

Guide to Problem Presentations

The Limits of Logic (PHIL 450)

Fall 2019

The only way to learn logic is by doing logic. The best way to understand an idea is to explain it to others.

You should make a serious attempt at all of the assigned exercises, though you shouldn't worry if you don't solve all of them. Working on the exercises is the only way to practice core skills and come to understand key concepts. Ideas that come up later in the class will build on earlier exercises, so if you don't keep up with consistent practice, it will be easy to get lost later on.

You should present roughly one exercise each week. Roughly every other class meeting will be devoted to student presentations of solutions to exercises. When you present your solution to an exercise, **you are the teacher** for that part of the class. Your goal should be to help everyone in the class understand the main ideas involved in your problem.

Most of the exercises are **informal proofs**. Your job is to clearly justify a statement, in a way that convinces everyone that the statement is true, and also (ideally) illuminates *why* it's true. **I don't expect you to know how to do this already.** This is one of the core skills that you'll be learning in this class. I'll be teaching you tricks, tools, and strategies as we go.

(Your job for these problems is *not* to give a derivation in some formal system, like "natural deduction" or a "truth-tree," like you might have learned in other logic classes. Similarly, your job is *not* to formalize statements in predicate logic. But those kinds of intro logic skills will come in handy. For example, it's important to be able to look at a complicated statement and figure out that it has "if ... then ..." structure.)

1. **Try to solve all of the assigned exercises.** It's okay if you don't come up with good solutions to all of them, but it's important to give them all serious thought. As a rule of thumb, don't give up on a problem until
 - (a) you've spent at least fifteen minutes on it, and
 - (b) you've tried to apply some of the strategies we'll discuss in class.

After the first few weeks, if you're not finding that you're able to solve *most* of the assigned exercises, **come to office hours** to get more help with strategies.

2. **Sign up online** for a problem to present in class. I will email you a link to the sign-up page. Normally sign-ups are first-come, first-serve, but feel free to ask other students to trade problems with you if you want.

3. Once you know what problem you'll present, **plan ahead** what things you'll write on the board, and what things you will say out loud.
4. Start your presentation by **explaining what the problem says, and what it means**. Is there anything about the problem that wasn't totally clear? You should also try to briefly explain how the problem fits with the rest of what we're doing, and why it might be important.
5. **Explain your solution to the problem, with a careful step-by-step justification.**

Pay particular attention to places where it wasn't obvious what to do. Did you use any special tricks? Did you try other strategies that didn't work? Think about what would help someone else figure out how to do similar problems.

You don't need to include *every* step of the justification, but if there are any gaps, you should be prepared to answer questions about how to fill them in.

If you think you've said enough, don't feel like you have to pad it out. Short is good. (Sometimes a good solution might be just one sentence!)
6. After you've presented your solution, **we'll discuss it as a group**. Are there any parts of the reasoning that people don't understand? What steps or strategies did you use to come up with your solution? Does anything seem fishy?

Very often in our discussion we'll find some mistakes. **It is okay to present a solution with mistakes.** Try not to be embarrassed by this—it's totally normal, even for professional logicians. **Your grade for problem presentations is not based on whether you get everything right.** It's based on whether

 - (a) you have made a serious attempt at a solution,
 - (b) you give a clear and organized explanation, and
 - (c) you respond well to questions and feedback.

The problems vary a lot. Sometimes a single sentence will be an adequate answer. In other cases, a good presentation may take ten or fifteen minutes. Hopefully everyone will get a chance to present a variety of different kinds of problems through the semester.

I encourage you to work together on exercises. But remember that you are individually responsible for understanding, explaining, and defending your ideas. It's easy to trick yourself into thinking you understand something better than you do. This doesn't help anybody. Here's a guideline if you work on a problem with others: set aside your notes from group sessions and write up your final solution on your own. That way you'll make sure you really understand it yourself. (This does not apply to take-home exams. Do those by yourself.)