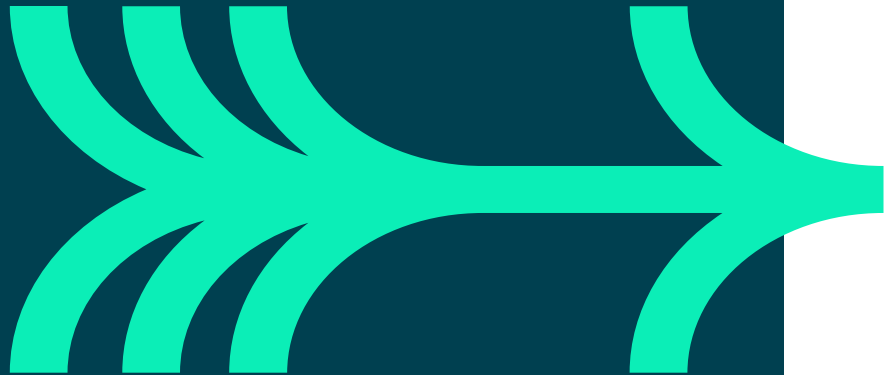# Persistent data: files

The Topic: What?

- An introduction to persistent data in Python
  - Ways to save data in non-volatile storage
  - File interaction sequential access
  - Pickle an Object
  - Shelving

Applications: Why?

- To store data in non-volatile storage
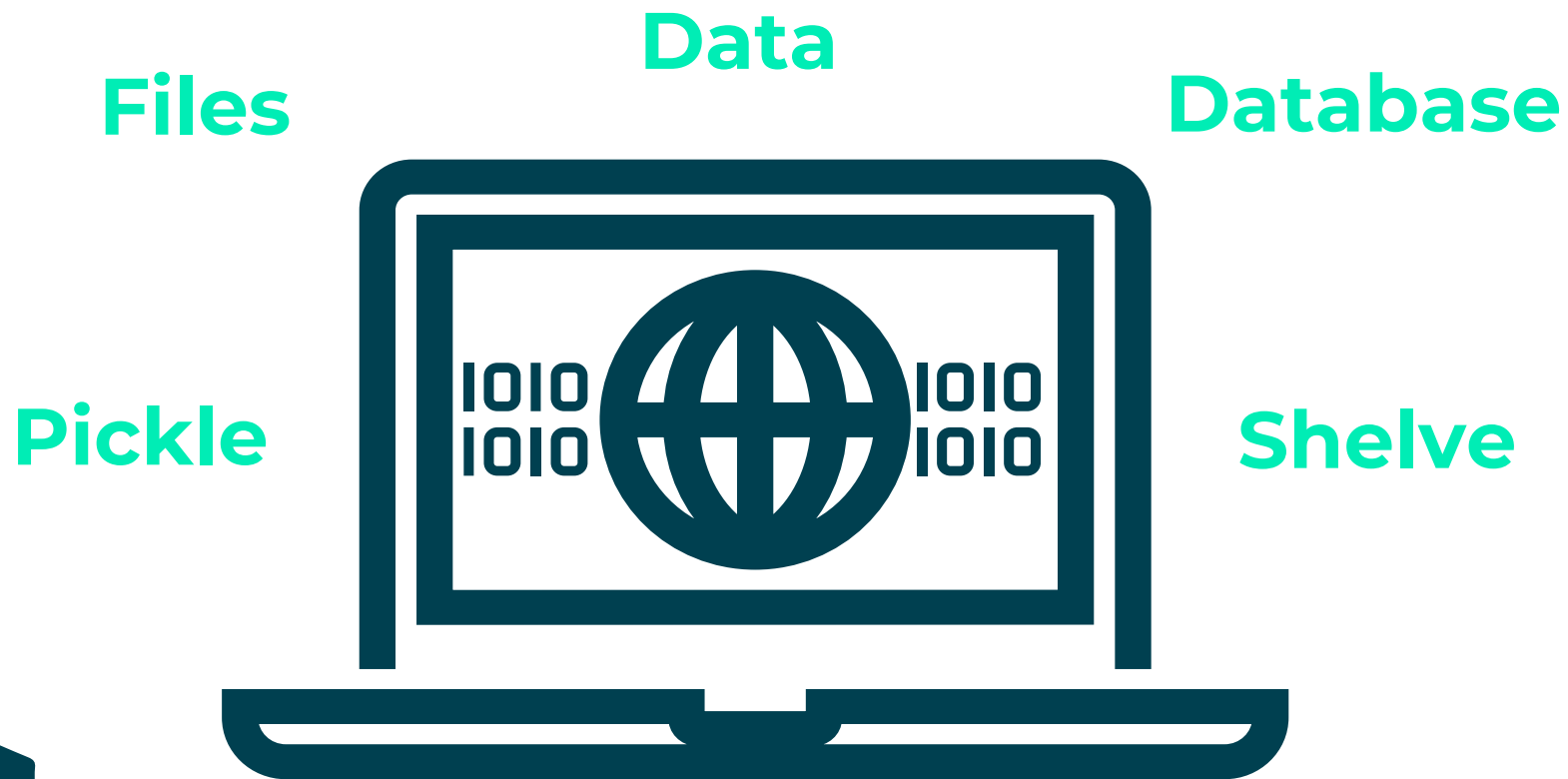
- To know how to use Python for file interaction

Expectations: Who?

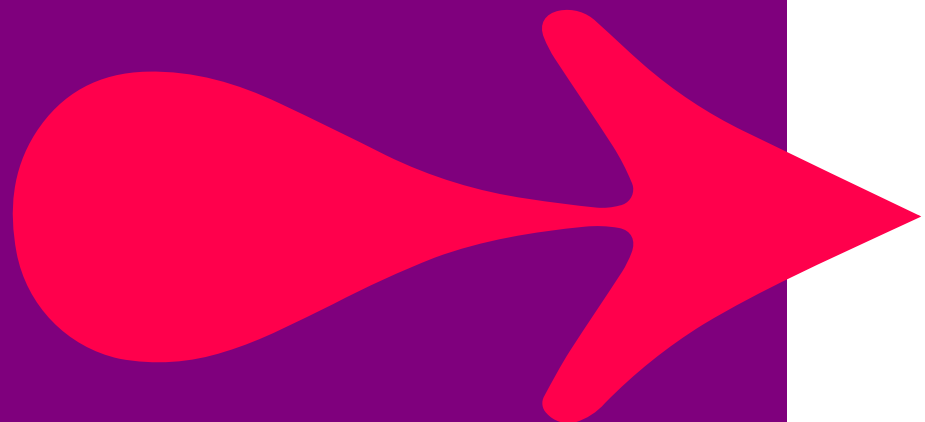- Learners are expected to have covered fundamental programming in Python previously.

