

Section Overview

What You Will Learn

- Reading files
- Writing to files
- Opening and closing files
- File objects
- String methods

What You Will Learn

- Reading files, one line at a time
- File modes
- Line endings (Unix vs Windows)
- Exceptions

Files

Part I

Files

Part II

Input and Output

- `input()` - Accept standard input
- `print()` - Write standard output
- Files are great for storage that lasts beyond the execution of a program.

File Input and Output

`open()` - Built-in Function that opens a file and returns a file object.

```
open(path_to_file)
```

`path_to_file` - Can be absolute or relative.

```
open('/var/log/messages')
```

```
open('log/messages')
```

File Input and Output

```
open('C:\Log\Messages\data.txt')
```

```
open('C:/Users/jason/Documents/python-notes.txt')
```

```
open('Documents/python-notes.txt')
```

File Objects (Stream Objects)

```
hosts = open('/etc/hosts')  
hosts_file_contents = hosts.read()  
print(hosts_file_contents)
```

```
127.0.0.1 localhost
```

File Objects (Stream Objects)

```
hosts = open('C:/Windows/System32/drivers/etc/hosts')
hosts_file_contents = hosts.read()
print(hosts_file_contents)
```

```
# Copyright (c) 1993-2009 Microsoft Corp.
#
# This is a sample HOSTS file used by Microsoft TCP/IP
# for Windows.
#
```

File Position

`read ()` - Returns the entire file.

`seek (offset)` - Change the current position to offset.

`seek (0)` - Go to the beginning of the file.

`seek (5)` - Go to the 5th byte of the file.

`tell ()` - Determine the current position in the file.

```
hosts = open('/etc/hosts')
print('Current position: {}'.format(hosts.tell()))
print(hosts.read())

print('Current position: {}'.format(hosts.tell()))
print(hosts.read())

hosts.seek(0)
print('Current position: {}'.format(hosts.tell()))
print(hosts.read())
```

```
Current position: 0  
127.0.0.1 localhost
```

```
Current position: 20
```

```
Current position: 0  
127.0.0.1 localhost
```

```
hosts = open('/etc/hosts')  
print(hosts.read(3))  
print(hosts.tell())
```

127

3

```
hosts = open('/etc/hosts')
hosts_file_contents = hosts.read()
print(hosts_file_contents)
hosts.close()
```

```
127.0.0.1 localhost
```

```
hosts = open('/etc/hosts')
hosts_file_contents = hosts.read()
print('File closed? {}'.format(hosts.closed))
if not hosts.closed:
    hosts.close()
print('File closed? {}'.format(hosts.closed))
```

File closed? False

File closed? True

Automatically Closing a File

```
with open(file_path) as file_object_variable_name:  
    # Code block
```

```
print('Started reading the file.')
with open('/etc/hosts') as hosts:
    print('File closed? {}'.format(hosts.closed))
    print(hosts.read())
print('Finished reading the file.')
print('File closed? {}'.format(hosts.closed))
```

```
Started reading the file.
File closed? False
127.0.0.1 localhost
Finished reading the file.
File closed? True
```

This is line one.
This is line two.
Finally, we are on the third and last line of the file.

```
with open('file.txt') as the_file:  
    for line in the_file:  
        print(line)
```

This is line one.

This is line two.

Finally, we are on the third and last line of the file.

This is line one.
This is line two.
Finally, we are on the third and last line of the file.

```
with open('file.txt') as the_file:  
    for line in the_file:  
        print(line.rstrip())
```

This is line one.
This is line two.
Finally, we are on the third and last line of the file.

File Modes

```
open(path_to_file, mode)
```

Mode	Description
r	Open for reading (default)
w	Open for writing, truncating first
x	Create a new file and open it for writing
a	Open for writing, appending to file

File Modes, continued

Mode	Description
+	Open a file for updating (read/write)
b	Binary mode
t	Text mode (default)

```
open('/pics/cat.jpg', rb)
```

Checking the file mode

```
with open('file.txt') as the_file:  
    print(the_file.mode)
```

r

```
with open('file2.txt', 'w') as the_file:
    the_file.write('This text will be written to
the file.')
    the_file.write('Here is more text.')

with open('file2.txt') as the_file:
    print(the_file.read())
```

This text will be written to the file. Here is more text.

Carriage Returns and Line Feeds

`\r` Carriage Return

`\n` New line

`\n` Unix/Linux/Mac line endings.

`\r\n` Windows style line endings.

```
with open('file2.txt', 'w') as the_file:
    the_file.write('This text will be written to
the file.\n')
    the_file.write('Here is more text.\n')

with open('file2.txt') as the_file:
    print(the_file.read())
```

This text will be written to the file.
Here is more text.

Binary Files

```
with open('cat.jpg', 'rb') as cat_picture:  
    cat_picture.seek(2)  
    cat_picture.read(4)  
    print(cat_picture.tell())  
    print(cat_picture.mode)
```

6

rb

```
# Open a file and assign its contents to a variable.  
# If the file is unavailable, create an empty variable.  
try:  
    contacts = open('contacts.txt').read()  
except:  
    contacts = ''  
  
print(len(contacts))
```

319

Section Summary

Summary

- To open a file, use the built-in `open()` function.

```
open(path_to_file, mode)
```

- If mode is omitted when opening a file it defaults to read-only.
- Forward slashes can be used as directory separators, even in Windows.

Summary

- The `read()` file object method returns the entire contents of the file as a string.
- To close a file, use the `close()` file object method.
- To automatically close a file use the `with` statement.

```
with open(file_path) as file_object_variable_name:
```

```
# Code Block
```

Summary

- To read a file one line at a time, use a for loop.

```
for line_variable in file_object_variable:
```

- To remove any trailing white space use the `rstrip()` string method.
- Write data to a file using the `write()` file object method.

Summary

- When a file is opened in binary mode, the `read()` method accepts bytes. When a file is opened in text mode, which is the default, `read()` accepts characters.
- In most cases a character is one byte in the length, but this does not hold true in every situation. (UTF-8)

Summary

- Plan for exceptions when working with files.
Use try/except blocks.