

# File IO

## Python for Ecologists

Tao Hong, Tom Purucker, Jonathan Flaishans, Marcia  
Snyder

Ecological Society of America Workshop  
Minneapolis, MN

[hongtao510@gmail.com](mailto:hongtao510@gmail.com)

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# Overview of files

- What is a file?
- Where is a file stored?
- Reading files
- Writing files
- Opening files on the Internet
- Hairy Issues
- Problems!

# What is a file?

- Technically - long strings of 0s and 1s
- Informally - a name for the place your program reads from and writes to

# Where is a file stored?

- Files can be stored on your computer, or on a remote computer.
  - When files are on your computer, life is easy, ex:
    - 'myFileName.txt'
  - When files are on a remote computer, you need a specific protocol to retrieve them, ex:
    - 'http://mywebsite.com/myFileName.txt'

# How do I get data out of a file?

- 1 Open the file.

```
file = open("myFileName.txt")
```

- 2 Loop through the File (here we loop through)

```
for line in file:  
    print(line)    # line is a string, lets print
```

- 3 Close the File

```
file.close()
```

# I want to do more than print!

## ■ Code:

```
file = open('myFileName.txt')
for line in file:
    print(line)    # line is a string, lets print it!
file.close()
```

- line is a string, so we can do whatever we want to it. If the line is a sentence, and we wanted to break it up by words, we could do this instead :

```
file = open('myFileName.txt')
for line in file:
    for word in line.split():
        print(word)    # lets print each word!
file.close()
```

# I want to save a file

- We can open a file for writing, as well as reading.

```
file = open('anotherFile.txt', 'w')  
file.write('This_is_output!\n')  
file.close()
```

- Be careful not to overwrite an important file!

# How can we open a file from the Internet?

- The 'urlopen' function tries to open URLs

```
import urllib2  
file = urllib2.urlopen( 'YourFilePathHere' )
```



# Why you'll hate files

- Files can be open in different modes
  - w - write
  - a - appends
  - r - read (default)
  - and more!
- Files involve string parsing and manipulation
  - This can be a real pain!
  - Corruption prone!

# Exercise

## 1 Read a file

- 1 Read StateoftheUnion.txt
- 2 Output each word on its own line

## 2 Sum a file

- 1 Read IntegerFile.txt, which has many numbers on one line.
- 2 Calculate the sum, and the mean. Hint, the `int()` function turns a string into a number.

## 3 File copier

- 1 Copy <http://www.ubertool.org/index.html> to a file on your local disk.