CSE 4083/5210 Formal Languages and Automata
asgn01   Assignment #1   Chapter 1 (Math)
Due: Fri, 12 Jan 2024

Reading. Read Chapter 1: "Introduction to the Theory of Computation" from the textbook; omit Section 1.3 entirely and permanently. Read Sections 1.2.2 and 1.2.3, but for the moment we ignore them. (1.2.3 "Automata" comes up officially next week, and 1.2.2 "Grammars" we ignore until section 3.4 or chapter 5.)

Additional Resources. This assignment is a review of the material found in a discrete math class. Mastery of Hein, *Discrete Structures, Logic, and Computability* would be ideal.

Assignment. Do some small number of the following exercises from Linz (the same numbering is used in the sixth and seventh edition):

- Section 1.1: 1–20, 38, 40–46.

- Section 1.2: 1–11.

We are especially interested in clear exposition and proof technique. (Some solutions sketches are in the back of the book.)

Submission. Write up the solutions. You may use pen and paper, plain text, or LATEX. Produce a PDF document, and submit it on Canvas by the due date before the end of the day.

The due date is for the completed problem set. You should read the material in advance, and start thinking and working on the problems in advance, so that you can ask questions in class.

Collaborating is encouraged; no individual grade for the homework will be used in determined the individual course grade (that's what the tests are for). Copying just wastes everyone's time; it is quality that is important not quantity. Copying is not practicing. Of course, some individual may require much more practice than others to achieve the same level of competency on the tests.

Questions. If you have questions about how to do the problems, you are welcome to send me e-mail: ryan@fit.edu. Students may be called upon to share and explain their progress on the exercises during class.

Assessment. Ultimately the written proofs, your choice of exercises, and your participation in answering and *asking* questions, will influence your course grade.

Objectives.   At the conclusion of the chapter, the student should be able to the following.

1. Define the terms: symbol, alphabet, string, and formal language

2. Apply mathematical techniques: induction and *modus tollens*

3. Perform mathematical proofs and understand logic

4. Define and implement string operations: concatenation, append, reverse, and length

5. Apply set operations: union, intersection, and set difference

6. Define, recognize, and implement operations on languages: concatenation, reverse, star

7. Define a grammar and a derivation