

The University of Western Ontario
Department of Computer Science

Computer Science 209 b

Exercise Series 10

The times indicated are estimates you should not exceed in an exam situation. As the exercises are intended to assist you in learning the concepts and methods, you are likely to need more time than indicated when you attempt to solve an exercise problem.

Problem 1 (time estimate: 5 minutes).

Give a formula which is satisfiable, but not in any domain with more than two elements.

Problem 2 (time estimate: 2 minutes).

Is there a formula which is satisfiable in an uncountably infinite domain, but not in a finite or countably infinite domain? Prove your answer.

Problem 3 (time estimate: 120 minutes).

In constructive logic there are slight changes to the proof rules: rules r_3 and r_{13} are replaced. The rules for constructive logic are c_1 – c_{13} and, of course rules q_1 – q_6 . Read Chapter 31 of the notes, compare the rules of constructive logic with those of classical logic and do as many of the problems in Table 31.2 as possible in the proposed time frame.

Problem 4 (time estimate: 5 minutes).

In constructive logic, one cannot, in general, conclude F from $\neg\neg F$. Explain how this implies that the schema of proof by contradiction does not work.

Problem 5 (time estimate: 120 minutes).

Make sure you understand the differences between classical and constructive logic. List the main items. Why might constructive logic be more adequate than classical logic in computer science? When you use constructive logic certain mathematical theorems are no longer provable. List a few of them. Find reading material on constructive logic and constructive mathematics on the WEB. Historically, who were the people insisting on constructivity?