Writing a 'Virus' in Python

CE235 Assignment 1 2016-17

Specification

The aim of the assignment is to write a Python 3 program which will modify another program. Specifically, it will do the following:

- Open a file called 'sfs.py' in the current directory (folder)
- Go to line 52 and add '`; print( "Virus" )`' to that line
- Save the file under its original name.

We provide a sample file sfs.py. It can be run from the command line like this:

```
python sys.py
```

This program computes the number of lines in a file and also the number of characters. For simplicity in the assignment, it always uses the file 'file.txt' when called from the command line as above.

The output of sfs when run is:

```
Number of lines: 2
Number of characters: 41
```

Your program should be called something like richard_sutcliffe.py (see below). Your program should run from the command line like this:

```
python richard_sutcliffe.py
```

You do not specify the file to be infected because it should always be sfs.py. The result of running your program as above will be that line 52 is modified in sfs.py.

Once the file has been modified by your program, the modified sfs.py should still work. It will produce different output:

```
Virus
Virus
Number of lines: 2
Number of characters: 41
```

How to Solve it

Take a look at sfs.py. When run, it tells you the number of lines in a file and also the number of characters, as described above. We can run it from the command line as we have already shown. We can also load it into Python ourselves and run it like this:

```
python
from sfs import *
sfs( "file.txt" )
```

Once the program is infected it will still produce the same information but it will write a lot of lines saying 'Virus' on the screen.

These are the steps to follow to solve the problem:

- Open the file for reading - you can see how to do this in sfs.py;
- Read the lines in the file into a list;
- Close the file;
- Open the same file for writing;
- Go through the list of lines and write lines 1 to 51 to the new file;
- Now we come to the line which we wish to change. Remove the newline from the end of it, add '`; print( "Virus" )`' to the end, add a newline, and finally write it to the new file;
- Write line 53 to the end to the new file. In other words, write line 53, line 54, etc up until, and including, the last line;
- Close the file.

Note these points:

Python indexes from zero and not from 1. If we have a list line_list and we want line 52 it will be

```
line_list[ 51 ]
```

When you read the file into the list, it will include the newlines '\n' at the end of each line. That is what we want. However, we must remove the newline on line 52 before adding our new text and add a newline at the end as well.

To take a substring of a line, e.g. the first two characters you can do

```
myline[ 0 : 2 ]
```

You can also count from the end using negative integers. So, to take the last character off a line (e.g. the newline in our case) we can do:

```
myline[ 0 : -1 ]
```

To make a for loop e.g. 0 to 4 you can do

```
for x in range( 0, 4 ):
    print( x )
```

To make your program run from the command line as specified, see the code at the bottom of sfs.py. In fact, most of the code you need can be found in sfs.py.

Note: The above points are suggestions. You can use any method to solve the problem as long as everything is written in Python 3. Please do not use Python 2.7 or any other programming language.

Labs

We have a two-hour lab on the Tuesday of the submission week. It is envisaged that you can finish everything in that time. We will be there to help you.

How to submit

Submit one .py file to Faser called:

givenname_surname.py .

So, if your name is Richard Sutcliffe, your filename will be:

richard_sutcliffe.py

Note that the filename is all lower case, it does not contain any spaces and it is a .py file.

givenname is your given name with no spaces and all lower case e.g. richard.
surname is your surname with no spaces and all lower case e.g. sutcliffe.

Submission Deadline

11h59 Friday 3rd February, Week 18.

Marking Scheme

There is 5% of the overall module for this assignment. We will test your program. If it works exactly as above, you will get 5%. If it modifies the file but not correctly, you will get some partial marks, depending on how close the modification is to the specification.

Plagiarism

You should work individually on this project. Anything you submit is assumed to be entirely your own work. The usual Essex policy on plagiarism applies: http://www.essex.ac.uk/plagiarism/ .

Acknowledgement

This assignment is based on an earlier one by Alexei Vernitski. Many thanks to Alexei for his ingenious ideas.