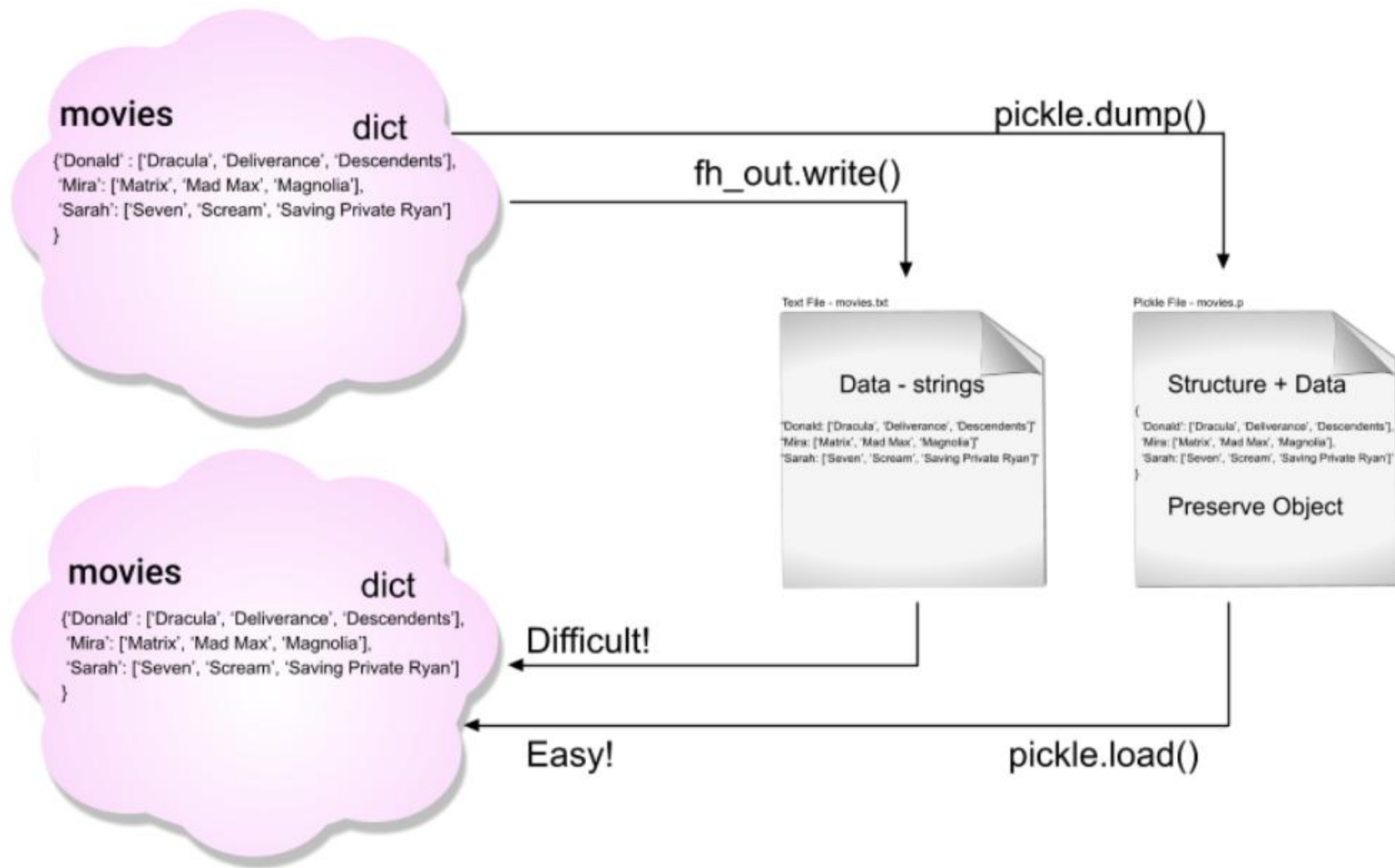# File interaction sequential access

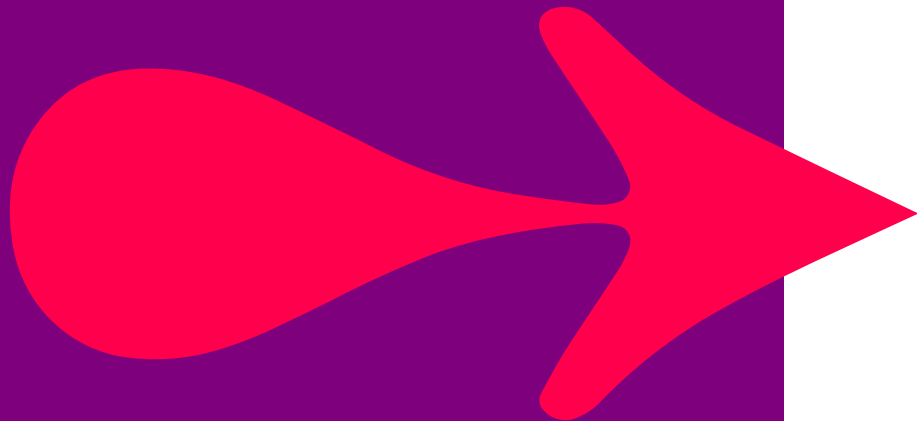## Trainer demonstration

demo_sequential_rw.py

Pickle an object

Pickle an object

Trainer demonstration

demo_pickle.py

Pickling converts any Python object, except functions, into a stream of bytes - preserving the Data plus its STRUCTURE!

