Files

Week 7

What is a file?

- So far, our programs lose the data they use or provide once execution ends

- Next, we will learn how to save data to **files** so that it can be accessed later

- A **file** is a collection of data stored on a computer's storage device.

- The storage device for files on a computer are the hard disk drive (HDD) or solid-state drive (SSD)

- There are different kinds of files: *images, audio, video, programs, spreadsheets*, etc. etc.

Text files

- Text files store data in a format using plain text. They typically contain characters **human-readable** from a character set like ASCII or Unicode.

- Common **extensions** include .txt, .csv, .html, .xml, etc.

- The content is organized as **lines of text**, which can be easily read and edited using text editors.

- Ideal for storing **readable** data like documents, source code, configuration files, simple data tables, and logs.

Example: A text file might contain:

```
Hello, World!
This is a text file.
```

Binary Files

- Binary files store data in a format that is **not human-readable**.
- The data is stored as a **sequence of bits** in a "raw" format.
- Data in binary file can be directly interpreted by the computer's hardware or software.
- Common **extensions** include .bin, .exe, .jpg, .png, .dat, etc.
- The content can include any type of data, such as *images*, *audio*, *video*, executable *programs*, etc.

Key differences

- Text files are **human-readable**, while binary files are not.
- Text files can be **easily edited** with simple text editors, whereas binary files require specialized software.
- Text files represent data as characters, while binary files represent data as raw bytes.

In this course we concentrate on text files only.

File operations

- **Opening a file** for a specific purpose (read, write, append)
- **Reading from a file**
- **Writing to a file**
- **Appending to a file:** Adds new content to the end of the file without deleting existing content.
- **Closing a file:** Closes the file to free up system resources