Now that we have completed the midterm exam and the "fundamental" portion of the course, we are transitioning to work on the final projects. The document describes the basic parameters for the final project, and the expectations for the last several weeks of class.

By Wednesday, November 11, you should email me a project proposal. This is the first deliverable for the project phase of the course. Your email should include

- Two or three topic ideas. We have discussed some potential topics in class, but you you can feel free to think broadly here, and propose anything that you think you will learn from and enjoy exploring. We will discuss your topic ideas individually and refine them, so you are not committing to anything at this stage, and you can think broadly here.
- Any topics or recent events you're interesting in *briefly* learning about and giving a *practice presentation* about. These can be part of your intended project topic, but need not be. This is just an opportunity for you to quickly learn about something and practice presenting on it.

After receiving your proposals, I will meet with you individually to choose a specific topic and goals.

The remaining class meetings will consist of a combination of discussion of special topics or techniques, which I will choose based on what seems likely to help you in your projects, students presentations, and work time for the projects.

Practice presentations. Before the final project presentations, each student should give one short presentation in class, roughly ten minutes, on a topic of their choosing. This is *not meant to be a large scale project*; it is fine to just spend several hours learning about something and then make a presentation about it. These presentations are intended for you to practice a presentation before the project presentation, and for the class to learn about some special topics. These can be about any of the following, or anything else that may interest the class and be relevant to the course topics: current events in proof formalization (e.g. recent released from AI labs); a portion of the Mathlib library; any other proof formalization project, e.g. that you might find on the Palomar registry or Tau Ceti.

The final project. The final project consists, by default, of the following three components. You can refine your project in consultation with me.

- A collection of Lean code. The code should be organized around proving a theorem of collection of theorems about your project topic. It should be well-organized, and you should be prepared to explain the code. Ideally the code should be gathered in a github repository, which I can work with you to set up.
- A written exposition of your code. This can take many formats, but a good baseline for the amount of text I have in mind is a *ten page paper.* But you are free to present the exposition in another format, e.g. by creating automaatically generated documentation for your code, or a website.
- A final presentation, to be given in the last two class meetings. The presentation should be about ten minutes, and should be aimed at your fellow students, explaining what you did in your project and what you have learned from it.

Use of generative AI is neither required nor prohibited. You may choose to use no AI tools, or you may choose whatever tools you wish to try using. Plesae let me know if there are tools that

you want to use but cannot access; I may be able to obtain access for you. The only requirements for AI use are:

- You must be **completely transparent** about all use of AI. Your exposition should describe all of your tool use in detail, including models, harnesses, etc.
- You should be prepared to explain any part of your project, including parts generated by AI.