Resultant pickle files can be written in a number of formats - this is called the pickle protocol and is a named parameter for the pickle dump function. Choose from:
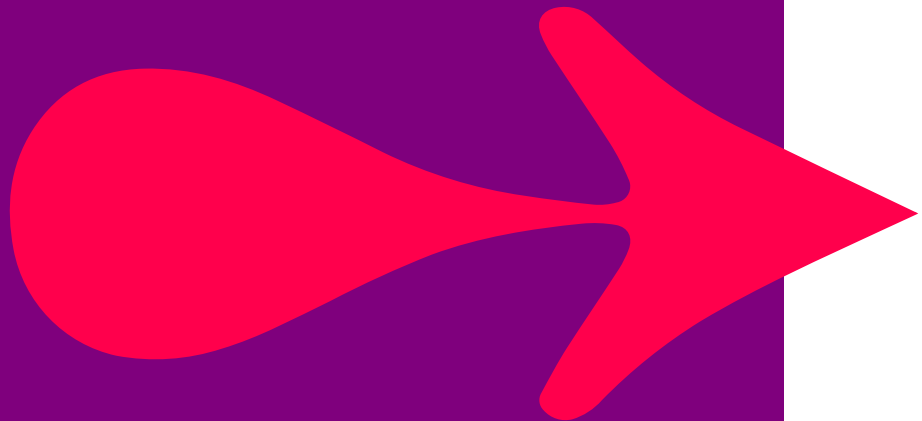
- protocol=0 (ASCII for backwards compatability)

- protocol=1 (Binary)

- protocol=2 (Binary from Python 2.3)

- protocol=3 or pickle.DEFAULT_PROTOCOL (Binary from Python 3.0)

- protocol=4 or pickle.HIGHEST_PROTOCOL (Binary from Python 3.4)

Shelving

Trainer demonstration

demo_shelve.py

Learning check

5-10 mins

Quiz!

1. What is the default mode for the built-in open() function?

2. What is the default buffering mode for text files?

3. Which Python standard library module preserves ONE Python object to a file?

4. Which Python standard library module preserves MULTIPLE Python objects to a file?

QA

Solutions

Persistent Storage quiz

1. What is the default mode for the built-in open() function?

   Answer: "rt" = Read and Text mode

2. What is the default buffering mode for text files?

   Answer: Line Buffering

3. Which Python standard library module preserves ONE Python object to a file?
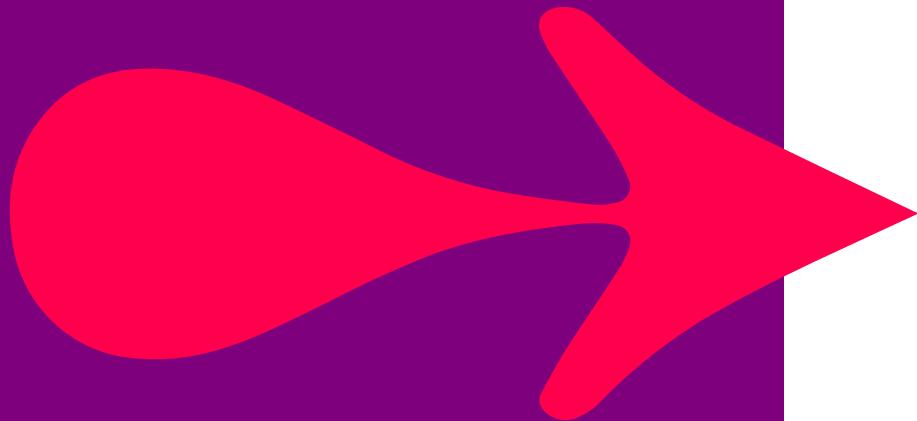
   Answer: pickle

4. Which Python standard library module preserves MULTIPLE Python objects to a file?

   Answer: shelve

Labs

1. **Open the file C:\labs\top250_movies.txt.** Notice it contains the top 250 movies as voted by IMDb online users.

