

Lab 11

This lab is designed to give you experience using the command line, programming for the command line, and using git.

First, ensure that you have a Unix command line available on your laptop. For mac OS X, this is the terminal application. For Windows 10, this is the Linux Subsystem:

<https://docs.microsoft.com/en-us/windows/wsl/install-win10>

If you have Windows, but not Windows 10, you can use cygwin, a free tool that provides a complete Unix environment:

<http://www.cygwin.com/>

If you install cygwin, you have a lot of control of the packages that are installed. Be sure to include Python 4 and git with the installed packages.

Write a program to shuffle an input string. In bioinformatics, it is a common task to shuffle sequences. The program will be called shuffle and it will take a string on the command line and output a shuffled sequence to the command line (using the Python print function).

The shuffling function is:

Shuffle(input_string)

```
string_list ← array/list of characters in input_string
for i ← 0 to length(string_list)-1
    j ← random choice of integer from 0 to (length(string_list)-1)
    string_list ← swap(string_list,i,j)
input_string ← concatenation of characters in string_list
return input_string
```

The swap function is:

swap(string_list,i,j)

```
temp ← string_listi
string_listi ← string_listj
string_listj ← temp
return string_list
```

(Google random.randint() to see how to generate the random number.)

Use the Unix command line to call your program with any string and verify a shuffled sequence is returned.

Also, try using git. After making your project, navigate with `cd` to the directory and establish a new repository. Add your source code to the project, and commit the changes with informative log messages. There is nothing format to turn in for git, but give it a try.

To use git on Apple OS X, you will need to install Xcode from the app store. Xcode provides developer tools, including C++ for Mac.