

## Closed Lab 2

## List Comprehensions

Description: Along with this document, you downloaded one directory: `datafiles`. This directory contains some number of directories, each of which contains some number of data files. Each directory in `datafiles` is named `run.x` where `x` is a positive integer. This should be largely familiar as it is similar to the programming assignment.

Some of the `run.x` directories contain a file called `run.x.rand`. Note that all of the `run.x` directories contain a file called `run.x.random`. Please do not confuse the two.

For the problems below, you may find some of the following useful.

- The Python `os` module includes a `listdir` function that returns a list of the files in a directory.
- Python strings support a method called `split` that returns a list of tokens in the string. It takes an optional parameter that defines the delimiter for tokenization. By default, the delimiter is `' '`. The delimiters are consumed.
- Python strings can be concatenated using `+`.

Details: You will write several list comprehensions. Some of you will find them challenging. If so, I suggest that you first accomplish the same task using a loop structure and then convert that to a comprehension. You are welcome to search the interwebs for information that will help you.

1. Write a list comprehension that creates a list of `run.x` directories that contain a `run.x.rand` file.
2. Write a list comprehension that creates a list of `run.x` directories for which `x` is an even integer.
3. Write a list comprehension that creates a list of all pairs `(run.x, run.y)` such that  $x + y \equiv 0 \pmod{100}$ .
4. Write a list comprehension that creates a list of `run.x` directories for which the value stored in `run.x.rand` is even.