

Why did the computer get glasses?



To improve its web sight!

LearnFunnyJokes.com

Welcome to CMPT 120

Introduction to **Computing Science** and **Programming 1**

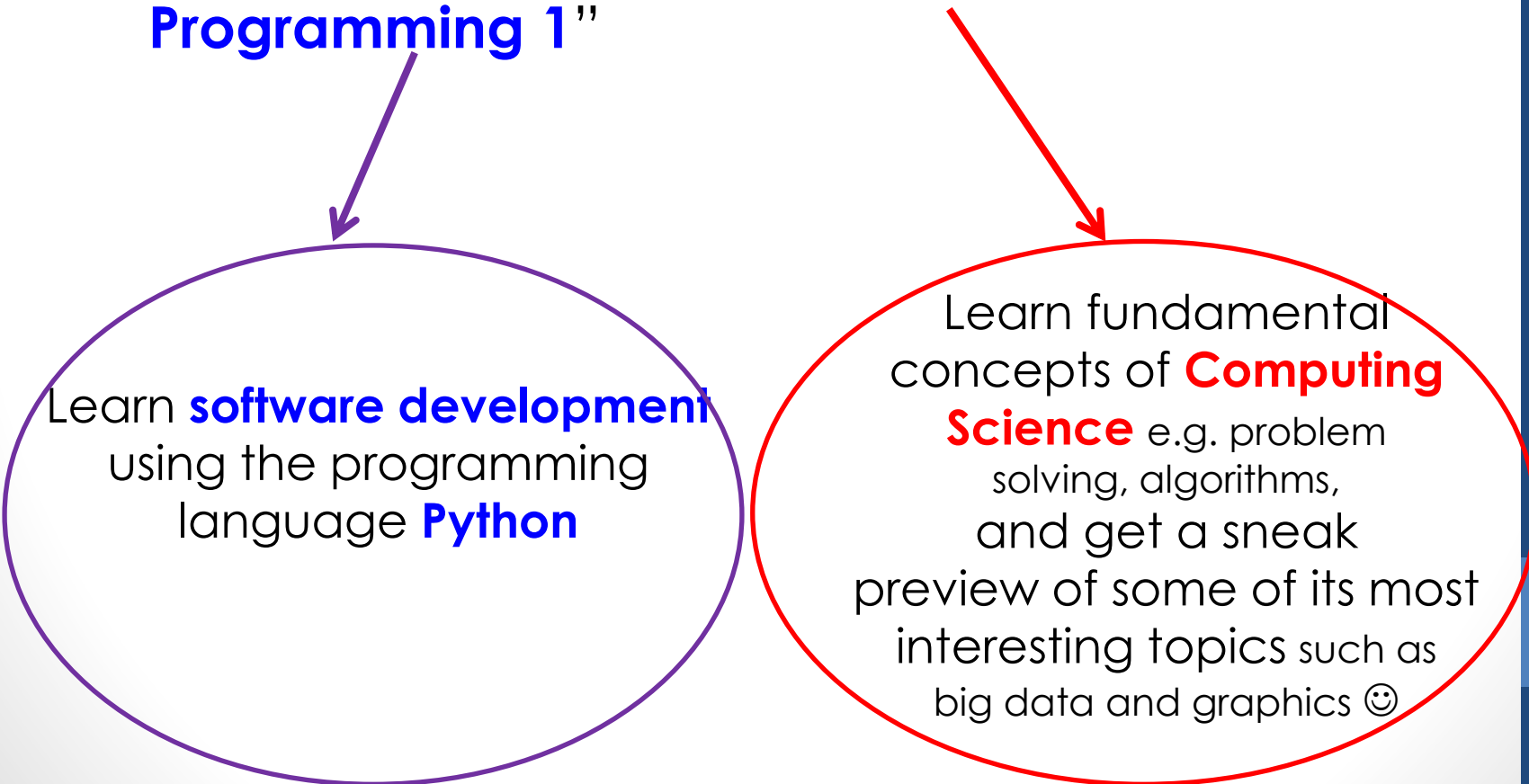
Anne Lavergne

Today's Menu

- Introducing the course
 - What is this course all about?
 - What kind of students take CMPT 120?
 - What do we need for this course?
 - How does this course work?
- Q&A
 - Waiting list
- Let's get started!
 - How does a computer work?
 - Python demo
- Summary
- Next lecture!

What is this course all about?

