

CSE 4083/5210 Formal Languages and Automata
Assignment #06
Due: Fri, 30 Sep 2022

Test. Exam on Friday, 23 September 2022. All questions will come from the textbook (or closely related, i.e., reworded, broken down into parts, or simplified.)

Reading. Read Chapter 4: “Properties of Regular Languages”. There are several pre-recorded lectures pertaining specifically to the pumping lemma. They can be found following the links on the grid of notes, or on Canvas.

Assignment. Do some small number of the following exercises.

- Section 4.3: Problems 1–9, 18.

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 determining 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.

1. State the closure properties of regular languages
2. Prove that regular languages are closed under union, concatenation, star-closure, complementation, and intersection
3. Prove that regular languages are closed under reversal
4. Describe a membership algorithm for regular languages
5. Describe an algorithm to determine if a regular language is empty, finite, or infinite
6. Describe an algorithm to determine if two regular languages are equal
7. Apply the pumping lemma to show that a language is not regular