Programing in Python

Lecture 5b - Files

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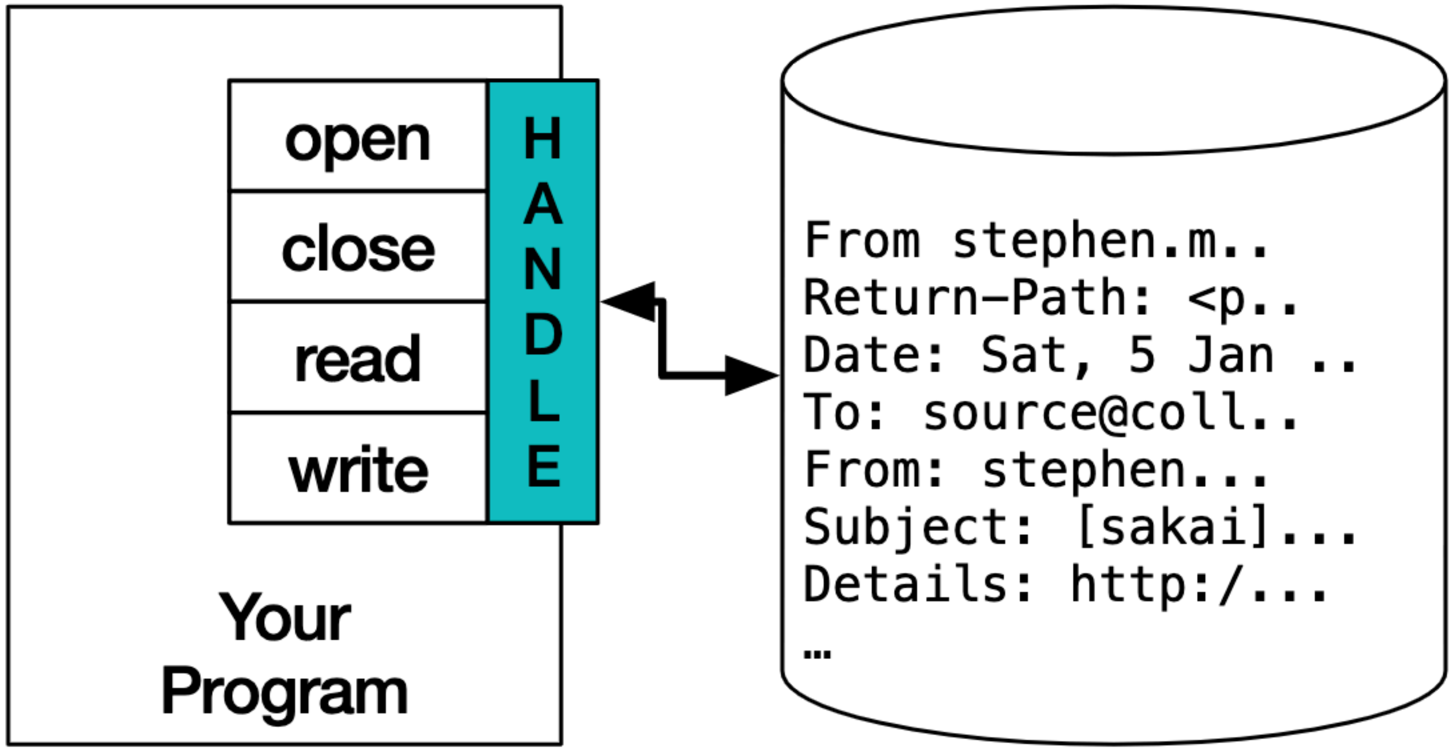
Outline

- Opening and Closing Files
- Reading Files
- Writing to Files

Working with Files

- Working with files has several stages:
  - **Open** a file - get its **handle**
  - **Read** or **Write** to the file some data using its handle
  - **Close** a file - free memory



open

close

read

write

HANDLE

Your Program

```
From stephen.m..
Return-Path: <p..
Date: Sat, 5 Jan ..
To: source@coll..
From: stephen...
Subject: [sakai]...
Details: http:/...
…
```

Opening Files

- To open a file, we use **open( )** function with 2 parameters:
  - file name (path)
  - opening mode - ‘r’ (read) or ‘w’ (write)
- open( ) returns a **handle** to a file

```
>>> fin = open(‘mailbox.txt’, ‘r’)
>>> fin
<_io.TextIOWrapper name='mailbox.txt' mode='r' encoding=‘UTF-8’>
>>>
>>> fin = open('tmp.txt', 'w')
>>> fin
<_io.TextIOWrapper name='tmp.txt' mode='w' encoding='UTF-8'>
```

Closing Files

- After we finish working with a file, we **must** close the file
- To close a file we use **close( )** function with file’s handle.

```
>>> fout = open('tmp.txt', ‘w’)
>>>
>>> # working with file ...
>>>
>>> fout.close()
```

Problems with Files

- When working with files some problems may happen:
    - Filename is not correctly given
    - File is not found on the path
    - No disk space to write file
    - No permissions to read/write files

```
>>> fin = open('greet.py')
Traceback (most recent call last):
  File "<stdin>", line 1, in <module>
PermissionError: [Errno 13] Permission denied: ‘greet.py’

>>> fhand = open('stuff.txt')
Traceback (most recent call last):
File "<stdin>", line 1, in <module>
FileNotFoundError: [Errno 2] No such file or directory: 'stuff.txt'
```

try … except …

- To prevent unexpected behavior use **try…except…** construction while opening a file

```
fname = input('Enter the file name: ')
try:
    fhand = open(fname)
except:
    print('File cannot be opened:', fname)
    exit()
```

Reading Files

- Once you have a handle to a file, we can scan the file line by line:

```
try:
    fhand = open(“input.txt”)
except:
    print('File cannot be opened')
    exit()

count = 0
for line in fhand:
    count = count + 1
    print(line)
print('Line Count:', count)

fhand.close()
```

Reading Files

- Also, we read the whole file at once with
  - read( ) — reads all the file as one text
  - readlines( ) — reads file as list
- This approach is good for small files only !!!

```
try:
    fhand = open(“input.txt”)
except:
    print('File cannot be opened')
    exit()

lines = fhand.readlines()

fhand.close()

count = 0
for line in lines:
    count = count + 1
    print(line)
print('Line Count:', count)
```

Searching through a file

- Once you have a handle to a file, we can scan the file line by line:

```
fname = ‘input.txt’

try:
    fhand = open(fname)
except:
    print('File cannot be opened:', fname)
    exit()

for line in fhand:
    line = line.rstrip()
    if line.startswith('From:'):
        print(line)


fhand.close()
```

Writing Files

- To write data into the file, we use **write( )** function

```
>>> fout = open('output.txt', 'w')
>>> line1 = "This here's the wattle,\n"
>>> fout.write(line1)
>>> line2 = 'the emblem of our land.\n'
>>> fout.write(line2)
>>> fout.close()
```

Thanks!