- Title: “Introduction to **Computing Science** and **Programming 1**”



Learn **software development**
using the programming
language **Python**

The diagram features a purple oval on the left and a red oval on the right. A purple arrow points from the word 'Programming' in the title to the purple oval. A red arrow points from the words 'Computing Science' in the title to the red oval.

Learn fundamental
concepts of **Computing
Science** e.g. problem
solving, algorithms,
and get a sneak
preview of some of its most
interesting topics such as
big data and graphics 😊

What is this course all about?

Why **Computing** and
not **Computer**?

- Title: “Introduction to **Computing Science** and **Programming 1**”

Learn **software development**
using the programming
language **Python**

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From the movie



Hidden Figures

Drama • 2016 • 2 hr 6 min



Source: <https://www.youtube.com/watch?v=XiwBpkyjrmQ>

Why **Computing** Science and not **Computer** Science?

- Title: “Introduction to **Computing Science** and **Programming 1**”

Computing: the systematic study of computation.

Wiki says that **computation** is any type of calculation that is well-defined, i.e., precise and described as a step-by-step process.

Why **Computing** Science and not **Computer** Science?

- From [Edsger Dijkstra](#): “Computing science is as much about computers as astronomy is about telescopes.”
- From wiki: “Despite its name, a significant amount of computer science does not involve the study of computers themselves.”
- **Computer**: a tool
- **Computing**: field of study



What is Computing Science?

Software development
and software engineering,
databases, operating
systems, computer
graphics, multimedia
systems, data science,
machine learning,
programming languages,
computability and
complexity theory,
cryptography, networking,
human-computer
interaction, robotics, ...

CMPT 340 - Biomedical Computing (3)

The principles involved in using computers for data acquisition, real-time processing, pattern recognition and experimental control in biology and medicine will be developed. The use of large data bases and simulation will be explored. Prerequisite: Completion of 60 units including one of CMPT 125, 126, 128, 135, with a minimum grade of C- or CMPT 102 with a grade of B or higher.

CMPT 353 - Computational Data Science (3)

Basic concepts and programming tools for handling and processing data. Includes data acquisition, cleaning data sources, application of machine learning techniques and data analysis techniques, large-scale computation on a computing cluster. Prerequisite: CMPT 225 and (STAT 101, STAT 270, STAT 271, ENSC 280, or MSE 210), with a minimum grade of C-.

CMPT 354 - Database Systems I (3)

Logical representations of data records. Data models. Studies of some popular file and database systems. Document retrieval. Other related issues such as database administration, data dictionary and security. Prerequisite: CMPT 225 and (MACM 101 or (ENSC 251 and ENSC 252)), all with a minimum grade of C-.

CMPT 361 - Introduction to Visual Computing (3)

Provides a unified introduction to the fundamentals of computer graphics and computer vision (visual computing). Topics include graphics pipelines, sampling and aliasing, geometric transformations, projection and camera models, meshing, texturing, color theory, image filtering and registration, shading and illumination, raytracing, rasterization, animation, optical flow, and game engines. Prerequisite: CMPT 225 and MATH 232 or 240, all with a minimum grade of C-.

CMPT 362 - Mobile Applications Programming and Design (3)

Teaches students how to design and implement smartphone applications. Topics include development environment, phone emulator, key programming paradigms, UI design including views, fragments, and activities, data persistence, threads, services, embedded sensors, and location based services (e.g., Google Maps). Concepts are reinforced through programming assignments and group projects. Prerequisite: CMPT 225 with a minimum grade of C-. Students with credit for IAT 359 may not take this course for further credit.

CMPT 363 - User Interface Design (3)

This course provides a comprehensive study of user interface design. Topics include: goals and principles of UI design (systems engineering and human factors), historical perspective, current paradigms (widget-based, mental model, graphic design, ergonomics, metaphor, constructivist/iterative approach, and visual languages) and their evaluation, existing tools and packages (dialogue models, event-based systems, prototyping), future paradigms, and the social impact of UI. Prerequisite: CMPT 225 with a minimum grade of C-.

CMPT 365 - Multimedia Systems (3)

Multimedia systems design, multimedia hardware and software, issues in effectively representing, processing, and retrieving multimedia data such as text, graphics, sound and music, image and video. Prerequisite: CMPT 225 with a minimum grade of C-.

