# CS 5010 Intensive Foundations of Computer Science
# Wednesdays 9-12:20PM

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| **Instructor** | Lindsay Jamieson |
| **Contact Information** | l.jamieson@northeastern.edu |
| **Office Hours** | By appointment: https://calendly.com/l-jamieson<br>On campus: TBD |
| **TA** | Liuxuan Ding (ding.liu@northeastern.edu |
| **TA Office Hours** | See Canvas |
| **Discord Discussion** | https://discord.gg/kdv4R6PdD6 |
| **Textbooks** | None |

## Course Description:

Introduces modern program design paradigms. Starts with functional program design, introducing the notion of a design recipe. The latter consists of two parts: a task organization (ranging from the description of data to the creation of a test suite) and a data-oriented approach to the organization of programs (ranging from atomic data to self-referential data definitions and functions as data). The course then progresses to object-oriented design, explaining how it generalizes and contrasts with functional design. In addition to studying program design, students also have an opportunity to practice pair-programming and public code review techniques, as found in industry today.

## Learning Objectives:

1) Design object-oriented solutions to small and moderately-sized problems
2) Describe and implement design patterns appropriately
3) Design and implement a clean, understandable and well documented solution in the Java programming language
4) Defend choices made in design and implementation to a group of peers
5) Generate appropriate documentation for developed solutions
6) Design unit tests for a given component and implement them using the JUnit testing framework for Java programs
7) Create, refine and express a design in graphical notation such as UML diagrams
8) Explore existing documentation to describe and use existing libraries and frameworks

## Asking for Help

Please follow the **Thirty Minute Rule**: If you've been working on a problem for 30 minutes and have not made progress, ASK FOR HELP. Email myself or a TA with a description of your roadblock and a question that may help you see a path forward. Then, take a break (get a snack, go for a walk, etc) until we get back to you.

## Schedule

| Date | Topic | Assignments |
|---|---|---|
| Sep 11 | Intro, Syllabus Review, Program Planning With Objects | |
| Sep 18 | Applying Design Strategies | |
| Sep 25 | Abstraction | |
| Oct 2 | Categorical Data Types & Linked Lists | Text Adventure due 10/4 |
| Oct 9 | Data Structures | |
| Oct 16 | An Introduction to Design Patterns | Mid-Semester Project due 10/18 |
| Oct 23 | Hierarchical Data Representations | Brewery Problem due 10/25 |
| Oct 30 | Rethinking Design Patterns | |
| Nov 6 | The State Pattern | |
| Nov 13 | Creational & Behavioral Design Patterns | Maze Problem due 11/15 |
| Nov 20 | Structural Design Patterns | |
| Nov 27 | Thanksgiving Break | Thanksgiving Break |
| Dec 4 | Front & Back End | Design Gone Wrong due 12/6 |
| Dec 11 | Final Presentations | |

## Evaluation:

The grading breakdown is as follows:

1) Projects - 50%
2) Recitation Activities - 15%
3) Mid Semester Project - 15%
4) Final Project - 20%

Exams: There will not be a traditional exam in this course. Instead, your projects through the semester will show your understanding of the topics. As the professor, I reserve the right to periodically ask you to explain portions of the code

Projects - There will be four projects across the semester, each worth 12.5%. Descriptions will be distributed on Canvas through the semester. Appropriate rubrics will be attached to the projects.

Recitation Activities - Each week where another project is not due, you will have an activity during the recitation that will help you with concepts that will be useful for the projects. These will be worth about 1% of your grade each.

Mid Semester Project - The mid semester project will be the alpha version of your final project. Full descriptions of the project are available on Canvas.

Final Project - The final project will be developed by you to demonstrate your understanding of the concepts presented in the course. It will be a further development of your mid semester project. Final projects will be presented during the final exam period on Dec 11, 2024. Attendance at that class is mandatory.

**Grading Scale:**

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| A: | 92+ |
| A-: | 90-91 |
| B+: | 87-89 |
| B: | 82-86 |
| B-: | 80-81 |
| C(ish): | 65-79 |
| F: | 0-64 |

## Polices

1) **Work "In Groups"** - Outside of class and in class, you may discuss concepts together. However, submissions should be in your own words, unless the assignment is specifically stated as group work. This means that you will not exchange code (in person or via electronic means) with classmates in this class. People who assist you with projects should be appropriately cited in your written report.
2) **Late Submissions** - There are four major deadlines in the semester: October 4, October 25, November 15, and December 6. All assessment points with deadlines on or before the late deadline will have a final deadline of the late deadline. Things due on the late deadline date may not be turned in late.
3) **Attendance** - Attendance is highly recommended. This does not mean simply presence in the meeting space, but rather presence and attention. Should you miss class, it is your responsibility to catch up on the material you missed, including obtaining notes from a classmate. The lectures will also be streamed on Zoom and recorded.

4) **Discord Discussion -** We will have a Discord server where you can post questions and get answers from fellow classmates, the TAs and myself. Please be professional in your communications on Discord.