BST281: Genomic Data Manipulation, Spring 2017

Wednesday 05: Python data input and output

Namespaces and modules.

 Python organizes local variables into blocks, and all variables into namespaces.

 By default, each file is its own namespace - you can access variables there for free.

 To use variables (or functions) from another module, use the **import** command.

 Many useful modules are built into Python: <http://docs.python.org>

The most common module is **sys**: it links your program up to the outside world, i.e. system.

 **import sys** to access.

 **sys.argv** is a list of strings that contain any command line parameters given to script at runtime.

 **sys.argv[0]** is always the file name of your Python script.

 **python script.py one 2 three** makes **sys.argv = ["script.py", "one", "2", "three"]**.

IO (input and output) is performed in Python using streams.

 Cursors that read data from a location (and advance) or write data to a location (and advance).

 **sys.stdin** and **sys.stdout** are built-in standard input and output streams.

 Come from the keyboard and to the screen by default; can be redirected using **<** and **>**.

 **python script.py < input.txt > output.txt**

 **sys.stderr** is an unbuffered output stream useful for debugging; separately redirectable using **2>**.

File IO streams can be created as variables using **open**:

 **istm = open( "input.txt", "r" )**

 **strInput = istm.readline( )**

 **ostm = open( "output.txt", "w" )**

 **ostm.write( strOutput )**

Don't forget to **close** IO streams (especially output).

Useful constructs:

 **with open( strFilename ) as istm:**

 **for strLine in istm:**

Beware of mismatched end-of-line characters (\r and \n) and use text mode carefully.

Beware of accidentally overwriting files using **open( strOutput, "w" )** or **>**.

# Textbooks

Python I/O: Haddock and Dunn, Chapter 10 p173-184, 188-192, Chapter 11 p201-214

# Literature

[Biology: The big challenges of big data. Marx, Nature 2013](https://www.ncbi.nlm.nih.gov/pubmed/23765498)

[Confronting the ethical challenges of big data in public health. Bourne, PLoS Comp Bio 2015](https://www.ncbi.nlm.nih.gov/pubmed/25664660)

[The Virtuous Cycle of a Data Ecosystem. Voytek, PLoS Comp Bio 2016](https://www.ncbi.nlm.nih.gov/pubmed/27490108)