Test. Written exam over chapters 1–4 on Fri, 8 Oct 2021.

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

Assignment. Do some small number of the following exercises.

- Section 4.2: Problems 1–12.
- 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 end of the day Fri, 8 Oct 2021.

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.

Questions. If you still 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. (§4.1) State closure properties of regular languages
2. (§4.1) Prove that regular languages are closed under union, complementation, and intersection
3. (§4.1) Prove that regular languages are closed under concatenation, star-closure, and reversal
4. (§4.1) Omit: Prove that regular languages are closed under homomorphism
5. (§4.1) Omit: Describe right quotient construction
6. (§4.2) Describe a membership algorithm for regular languages

7. (§4.2) Describe an algorithm to determine if a regular language is empty, finite, or infinite

8. (§4.2) Describe an algorithm to determine if two regular languages are equal

9. (§4.3) Apply the pumping lemma to show that a language is not regular