CSE 4083/5210 Formal Languages and Automata
asgn05   Assignment #5   Chapter 5 (CFL/Grammars)
Due: Fri, 9 Feb 2024

Reading. Read Section 1.2 on grammars. Read Chapter 5, "Context-Free Languages," and omit Section 5.3. Lecture notes can be found following the links on the grid of notes.

Assignment. Do some of the following exercises.

- Section 1.2: 15, 16, 20

- Section 5.1: Problems 1, 9–19 (**9**, **10**, **12**, and **16** in back)

- Section 5.2: Problems 8, 9, **13**, **15**, **17**, 23.

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 this unit, the student should be able to:

1. (§1.2) Define (unrestricted) grammars

2. (§5.1) Identify and construct context-free grammars (Definition 5.1, page 130)

3. (§5.1) Define a context-free language (Definition 5.1, page 130)

4. (§5.1) Identify and construct leftmost and rightmost derivations (Definition 5.2, page 134)

5. (§5.1) Identify and construct derivation trees for sentential forms (Theorem 5.1, page 137)

6. (§5.2) Peform exhausive search parign (Theorem 5.2, page 143)

7. (§5.2) Show/demonstrate that a context-free grammar is ambiguous (Definition 5.5, page 145)

8. (§5.2) Rewrite a grammar to remove ambiguity