INSTRUCTIONS

Homework solutions should be neatly written or typed and submitted through Gradescope. No work can be accepted outside of this system, and no late work will be accepted. Please ensure that your submission is legible (neatly written and not too faint) or your homework may not be graded. You may update your submission as many times as you’d like up to the deadline. Only the most recent submission will be graded.

Thirty problems from homework assignments will be graded randomly throughout the quarter. You will not know in advance which problems, if any, will be graded on each assignment.

You may consult your textbook, class notes, lecture slides, instructors, TAs, and tutors for help with homework. You may also discuss homework questions with classmates, but you may not share written work with classmates. You must write up your solutions alone, in your own words. The assignments have been developed to facilitate your learning and to provide a method for fairly evaluating your knowledge and abilities, not the knowledge and abilities of others. To facilitate learning, you are authorized to discuss assignments with others; however, to ensure fair evaluations, you are not authorized to view or share written work with another person, or to write your submission in collaboration with another person. You should not look for answers to homework problems in other texts or sources, including the internet.

Do not post about homework questions on Piazza. For help with homework, please consult the course textbook, lecture slides, class notes, and podcasts, or come visit us in office hours.

READING: Sipser 1.3
1. (a) Using the procedure from class and the textbook, convert this DFA to an equivalent regular expression, showing your work along the way. Remove state A first, then B, then C.
To avoid a cluttered diagram, please do not draw arrows marked with the empty set symbol $\emptyset$, which is the convention your textbook uses in Examples 1.66 and 1.68 (pages 74 to 76).

(b) Now use JFLAP’s algorithm to convert the same DFA to a regular expression. Note that JFLAP uses $+$ in place of $\cup$ when writing regular expressions.
- Draw the above DFA in JFLAP. It is important to make two separate transition arrows from state A to state B (and not just use $a,b$ on a single arrow).
- In the menu, go to Convert, then Convert FA to RE.
- Follow the instructions given.
- When asked to Reform Transitions using the collapse tool, click the fourth button from the left, and then click the transition from A to B.
- When asked to place empty transitions, click the do it button.
- When asked to Remove States using the collapse states tool, click the fifth button from the left, and select state B. A table will be displayed, showing you how the removal of that state will change the labels on the transitions between the other states in the diagram. Press Finalize to see these changes in your diagram.
- Repeat the previous step but select state C.
- Select Export and copy paste the resulting regular expression into your homework submission.

Now repeat the whole process, but this time remove state C first and then state B.

To turn in: What regular expression(s) did you produce? Does JFLAP’s algorithm seem to be dependent on the order in which you remove states? Does JFLAP’s algorithm produce the same regular expression as the algorithm from class and the textbook?