Course Organization

CPSC 501: Advanced Programming Techniques
Fall 2022

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Welcome!

Jonathan Hudson, Ph.D

Lectures: CPSC 501

L01 MonWedFri 13:00-13:50 ST 145

Office: ICT 712

Office hours: MonWed 14:00-14:50 or by email-scheduled appointments. (Zoom, link in D2L)

jwhudson@ucalgary.ca

https://pages.cpsc.ucalgary.ca/~hudsonj/CPSC501F22/

Tutorials

Start next week Monday.

In-person, point is active interaction with TA for material and assignment help.

Your enrollment tutorial TA will mark your assignment material and they are only responsible for the students enrolled in their tutorial.

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Why CPSC 501?

This course is full of things other courses likely never got to BUT are often encountered during more advanced programming and very useful to know.

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Course Goal

From the calendar:

- "Theory and application of advanced programming methods and tools. Recent issues as well as those of an enduring nature will be discussed.

- Topics may include the Fourier transform; wavelets; functional programming; genetic algorithms, simulated annealing and neural networks; parallel and distributed programming; images and graphics user interface programming."

Course Outcomes

From the outline:

- Code refactoring, including how refactoring improves the design of software systems.
- Refactor object-oriented code using a disciplined process that uses version control and unit testing.
- Concepts of reflection as embodied in modern programming languages.
- Object introspection using the reflective capabilities of the Java programming language.
- Reflection serialization and deserialization using the reflection API of the Java programming language.
- Techniques used to optimize software performance, including how to measure performance gains.
- Optimize a computationally expensive digital signal processing program and create a report that describes the process they went through to accomplish this.

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Lectures

We will be using Java/Python in this course

We will cover:

- Refactoring

- Reflection

- Serialization

- Optimization

- Selected topics (AI methods, Digital Signal Processing)

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Out of lecture?

There is no attendance at tutorials but they are highly recommended

- Start Monday/Tuesday next week

- TAs will use classes to cover coding material in hands-on environment

- Material will be covered and there will also be assignment work/help

There is an in-person in-class midterm scheduled

- Friday, November 4th, 2022 13:00-13:50 (01:00-01:50pm).

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Grading

Component	Weighting %
Assignments (4)	50%
Quizzes (D2L)	2.5%
Participation (D2L)	2.5%
Midterm	20%
Final	25%

- Each of the above components will be given a letter grade using the official University grading system. The final grade will be calculated using the grade point equivalents weighted by the percentages given above and then converted to a final letter grade using the official University grade point equivalents. (A+ are 4.3 for in-class component weighting)

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Simplified Example
(Moved quiz/participation into midterm 25%)

- A1: A+

- A2: B

- A3: C

- A4: D

- Midterm: B+

- Final: A-

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Example

- A1: 4.3
- A2: 3
- A3: 2
- A4: 1
- Midterm: 3.3
- Final: 3.7

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Example

- A1: 0.5375
- A2: 0.375
- A3: 0.25
- A4: 0.125
- Midterm: 0.825
- Final: 0.925

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Example

- A1: 0.5375
- A2: 0.375
- A3: 0.25
- A4: 0.125
- Midterm: 0.825
- Final: 0.925

- Sum: 3.0375 (which is a B)

Assignments

- Four individual assignments (50%)

- Refactoring, TensorFlow Machine Learning, Reflection, and Serialization (or Digital Signal Processing)

- Assignment deadlines will be 11:59 pm on Friday due dates.

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Exams

- Midterm (20%)
  - In-class, in-person
  - Written (long answer)
  - Refactoring/AI

- Final (25%)
  - Registrar scheduled, in-person
  - Written (long answer)
  - Cumulative
  - Light on selected topics
  - Focus on reflection/optimization and then lighter on midterm topics

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Course Policies

- When you email include your first name, and last name.

- Please use "CPSC501F22" as the prefix in the subject line

- Make-up examinations and deferred examinations will not be provided except in cases of extreme personal emergencies.

- There are no late submissions. Submit early and double check after submitting. You can submit multiple times on D2L with no issue, so excuses will not be accepted.

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Academic Dishonesty

- *See website posted guideline document*

Be Computer Science 'Lazy'

- Search internet for answers.

- If you find something, read and **<u>understand</u>** it.

- Then develop **<u>your own</u>** solution using what you've learned.

- Do not copy and paste the answer! It is considered plagiarism!

- Being computer science lazy is an important skill and we will return to it.

Getting Help

- Do your part: Attend the lectures and tutorials

- Act early!

- First try it yourself→
  - Study the material carefully
  - Break the problem down
  - Try to narrow down the question
  - Search on google for your answer

- Still unclear?

- Ask your TA

- Come to my office ☺

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Crisis line!

- If you think:
  - You suck at programming!
  - You suck at java/python!
  - You are not sure about this course!
  - You are OK with only a passing mark!!!
  - You tried but you didn't understand!

- Come to my office → I'll prove to you that you are wrong!

- Come early before things piled up!

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Textbooks

- Recommended Textbook(s):

  - See website list of references.

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Access to CPSC

- The Java 17/Python 3 are your primary work environment for this course.

- Assignments & exercises are acceptable if they run on Java 17 (1.17) and Python 3.10.6+

- You can access the CPSC lab remotely. (no need to do this)
  - SSH (Secure Shell) allows you to establish a remote connection with the CPSC lab.
  - https://ucalgary.service-now.com/it?id=kb_article&sys_id=29aedd1bdb3e63c0d1b63ccb7c961963

- Please do not use any non-Linux-based CPSC server for this course.

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Onward to ...
Refactoring.

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https://pages.cpsc.ucalgary.ca/~jwhudson/

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