2. Create a script called **display_movies.py** in the **C:\labs** folder that will **open** and retrieve the movies one at a time. Display the movies names and remember to **close** the file when finished. Use f-strings to display the movie information.

3. You may have noticed that the movie titles are in lower case. Modify the script so that each word of the movie title is capitalised.

4. Modify the script to display the ranking from 1 to 250 next to the movie title. Use the built-in enumerate() function to generate the ranking.

Stretch Exercises 5-6

END OF SECTION
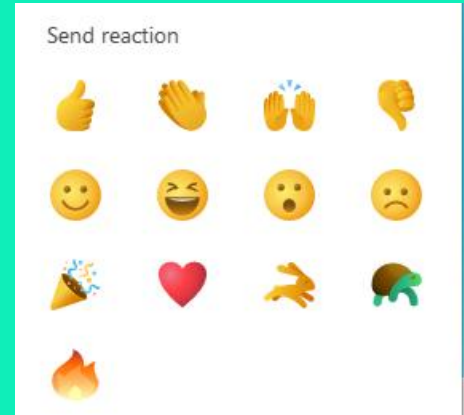
An introduction to persistent data in Python
- Ways to save data in non-volatile storage
- File interaction sequential access
- Pickle an Object
- Shelving

•To store data in non-volatile storage

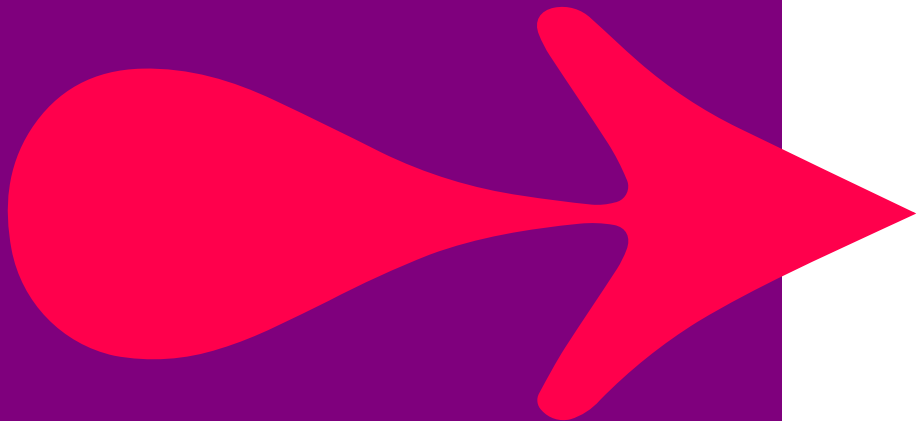•To know how to use Python for file interaction

EXTENSION MATERIALS

File Interaction Text Random Access

 - demo_random_rw_text.py

File Interaction Binary Random Access

- demo_random_rw_binary.py

REMINDER: TAKE A BREAK!

10.30 - 10.40
11.40 – 12.50
12.50 – 13.30
14.30 – 14.40
15.40 – 15.50

Your Body on Walking

Ridiculously simple, astonishingly powerful, scientifically proven by study after study: Sneaking in a few minutes a day can transform your health, body, and mind. Why are you still sitting?

BRAIN: Just 2 hours of walking a week can reduce your risk of stroke by 30%.

MEMORY: 40 minutes 3 times a week protects the brain region associated with planning and memory.

MOOD: 30 minutes a day can reduce symptoms of depression by 36%.

HEALTH: Logging 3,500 steps a day lowers your risk of diabetes by 29%.

LONGEVITY: 75 minutes a week of brisk walking can add almost 2 years to your life.

HEART: 30 to 60 minutes most days of the week drastically lowers your risk of heart disease.

BONES: 4 hours a week can reduce the risk of hip fractures by up to 43%.

WEIGHT: A daily 1-hour walk can cut your risk of obesity in half.