# Natural Language ToolKit (NLTK) and Python

Using NLTK in NLP

- NL ToolKit provides libraries of many of the common NLP processes at various language levels
  - Leverage these libraries to process text
- Goal is to learn about and understand how NLP can be used to process text without programming all processes
  - However, some programming is required to
    - Call libraries
    - Process data
    - Customize NLP processes
  - Programming language is Python

Python and NLP

- Python is freely available for many platforms from the Python Software Foundation:

  - http://www.python.org/

  - Named for the group Monty Python

  - We are using Python version 2.07 (and **not** Python 3.x)


The group in 1969

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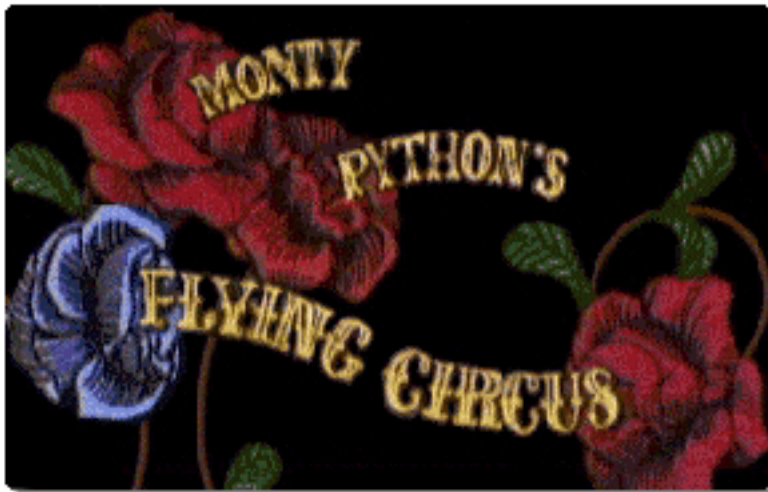
Characteristics of Python

- Easy-to-learn scripting language, similar in many aspects to Perl
  - But with WYSIWYG block structure
- Object-oriented, with modules, classes, exceptions, high-level dynamic data types, similar to Java
- Strongly typed, but without type declarations (dynamic typing)
- Regular Expressions and other string processing features

Natural Language Toolkit (NLTK)

- A suite of Python libraries for symbolic and statistical natural language programming
  - Developed at the University of Pennsylvania
- Developed to be a teaching tool and a platform for research NLP prototypes
  - Data types are packaged as classes
  - Goal of code is to be clear, rather than fastest performance
    - But increasingly production level software is made available through wrappers
- Latest version is compatible with Python 3.x
  - Does it also work with Python 2.7?

- Online book:
  http://www.nltk.org/book_1ed/
- Authors:
  Edward Loper, Ewan Kline
      and Steven Bird
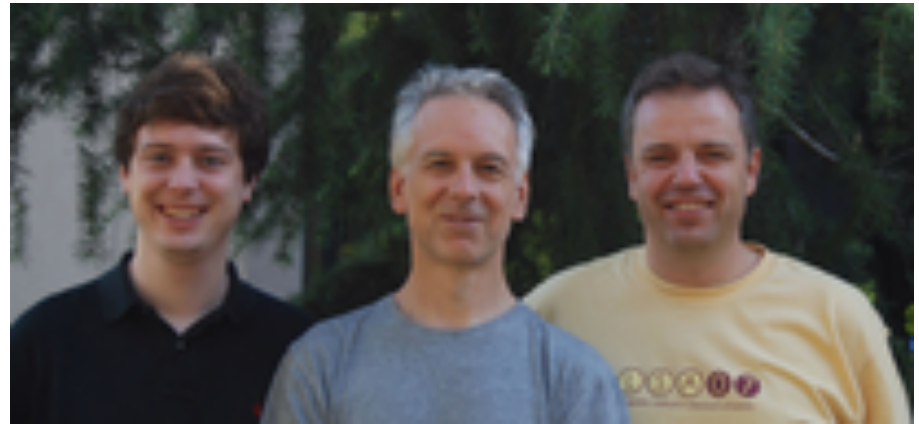
Getting Started in Python

- Python can be run as an interactive system
  - Type in expressions or small pieces of programs to try them out
- or as a command-line system.
  - Run stored python programs
- For both, it is recommended to use a Python development environment
  - IDLE is standard but really simple: especially good to edit Python programs in IDLE to keep track of the indentation for block structure
    - Or try Wing free version, PyCharm or iPython to get an IDE

Introduction to NLTK

- NLTK provides:
  - Basic classes for representing data relevant to Natural Language Processing.
  - Standard interfaces for performing NLP tasks such as tokenization, tagging and parsing
  - Standard implementation of each task which can be combined to solve complex problems

Some NLTK Modules

- **corpora:** a package containing modules of example text
- **tokenize:** functions to separate text strings
- **probability**: for modeling frequency distributions and probabilistic systems
- **stem** – package of functions to stem words of text
- **wordnet** – interface to the WordNet lexical resource
- **chunk** – identify short non-nested phrases in text
- **etree**: for hierarchical structure over text
- **tag**: tagging each word with part-of-speech, sense, etc.
- **parse**: building trees over text
  - recursive descent, shift-reduce, probabilistic, etc.
- **cluster**: clustering algorithms
- **draw**: visualize NLP structures and processes
- **contrib:** various pieces of software from outside contributors

Tutorials for Python and NLTK

- Python

  http://docs.python.org/tut/tut.html, the classic by Guido van Rossum

- NLTK is a SourceForge project at: http://www.nltk.org

  documentation: http://www.nltk.org/documentation, including

  book: http://www.nltk.org/book_1ed/

  API: http://nltk.googlecode.com/svn/trunk/doc/api/index.html