Python Installation & Basics

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Software Installation

We will use Python and NetworkX for the exercises of computer programming, data processing and network analysis. We will need the following software installed to your computer:

- **Enthought Canopy** (pre-packaged free Python programming environment)
  - Obtain an installer either from the thumb drives available from the instructors, or from online (https://www.enthought.com/products/canopy/). Install it by double-clicking the installer file.
- **NetworkX** (network analysis module)
  - You can install this software from Enthought Canopy. Launch Enthought Canopy, select Package Manager, search for "networkx", and then install it.

Python Programming Basics

- **Python Basics**
  - "Hello, world!"
  - Using Python interactively
  - Writing a separate program code
  - How to get help *(i.e., just Google it)*

- **Data Representation**
  - Numbers
    - integer, real (floating point), complex
  - Variables and assignments
  - Numerical and logical operations
    - Arithmetic operators, =, <, >, <=, >=, is, not, and, or, in
  - Strings
    - Arithmetic operators, find, replace, split, etc.
  - Lists ("[v1, v2, ...]")
    - Nested lists
    - len, min, max, sum, count, append, pop, sort(ed), reverse, filter, etc.
    - Slice operator (":")

  - *Advanced topic: Dictionaries ("{ k1:v1, k2:v2, ...}")*

- *Advanced topic: Sets ("{ v1, v2, ...}"), tuples ("(v1, v2, ...)")*
- *Advanced topic: List/dictionary/set comprehension*
- *Advanced topic: Classes and objects*
- *Advanced topic: Graph, DiGraph objects*

- **Algorithm Representation**
  - Indent-based syntax
  - Loops (while, for)
  - Flow control (if, else, elif)
  - User-defined functions (def)

  - *Advanced topic: Local and global scopes of variables*

- **Other Topics**
  - Modules
    - import, math, random, etc.
  - File I/O
    - open, close, read, write, etc.
    - reading/writing .csv files
  - Visualization (matplotlib's plot, NetworkX's draw)

Online Resources

- The Python Tutorial http://docs.python.org/2/tutorial/
- Library Reference http://docs.python.org/2/library/
- matplotlib Documentation http://matplotlib.org/1.3.1/users/index.html
- NetworkX Documentation http://networkx.github.io/documentation/latest/