CMPT 371 - Data Communications and Networking (3)

Data communication fundamentals (data types, rates, and transmission media). Network architectures for local and wide areas. Communications protocols suitable for various architectures. ISO protocols and internetworking. Performance analysis under various loadings and channel error rates. Prerequisite: CMPT 225 and (MATH 151 or MATH 150), with a minimum grade of C-. MATH 154 or MATH 157 with a grade of at least B+ may be substituted for MATH 151 (MATH 150).

What kind of students take CMPT 120?

- Students from a variety of faculties and departments
 - Let's have fun! Let's see from which SFU departments we are:
 - Join at [menti.com](https://www.menti.com) use code **3148 8874**
- Students with no previous software development experience

What do we need for this course?

- Access to our course web site:

<https://www.cs.sfu.ca/CourseCentral/120/alavergn/index.html>

- Access to CourSys

- Python  pythonTM

A basic editor
and interpreter
environment

- **Python IDLE**: Integrated **D**evelopment and **L**earning **E**nvironment for Python
 - See the link called ***Install Python 3.12.1 (or latest) IDLE*** under **Week 1** on our **course web site**

Why Python?

- Simple and easy to use (easy syntax)
- Yet powerful
- Readable code (i.e., *English-like* code)

Why Python?

From PYPL Popularity of Programming Language:

Worldwide, Jan 2024 :

Rank	Change	Language	Share	1-year trend
1		Python	28.2 %	+0.5 %
2		Java	15.73 %	-0.9 %
3		JavaScript	8.91 %	-0.6 %
4	↑	C/C++	6.8 %	-0.0 %
5	↓	C#	6.67 %	-0.3 %
6	↑	R	4.59 %	+0.6 %
7	↓	PHP	4.54 %	-0.7 %
8		TypeScript	2.92 %	+0.2 %
9		Swift	2.77 %	+0.6 %
10		Objective-C	2.34 %	+0.2 %

Source: <https://pypl.github.io/PYPL.html>

Why Python?

From Northeastern University:

Top 10 Most In-Demand Programming Languages

The 10 most in-demand programming languages in 2023 are:

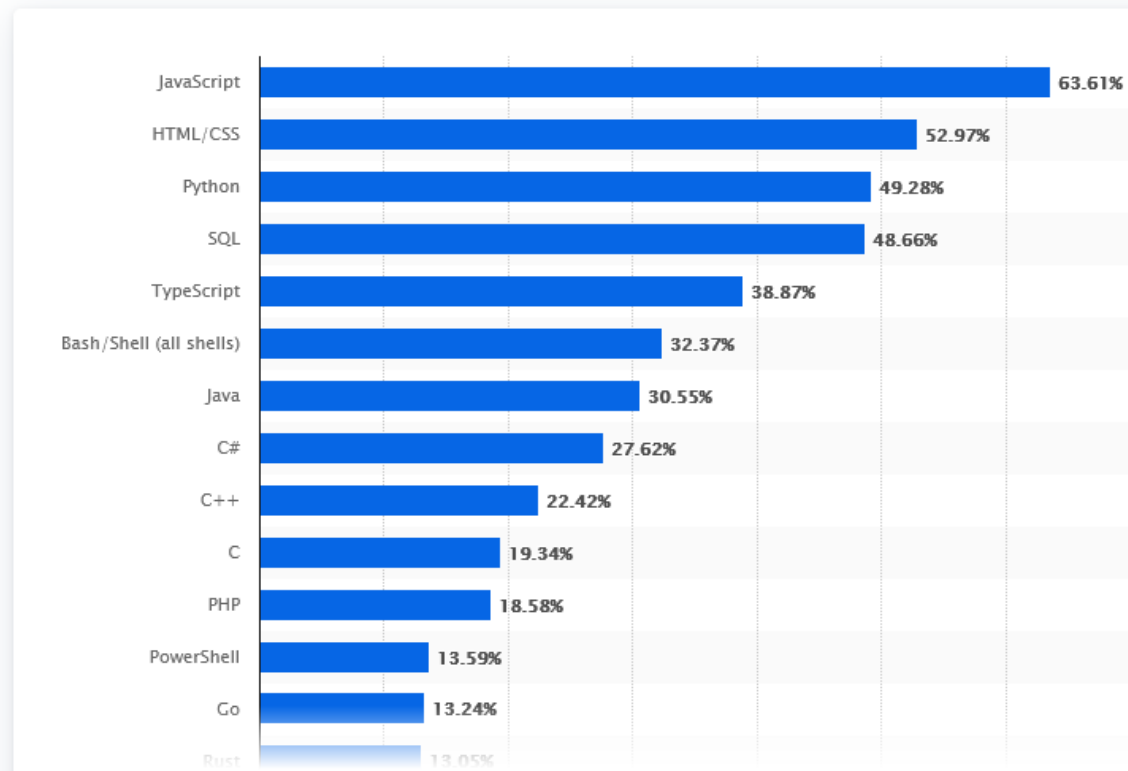
- 1) Structured Language Query (SQL)
- 2) Python
- 3) Java
- 4) JavaScript
- 5) C#
- 6) C++
- 7) R
- 8) C
- 9) Go
- 10) Perl

