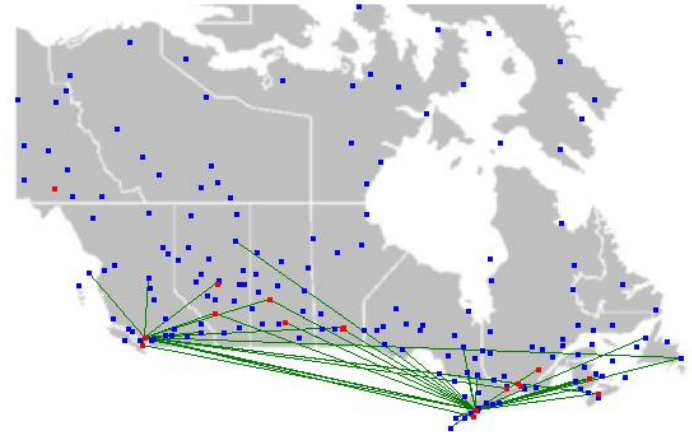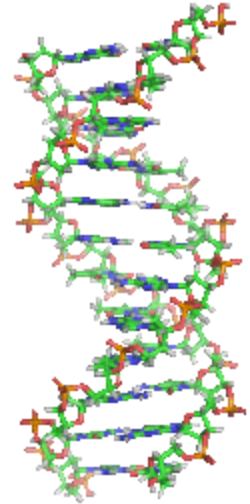# Introduction
to Computers and Python

CS 0008

Why Program

- Computers are tools
  - Multi-purpose

- Computers are customizable tools
  - Customize through programming

- Computers are good at...
  - tedious, repetitive tasks
  - math
  - handling a lot of data
  - following instructions *exactly* as you give them

Some problems computers can handle

- Remove red-eye from a picture

- Find the complement of a DNA strand

- Display maps with airplane flight paths

- Multiply matrices

- Assess the reading level of a text book

Programming Languages

- Ada
- Assembly
- BASH
- BASIC
- C
- C++
- C#
- D
- COBOL

- FORTRAN
- Go
- Haskell
- Java
- JavaScript
- LISP
- Mathematica
- MATLAB
- ML

- Objective C
- Pascal
- Perl
- PHP
- Prolog
- Python
- R
- Ruby
- Visual Basic

and *many* others

So why Python?

- Popular language
  - Often ranked among top 10 programming languages
  - Used at many companies
    - One of four official Google languages (the others are Java, C++, and Go)

- Free, well-documented, and well-supported

- Clean syntax

Learning to Program

- Programming ideas are the same from one language to another
  - Once you learn one language, it is straightforward to learn others

- Python programs are shorter and simpler than other languages
  - You can concentrate on the ideas, and learn programming concepts quicker.

Python vs. Java

Java:

```
public class HelloWorld
{
    public static void main (String[] args)
    {
        System.out.println("Hello, world!");
    }
}
```

Python:

```
print("Hello, world!")
```

Running Python Programs

- Scripting, interpreted language
  - Write code in interpreter for immediate feedback
  - Although, can write code in text files for easy reuse

- Two versions of Python currently in use:
  - Python 2
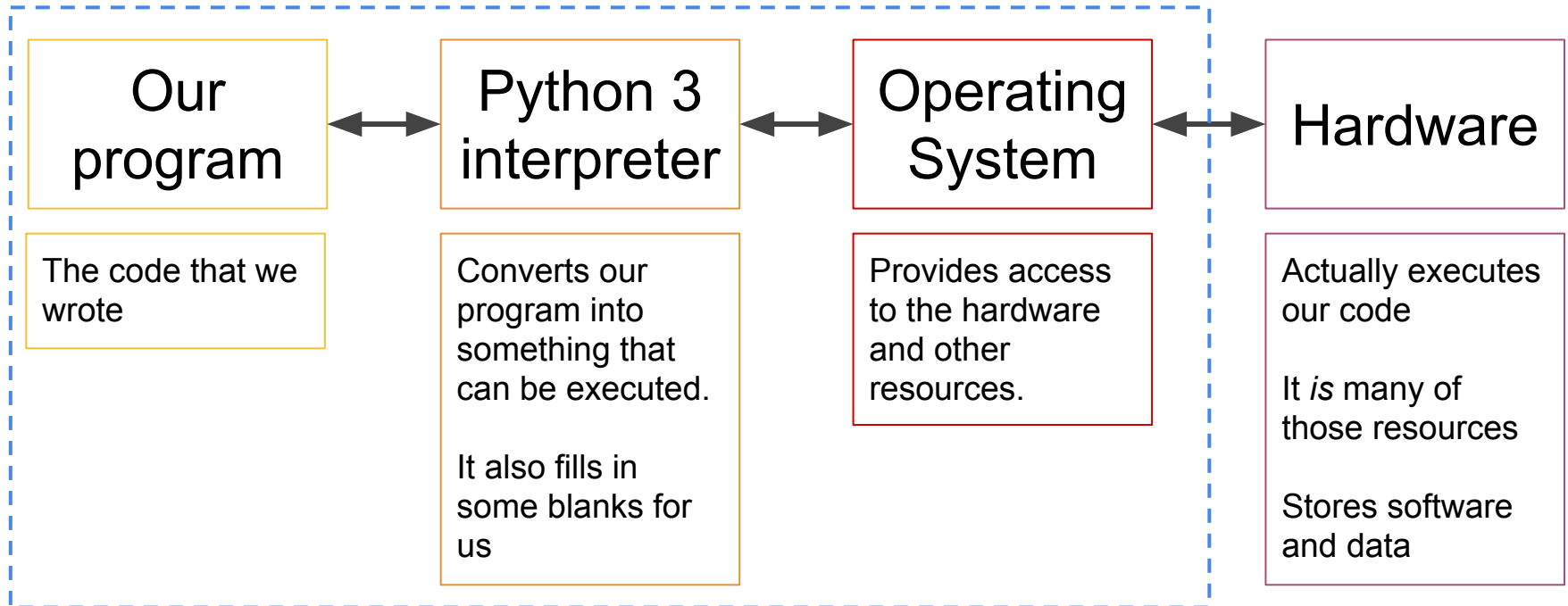 - Python 3 ⬅ We will use Python 3

A lot of information online about Python refers to Python 2, but there are incompatibilities between the languages

The Big Picture

- How will our programs run?

Software

Our program	Python 3 interpreter	Operating System	Hardware
The code that we wrote	Converts our program into something that can be executed. It also fills in some blanks for us	Provides access to the hardware and other resources.	Actually executes our code It *is* many of those resources Stores software and data

The Big Picture