CPSC 100

CPSC 100

Computational Thinking

Syllabus + Introduction

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Department of Computer Science
University of British Columbia

Land Acknowledgement

I acknowledge that I am presenting this session today on the traditional, ancestral, and unceded territory of the xwməθkwəy̓əm (Musquem) peoples.

Plan for Today

- About Me
- About You
- Syllabus
- Computation Thinking

Firas Moosvi

Lecturer

University of British Columbia

Biography

I am a Lecturer in the Computer Science department at the University of British Columbia. Though I mainly teach computer science now, I am a multidisciplinary educator with a PhD in Physics and is also interested in data science and education in general. I strongly believe in computational literacy for all and aims to make STEM courses accessible through Active Learning techniques and open education resources. My two main research umbrellas are the scholarship of teaching and learning (SoTL), and Learning Analytics. I am looking at how learning analytics data can provide insight to surface and ultimately reduce inequities in STEM programs. I am also heavily invested in promoting and implementing alternative grading systems in large classes, at scale. I am always happy to collaborate on teaching and learning projects, drop me a note here!

Interests

- Scholarship of teaching and learning
- Authentic assessments
- Alternative grading paradigms
- Learning analytics
- Data visualization and science communication

Education

PhD in Medical Physics, 2019
University of British Columbia

MSc in Medical Biophysics, 2012
University of Toronto

BSc in Biophysics, 2009
University of British Columbia

Research Interests

Learning Technologies

Use of learning technologies to enhance teaching and learning.

Active Learning

A learning method that de-emphasizes didactic teaching and actively engages students with material via problem solving, case studies, role plays and other methods.

Learning Analytics

Extracting trends from learner data using analytical tools to improve learning.

Equity in STEM

Developing and implementing methods of inclusive teaching to reduce systemic inequities in STEM education.

Visualizations

Representing data using effective graphs, plots, and other special visualizations.

Alternative Grading

Challenging the systems and structures associated with traditional grading in higher education.

Learning Goals

What are Learning Goals?

Learning Goals

A learning goal is designed to tell you what information you should learn about a topic

- At the beginning of the topic, the learning goal may not even make any sense
- By the end of a topic, it should help you know what to study

Learning Goals for the course

Learning Goals

At the highest level, this courses has three main goals.

Students who complete this course will be able to

- explain foundational computing concepts,
- explore applications built on these foundations,
- describe the implications of the applications.

How are you going to learn?

How to learn?

The best way to learn is by doing

Weekly Labs - in labs you will

- Get hands-on practice with a computer
- Work on projects

“Lectures” will involve

- Doing exercises
- Discussing the readings (in small and large groups)
- Hearing concepts explained
- Answering clicker Questions

What does this mean for you?

You will need to read and review slides for the next class before coming to class.

Sometimes, there will be assigned pre-class readings or videos.

You need to come to class prepared to *do* things:

- Bring a web-enabled device (tablet, laptop, even a phone will do)
- Follow-along the slides posted on the course website
- Be prepared to be **ACTIVE!**

About this course

About this course

CPSC 100 - Computational Thinking [3]

- Monday / Wednesday / Fridays, 4-5 PM in MCML 360

- “Lectures” will involve:
  - In class activities on PrairieLearn
  - Clickers by show of hands
  - Discussions

What this course includes ✅

Course Schedule

This is the tentative plan for CPSC 100 this term. Thin
subject to change.

Week	Week of	Topic
1	Sep 1	Introductions
2	Sep 8	Algorithms and Using AI
3	Sep 15	Algorithms and Programming
4	Sep 22	Programming
5	Sep 29	Data Representation
6	Oct 6	Internet and HCI
7	Oct 13	Catch-up Week
8	Oct 20	Artificial Intelligence
9	Oct 27	Artificial Intelligence
10	Nov 3	Data Mining
11	Nov 10	Fall reading break
12	Nov 17	Data Provenance
13	Nov 24	Data Visualization
14	Dec 1	Final Projects

Algorithms & Programming

Data & Internet

AI & Data Mining

Data Provenance & Visualization

What this course is NOT ❌

1) A typical Computer Science course

- You will do more reading/writing than coding

2) A coding-based course

- You will not really be programming (only block-based)

3) An "easy A"

- Course is set up reward students who do the work!

This is NOT a "GPA booster class"

Course Logistics

Course website

firas.moosvi.com/courses/cpsc100/2025W1

Communication

Ed Discussion (join via link on Canvas)

It is your responsibility to check Ed for announcements

At least once a day!

Class Etiquette

Course Etiquette

Be professional, respectful and thoughtful

- Attend class on time and prepared
- Don't distract others

Please stay home if you are not feeling well

- Review posted course material
- Contact classmates to catch up

Professionalism

A high level of professionalism in expected

Respectful communication in class, emails, etc.

A typical Ed Discussion Post:

Tag the post correctly (Lab, LL, Test, Logistics, etc.)

A greeting, a clear message, a closing

Using ChatGPT for posts is NOT recommended

Blatant violations of this will be returned for revision

My Expectations of you

Reach out if you need help

Academic, mental health, etc.

Be honest

Academic integrity, always ask if you're unsure

Be a considerate team member

Attend (on-time) and participate in meetings

Do your share of the job, well and on time.

Syllabus Review

Computational Thinking

What is Computational Thinking?

"Computational thinking is the **thought processes** involved in formulating problems and their solutions so that the solutions are in a form that can be effectively carried out by an information-processing agent" [Cuny, Snyder, Wing 10].

DECOMPOSITION

Breaking down problems into smaller, easier parts.

PATTERN RECOGNITION

Using patterns in information to solve problems.

ABSTRACTION

Finding information that is useful and taking away any information that is unhelpful.

MODELLING AND SIMULATION

Trying out different solutions or tracing the path of information to solve problems.

ALGORITHMS

Creating a set of instructions for solving a problem or completing a task.

EVALUATION

Assessing a solution to a problem and using that information again on new problems.

ACTIVITY (Groups of 5)

Discuss in your groups the following question:

Which of the 6 computational thinking skills do you think are the most important (rank them)?

Which do you think are the most intuitive?

Wrap up

Wrap Up

- Due Friday at 6 PM:
  - First lab (Lab 0) to be done on your own
  - Learning log (LL0)
  - Syllabus Quiz (Test 0) - not for real marks
- Labs start next week
- First test (Test 1) is next week!