Source: <https://graduate.northeastern.edu/resources/most-popular-programming-languages/>

Why Python?

From statista.com:

Most used programming languages among developers worldwide as of 2023



Source: <https://www.statista.com/statistics/793628/worldwide-developer-survey-most-used-languages/>

How does this course work?

- Let's have a look at our **course web site** and **CourSys**

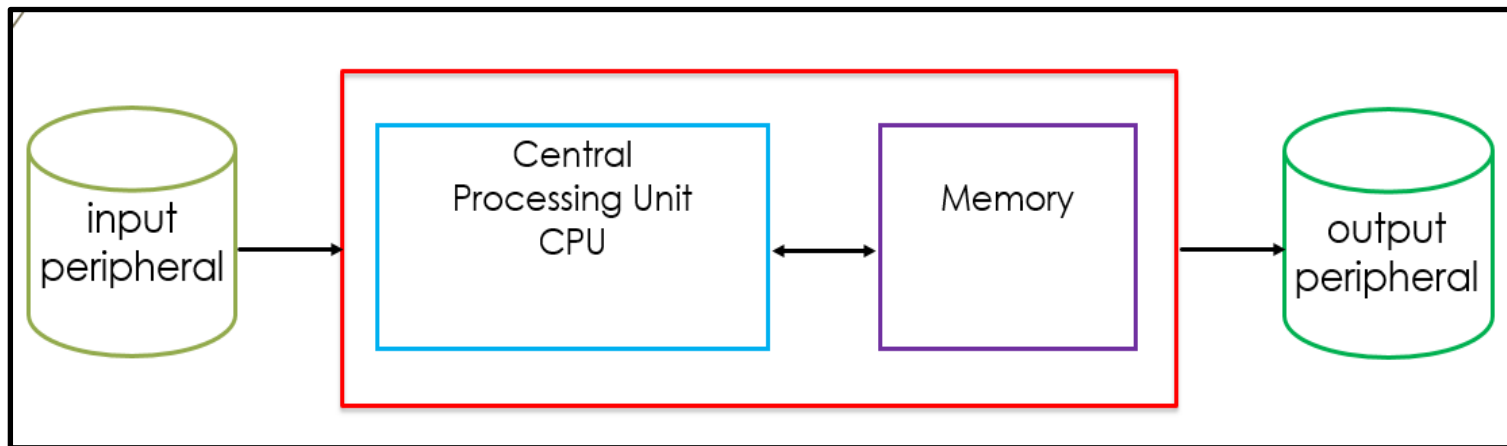
Q&A: Any Questions?

- Waiting list
 - Hang in there! 😊
 - Continue to come to lectures
 - No grade-based activities due during Week 1 and Week 2
 - Waiting lists will be resolved by the end of Week 1
 - If you have not been enrolled into CMPT 120 by the start of Week 2, you may wish to try to enroll next semester.
 - Please, do not send emails to the instructor 😞
 - Good luck!

Let's get started!



- How does a computer work?



Data in Memory

Python Demo

- Let's write a little Python program and see how the computer executes it.

Summary

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 - ✓ How does this course work?
- ✓ Q&A
 - ✓ Waiting list
- ✓ Let's get started!
 - ✓ How does a computer work?
 - ✓ Python demo

How to prepare ourselves for the next lecture?

- Become familiar with our **course web site**
- Print/download and read the **Lecture Notes** for next lecture
- Read the **Readings**
- Download and install **Python IDLE**
- Bring your questions ... and **bring your laptop!!!**

Next Lecture

- Software development process
 - Natural and Formal languages
 - Algorithm
 - Our first program
 - Execution flow
 - Interpreted program versus compiled
 - Comments
 - Python
 - *print* function
 - strings
 - variables



How best to prepare for our next lecture?

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- Install Python
- Bring questions ... and your laptop!!!