7.4: READING FILES

Contributed by Chuck Severance
Clinical Associate Professor (School of Information) at University of Michigan

While the *file handle* does not contain the data for the file, it is quite easy to construct a `for` loop to read through and count each of the lines in a file:

```
fhand = open('mbox-short.txt')
count = 0
for line in fhand:
    count = count + 1
print('Line Count:', count)

# Code: http://www.py4e.com/code3/open.py
```

We can use the file handle as the sequence in our `for` loop. Our `for` loop simply counts the number of lines in the file and prints them out. The rough translation of the `for` loop into English is, "for each line in the file represented by the file handle, add one to the `count` variable."

The reason that the `open` function does not read the entire file is that the file might be quite large with many gigabytes of data. The `open` statement takes the same amount of time regardless of the size of the file. The `for` loop actually causes the data to be read from the file.

When the file is read using a `for` loop in this manner, Python takes care of splitting the data in the file into separate lines using the newline character. Python reads each line through the newline and includes the newline as the last character in the `line` variable for each iteration of the `for` loop.

Because the `for` loop reads the data one line at a time, it can efficiently read and count the lines in very large files without running out of main memory to store the data. The above program can count the lines in any size file using very little memory since each line is read, counted, and then discarded.

If you know the file is relatively small compared to the size of your main memory, you can read the whole file into one string using the `read` method on the file handle.

```
>>> fhand = open('mbox-short.txt')
>>> inp = fhand.read()
>>> print(len(inp))
94626
>>> print(inp[:20])
From stephen.marquar
```

In this example, the entire contents (all 94,626 characters) of the file `mbox-short.txt` are read directly into the variable `inp`. We use string slicing to print out the first 20 characters of the string data stored in `inp`.

When the file is read in this manner, all the characters including all of the lines and newline characters are one big string in the variable *inp*. Remember that this form of the `open` function should only be used if the file data will fit comfortably in the main memory of your computer.

If the file is too large to fit in main memory, you should write your program to read the file in chunks using a `for` or `while` loop.