CSC110 LEC9201 Lecture Notes

Anatoly Zavyalov

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1 Programs, Python, Proofs

1.1 Computation is everywhere!

- Desktop, web, and mobile software
- Bioinformatics & computational medicine
- "Smart" devices and home assistants
- Artificial intelligence
- Disease modelling, climate modelling, ...

1.2 Some Definitions

A **computer program** is a set of instructions that can be understood and executed by a computer. A **programming language** is a way of communicating a set of instructions to a computer. In this course, the **Python** programming language will be used.

1.3 Why Python?

- beginner-friendly rules for writing code
- powerful and accessible libraries
- widely used in industry and research

1.4 More about Python

The **Python interpreter** is a computer program whose job is to execute Python code.

There are two ways of "talking" to the interpreter:

1. Using the Python interactive console
2. Writing code in a file, then executing the code

There are two different "contexts" when talking about Python:

1. Python the **programming language** is the set of rules that determines what code humans can write.
2. Python the **interpreter** is a program to take that code and execute it on your computer.

2 Thinking like a computer scientist

Writing code is **EMPOWERING**. IT'S VERY VERY COOL!!!!!!!! YOUR COMPUTER DOES WHAT YOU ASK IT TO DO!!!1!!!!! IT'S SO GOOD!

3 The three "layers" of a computer program

3.1 Data

1. What **data** does this program need to work with?
2. Where does input data come from?
3. What data needs to be output?

3.2 Algorithms

1. What **algorithms** does this program need to use to operate on its data?
    - An algorithm is a sequence of steps a computer can perform to solve a specific problem.
2. How do we know these algorithms are correct?
3. How do we know these algorithms will be efficient (not take too long or too much computer memory)?

3.3 User Interface

1. Who are the intended users of this program?
2. How will the users interact with the program?
3. How can we make it easy for users to perform these interactions?

4 A few tips for having a good year

1. Don't wait around for things to happen - **be proactive**.
2. Give yourself permission to make mistakes and be less than perfect.
3. Culture and community are the accumulation of individual actions, interactions, and reactions, made by accident or by choice.
4. You have the power to shape the community you want for yourself this year. Use it!

5 Homework

- Review course syllabus
- Mark due dates in your calendar
- Do the week 1 prep
- Complete the software installation guide
- Complete the welcome survey
- Get on Campuswire: setup a profile picture, introduce yourself!