': 'Sydney'}

---

## 6. Writing CSV as Dictionary

You can write a dictionary into a CSV file using csv.DictWriter().

**Example: Using DictWriter**

```
import csv

data = [
   {"Name": "John", "Age": 35, "City": "Chicago"},
   {"Name": "Anna", "Age": 28, "City": "Los Angeles"}
]

with open("output.csv", "w", newline="") as file:
   fieldnames = ["Name", "Age", "City"]
   writer = csv.DictWriter(file, fieldnames=fieldnames)

   writer.writeheader()  # Write header
   writer.writerows(data)  # Write multiple rows
```

**✓ Creates output.csv with:**

```
Name,Age,City
John,35,Chicago
Anna,28,Los Angeles
```

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## 7. Handling Different Delimiters (e.g., ;, |)

By default, CSV files use a **comma (,)** as a separator. You can change this using the delimiter argument.

**Example: Using ; as a Separator**

```
with open("data.csv", "r") as file:
   reader = csv.reader(file, delimiter=";")  # Change delimiter
   for row in reader:
      print(row)
```

**✓ For a file containing:**

```
Name;Age;City
Alice;25;New York
```

**✓ Output:**

```
['Name', 'Age', 'City']
['Alice', '25', 'New York']
```

**Example: writing a new delimeter**

```
import csv
data = [
   ["Name", "Age", "City"],
   ["Sophia", 27, "Toronto"],
   ["John", 30, "New York"]
]
with open("data2.csv", "w", newline="") as file:
   writer = csv.writer(file, delimiter="|")  # Use '|' as delimiter
   writer.writerows(data)
```

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## 8. Handling Quotes in CSV Files

Sometimes, CSV fields contain **commas or quotes**. You can handle them using the quotechar argument.

### Example: Handling Quotes

```
with open("data.csv", "r") as file:
    reader = csv.reader(file, quotechar=' " ')
    for row in reader:
        print(row)
```

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## 9. Checking if a CSV File Exists Before Writing

```
import os
import csv

filename = "output.csv"

if not os.path.exists(filename):
    with open(filename, "w", newline="") as file:
        writer = csv.writer(file)
        writer.writerow(["Name", "Age", "City"])  # Write header
```

This **prevents overwriting existing files**.

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## 10. Using pandas for CSV Files (Alternative)

The pandas library provides a simpler way to work with CSV files.

### Reading a CSV File

```
import pandas as pd

df = pd.read_csv("data.csv")
print(df)
```

### Writing a CSV File

```
df.to_csv("output.csv", index=False)
```

✓ **This automatically handles headers, delimiters, and formatting!** 🚀

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### Conclusion

- ✅ csv.reader() → Reads CSV file as a **list of lists**
- ✅ csv.writer() → Writes data to a CSV file
- ✅ csv.DictReader() → Reads CSV file as **dictionary**
- ✅ csv.DictWriter() → Writes data to a CSV file as **dictionary**
- ✅ pandas → Easier CSV handling with read_csv() and to_csv()

Python's csv module provides a **powerful yet simple way** to handle structured data!