CS580 – Course Introduction

This course

- Programming in python
  - Incl. object oriented programming
- Algorithmic thinking
  - How to think like a computer scientist
- Problems motivated by biological data (protein/DNA sequences)

Grading criteria

- Assignments: 45%
- Midterm: 20%
- Final: 35%

Why English can’t be used as a programming language
program
- a set of instructions telling a computer exactly what to do

programming language
- precise language for expressing computations
  - no ambiguities! no nuances!

algorithm
- a sequence of operations to be followed to solve a problem (independent of a programming language)

High level vs. Low level languages
- The computer understands instructions in a very simple language – machine language
  - Instructions are specific to a particular processor

- We would rather program in a high-level language!

Interpreted vs. compiled languages
- Compiled languages
  - C, C++, Java
- Interpreted languages
  - python, perl, R, matlab

Advantages of interpreted languages:
- Succinct, shorter programs
- Disadvantage: speed

What about perl?

```perl
@P=split//,"URRUcR":@d=split//,"nrekcah
xinU / lreP rehtona tsuJ":sub p(@(p["r$p","u
$p"]=(P,P);pipe"r$p","u$p";++$p;($q+=2))=+=f=! for$k,map($P=$P[$k(ord($P($_,)$6))])=$P($_,)/-*$p/
ix?$P;close$_keys$p;p;p;p;map($P($_)=/-"$P/"j$P>&p;wait until$?;map($r/$P/&&$_>)%$_=$P($_,);sleep rand(2)/if(S//print
```

code from: http://perl.plover.com/obfuscated/

A few Perl quotes
- Perl is like vice grips. You can do anything with it, and it's the wrong tool for every job
  - Leaves teeth marks everywhere
- Perl is worse than Python because people wanted it worse. Larry Wall, 14 Oct 1998
- I would actively encourage my competition to use Perl. Sean True, 30 Mar 1999

http://xkcd.com/353/
What is python
- An interpreted, object-oriented, high-level programming language
- Simple, easy to learn syntax
- Highly readable, compact code
- An extensive standard library
- Strong support for integration with other languages (C,C++,Java)

Why I love Python
- I am more productive!
  - Machine performance vs. programmer performance
- Makes programming fun!

Why I love Python
- In Java/C++ I have to look up how to do every little thing
  - Not the case in python!
- Shorter programs – less typing = less time
  - Simple, but not too simple

Does anyone else use python?
- One of the three “official languages” in google.
  - Peter Norvig, Director of Research at Google: “Python has been an important part of Google since the beginning, and remains so as the system grows and evolved. Today dozens of Google engineers use Python, and we’re looking for more people with skills in this language”
- Yahoo groups, Yahoo maps – 100% python
- Bioinformatics – Biopython (biopython.org)

Which version of python?
- Python 2.5/2.6 vs. 3.1
  - 3.0 is not backwards compatible
- Use 2.5/2.6 – the version installed on your Mac
- Not a big difference

Our first Python program
Python 2.5.1 (r251:54863, Feb  6 2009, 19:02:12)
[GCC 4.0.1 (Apple Inc. build 5465)] on darwin
Type "help", "copyright", "credits" or "license" for more information.
>>> print 1 + 1
2
>>> print (1 + 1)
2
>>>