

St. Francis Xavier University
Department of Computer Science
CSCI 544: Computational Logic
Group Lecture and Report
Winter 2023

The group lecture and report are major assessments of this course. These assessments consist of three components: a lesson plan, the lecture itself, and an individual report. The group lecture is preferably completed in a group of four students, though *very limited* exceptions can be made if a group of four cannot be formed.

The lesson plan is worth a total of 10% of your final grade. The lecture component is worth a total of 20% of your final grade. The individual report is worth a total of 10% of your final grade. You must complete all of these components in order to pass the course.

Do not leave these assessments until the last minute! Start as soon as possible!

Lesson Plan

Due February 27, 2023 in lecture

The lesson plan is a short document meant to serve as a summary of your group's chosen lecture topic and what your group plans to cover in your lecture. The lesson plan should include, at a minimum, the following information: the names of your group members, an outline of each group member's general duties (e.g., background research, slide creation, code writing, etc.), one or two paragraphs giving a high-level introduction to your group's chosen topic, a broad outline of the structure of your group's lecture (e.g., X minutes for introduction, Y minutes for background, etc.), and 2–3 preliminary references that your group will use to create your lecture.

Existing survey articles or textbooks are great preliminary references, as they often include a large amount of background information presented at an accessible level. If your group needs pointers to such preliminary references, let me know and I can try to help.

Your group's lesson plan should be a 1–2 page double-spaced document written in 12-point text. This is a strict page limit. The lesson plan will be marked in terms of completeness and organization.

Lecture

Due date varies (last ~3 weeks of lectures)

The lecture is a ~50 minute presentation on your group's chosen topic. Your group will not be presenting for the entire length of time; you should budget ~5 minutes for setup at the beginning and ~5 minutes for questions and teardown at the end. Therefore, your actual lecture time will be closer to ~40 minutes, and each group member should spend an approximately equal amount of time speaking (e.g., in a group of four, each group member speaks for ~10 minutes).

Group members should take turns presenting so that no one is unfairly burdened with having to speak for the entire duration. This is an opportunity for individuals to use their strengths; for example, one person can give the introduction, one person can work through an example, one person can lead a live coding session, etc.

Your group's lecture should be presented at a level similar to other lectures in this course: targeted at a graduate student audience that is familiar with computational logic. Your group can refer to past lecture notes as background material, but your group should ultimately develop your own notes or slides for use in the lecture itself.

Your group must submit your lecture materials (e.g., notes, slides, etc.) *at least one day before* the lecture is scheduled. Your lecture will be marked in terms of three broad categories: quality (e.g., focused on topic, targeted at an appropriate level), accuracy (e.g., correct summary of main results, material all related to topic), and organization (e.g., notes/slides are clearly written, lecture is well-paced).

Lastly, remember that *quality is better than quantity*. A very well-produced lecture that takes ~30 minutes is better to experience than a poorly-planned lecture that takes ~40 minutes.

Report

Due April 5, 2023 in lecture

The report is an individual submission meant to serve as a follow-up to the group lecture. In this report, you will give a reflection on your group lecture and your group's performance in planning, designing, and delivering the lecture. Your report should include, at a minimum, the following information: the topic of your lecture, the names of your group members, a list of the specific duties you completed in your group, and approximately one paragraph devoted to *each* of the following points: aspects of your lecture that you feel went well/that you enjoyed, aspects of your lecture that you feel went poorly/could have been improved, and your opinion on your group's dynamic. Your opinion will not be shared with other group members.

You are not explicitly asked to grade or evaluate your groupmates' individual performance in your report; rather, this is an opportunity to give general comments on how well your group worked together, your favourite parts of the group lecture, and areas where you feel you or your group could improve in the future.

Your report should be a 2–3 page double-spaced document written in 12-point text. This is a strict page limit. The report will be marked primarily in terms of completeness and organization.

Suggested Topics

Below, I offer a (non-comprehensive) selection of suggested topics that your group can choose for your lecture topic. Your group does not have to choose your topic from this list; these are only some ideas. Your group is welcome to study and present a topic related to this course that is not on this list.

- **Special topics**

- Binary decision diagrams (BDDs)
- Gentzen calculus
- Hilbert calculus
- Peano arithmetic
- Predicate logic with equality

- **Advanced logic systems**

- Belief logic
- Deontic and imperative logic
- Modal logic
- Temporal logic

- **Program verification and model checking**

- Hoare logic
- Linear-time temporal logic
- Software verification, partial correctness, and total correctness

- **Proof assistants and theorem provers**

- The Coq proof assistant
- The HOL/Isabelle proof assistants
- The Lean proof assistant

- **Logic programming languages and software tools**

- Agda
- Prolog
- SAT solvers