

Data Structures and Programmatic Thinking

Session 13

Pepe García jgarciah@faculty.ie.edu

2020-09-23

Plan for today

- Handling files in Python

Plan for today

- Handling files in Python
- CSV files

the **open** function

We can use **open()** to open a file in Python, we only need to pass the path of the file we want to open. Let's say there's a file named `hello.txt` in my desktop that I want to open and read from Python, I can do it as follows:

the **open** function

We can use **open()** to open a file in Python, we only need to pass the path of the file we want to open. Let's say there's a file named `hello.txt` in my desktop that I want to open and read from Python, I can do it as follows:

```
file = open("/Users/pepe/Desktop/hello.txt")
```

closing files

Something very important we must do if we're going to deal with files is to close them. Once we've opened them, we can directly call **close()** on them at any point to close them.

closing files

Something very important we must do if we're going to deal with files is to close them. Once we've opened them, we can directly call **close()** on them at any point to close them.

```
file = open("/Users/pepe/Desktop/hello.txt")
```

```
# deal with the file
```

```
file.close()
```

Reading the contents of a file

Now that we know how to open and close files, we can read the contents of a file. Let's do that line by line.

Reading the contents of a file

Now that we know how to open and close files, we can read the contents of a file. Let's do that line by line.

```
file = open("/Users/pepe/Desktop/hello.txt")  
  
for line in file:  
    print(line)  
  
file.close()
```

Reading the contents of a file

Now that we know how to open and close files, we can read the contents of a file. Let's do that line by line.

```
file = open("/Users/pepe/Desktop/hello.txt")  
  
for line in file:  
    print(line)  
  
file.close()
```

As you can see, we're treating file as a list of lines.

Be careful with closed files

If you try to operate with a file that has already been closed, you'll see an error.

```
file = open("/Users/pepe/Desktop/hello.txt")
```

```
# In this line we're closing the file
```

```
file.close()
```

```
# trying to do this will cause an error
```

```
for line in file:
```

```
    print(line)
```

Be careful with closed files

If you try to operate with a file that has already been closed, you'll see an error.

```
file = open("/Users/pepe/Desktop/hello.txt")
```

```
# In this line we're closing the file
```

```
file.close()
```

```
# trying to do this will cause an error
```

```
for line in file:
```

```
    print(line)
```

ValueError: I/O operation on closed file.

Interlude, **with**

there is a useful Python keyword that one can use to make sure that the file will always be closed, **with**:

Interlude, **with**

there is a useful Python keyword that one can use to make sure that the file will always be closed, **with**:

```
with open("file_path") as file:
```

```
    for line in file:
        #do something with line
        print(line)
```

Handling files. modes

When opening a file, we can choose in which **mode** we open it depending on how we're going to use it.

I/O Mode	Syntax	Behavior
Read	'r'	Opens the contents of a file for reading into the file interface, allowing for lines to be read-in successively.
Write	'w'	Creates a file with the specified name and allows for text to be written to the file; note that specifying a pre-existing filename will overwrite the existing file.
Append	'a'	Opens an existing file and allows for text to be written to it, starting at the conclusion of the original file contents.
Read and Write	'r+'	Opens a file such that its contents can be both read-in and written-to, thus offering great versatility.

Python's available file-access modes are summarized here.

doi:10.1371/journal.pcbi.1004867.t004

Figure 1: file modes

Writing files

We can write into files in a way similar to the one used for reading them.

Writing files

We can write into files in a way similar to the one used for reading them.

```
with open('/Users/pepe/Desktop/goodbye.txt', 'w') as file:  
    file.write("goodbye y'all!")
```

Checkpoint

Checkpoint

Is everything clear so far? do you have any question?

CSV files

Python comes with a **CSV** library that we can use out of the box. We use it by **importing** it. **Imports** are commonly added at the top of the file.

```
import csv
```

CSV files

The **csv** library is based on the idea of readers and writers. One can read all lines in a file like so:

```
with open("file.csv") as f:
    reader = csv.reader(f)
    for line in reader:
        print(line) #line will be a list here
```

CSV files

The **csv** library is based on the idea of readers and writers. One can read all lines in a file like so:

```
with open("file.csv") as f:
    reader = csv.reader(f)
    for line in reader:
        print(line) #line will be a list here
```

first we open the file normally

CSV files

The **csv** library is based on the idea of readers and writers. One can read all lines in a file like so:

```
with open("file.csv") as f:
    reader = csv.reader(f)
    for line in reader:
        print(line) #line will be a list here
```

first we open the file normally

Then we create a reader using **csv.reader()**

CSV files

The **csv** library is based on the idea of readers and writers. One can read all lines in a file like so:

```
with open("file.csv") as f:
    reader = csv.reader(f)
    for line in reader:
        print(line) #line will be a list here
```

first we open the file normally

Then we create a reader using **csv.reader()**

Finally, we operate with the reader

CSV files

writing is not very different from reading:

```
lines = [  
    ["asdf", "qwer"],  
    ["hello", "world"]  
]  
  
with open("file.csv", "a") as f:  
    writer = csv.writer(f)  
    for line in lines:  
        writer.writerow(line)
```


CSV files

writing is not very different from reading:

```
lines = [  
    ["asdf", "qwer"],  
    ["hello", "world"]  
]  
  
with open("file.csv", "a") as f:  
    writer = csv.writer(f)  
    for line in lines:  
        writer.writerow(line)
```

First we need some data to put in the csv file

CSV files

writing is not very different from reading:

```
lines = [  
    ["asdf", "qwer"],  
    ["hello", "world"]  
]  
  
with open("file.csv", "a") as f:  
    writer = csv.writer(f)  
    for line in lines:  
        writer.writerow(line)
```

First we need some data to put in the csv file

Then we open the file with the append mode

. . . Later, we create a **csv.writer**

CSV files

writing is not very different from reading:

```
lines = [  
    ["asdf", "qwer"],  
    ["hello", "world"]  
]  
  
with open("file.csv", "a") as f:  
    writer = csv.writer(f)  
    for line in lines:  
        writer.writerow(line)
```

First we need some data to put in the csv file

Then we open the file with the append mode

. . . Later, we create a **csv.writer**