Introduction
ENGI 5895: Software Design

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Faculty of Engineering & Applied Science
Memorial University of Newfoundland

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What is this course about?

Many people can program, but are they Software Engineers? A Software Engineer is someone who can do the following:

- Ensure the correctness of their software
- Develop efficient solutions
- Design systems which are flexible, reusable, and maintainable
- Communicate the design and behaviour of a software system

This course focusses on the last two points, but we will always be mindful of correctness and efficiency.
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You have developed software that behaves correctly and efficiently in scenario A.

- **Flexibility:** Your boss adds scenario B. How much effort does it take to make it work?
- **Reusability:** You realize that part of your code might actually be useful in scenarios X and Y. How much effort does it take to isolate the parts that you need?
- **Maintainable:** Over time features are added and bugs are corrected. How much effort does it take to make these changes and to continue making similar changes in the long-run?

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This course is also about communication. Software gets very complicated very quickly! How can you communicate the essential ideas behind your design...

- to yourself, when you look at your code two years from now
- to your peers
- to your boss, to explain the difficulty of the problem you are addressing

In this course you will learn to describe your designs using the Unified Modelling Language (UML).
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- Two assignments (15%):
  - Complete individually or in pairs
  - Assign. 1: Implement a given design
  - Assign. 2: Design a system

- Labs (0%)
  - Familiarization with Java IDE (Eclipse) and Visual Paradigm CASE tool

- Project (60%):
  - Teams of 2-3
  - Choose your own stand-alone software system to implement (e.g., game, simulation, application, ...)
  - Project includes both design and implementation

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- In the project, there will be design review meetings where you will present your design and explain its rationale and history.
- It is your responsibility to highlight and explain the principles and patterns utilized in your design!
- You will demo your working programs and submit clean and carefully documented source code.
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  - The Unified Modelling Language (UML)
    - Class and sequence diagrams; use cases
  - Brief introduction to Java
  - Development Processes
  - Design Principles
    - e.g., The Single-Responsibility Principle: "A class should have only one reason to change"
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  - Various bits of technology needed for the project:
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