COMP 4200 - Formal Languages: Homework #4

Due on Wednesday, February 22, 2023, at 10:00 pm
Instructor: Hugh Kwon

Instructions:

- Submit your work as a single PDF through GradeScope (link on Canvas). You will need to mark your solution to each question (click for the instruction).
- Note that it is your responsibility to make your submissions readable by TAs. If your handwriting is not readable by the TA, he may not give you full credits (or any credits at all) for the illegible part.
- You will not only be graded on your mathematics, but also on your organization, proper use of English, spelling, punctuation, and logic.
- Late submissions will NOT be graded unless as specified by the Late Assignment Submission policy in the syllabus.
- For any questions regarding the assignment or grading of the assignment, please email our TAs.

Problem 1

Total: 20 points (10 points each)
Convert the following regular expressions into equivalent NFAs. Draw the final NFAs using JFLAP (jflap.org/ or FSM Designer (madebyevan.com/fsm). That is, provide screenshots or exported drawings of the diagrams in your solution. Hand-drawn drawings will be NOT graded.

1. a*(b ∪ c)*c
2. ((b ∪ a)* ∪ (c ∪ a))*(cb)*

Problem 2

Total: 40 points (20 points each)
Convert the following NFAs into equivalent regular expressions. Show **all the intermediate steps** (i.e. GNFAs) and make appropriate comments to help graders understand your steps.
For example, step 1: remove state "q_0"; step 2: remove state "q_3", etc.
For this problem, it is not necessary to use JFLAP or FSM Designer.

a. Convert the NFA in Figure 1 into an equivalent regular expression.

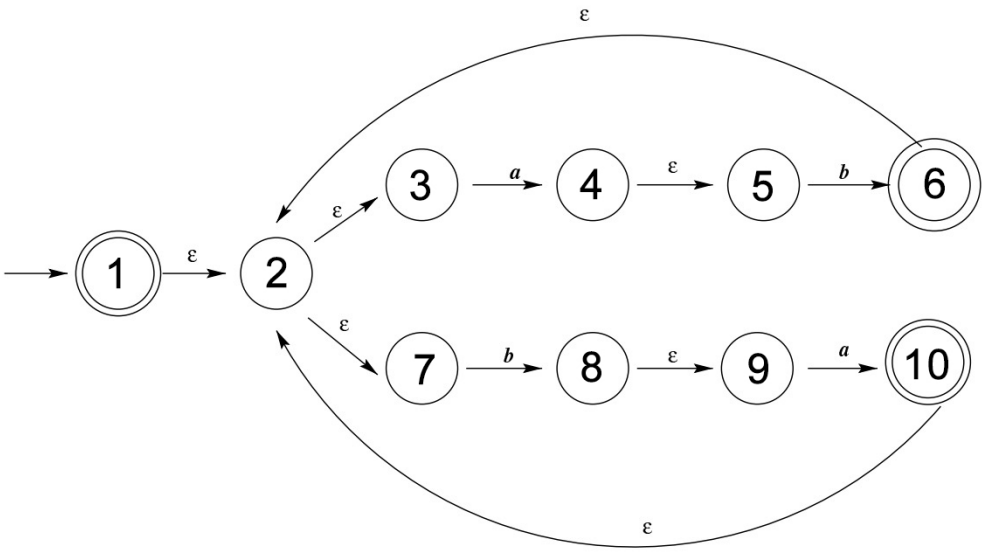

Figure 1:

b. Convert the NFA in Figure 2 into an equivalent regular expression.

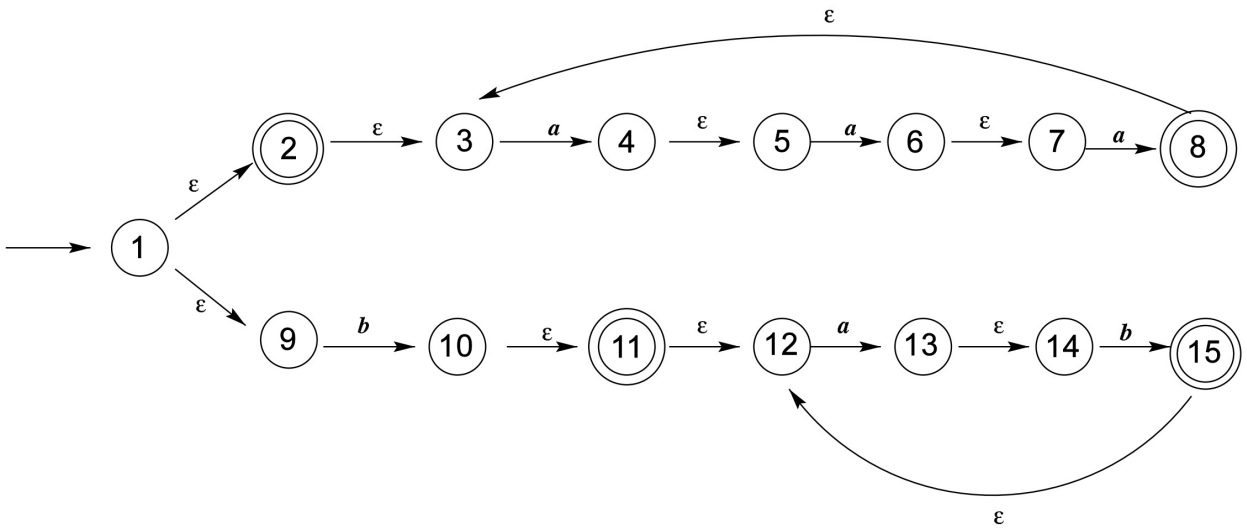

Figure 2: