CS323 Assignment 2

1 Requirements

You are expected to complete all required homework exercises and encouraged to complete the optional ones (if there are). For submission, please put all your answers in a single PDF file and submit it via the assignment channel on Blackboard. The name of the file should follow the format **"studentID_A#"** (e.g., 30003554_A2). **The submission deadline is 10:00 PM, October 18, 2023.** Late submissions are allowed within one week after the deadline (grace period). If you submit your assignment during the grace period, your score will be 80% of the score you could get if the submission was made in time. Assignment submitted after the grace period will not be graded.

2 Required Exercises (100 points)

You are required to complete three exercises related to the following two regular languages. The alphabet contains three symbols: a, b, c.

1. $L(((\epsilon|\texttt{ab})^*\texttt{c})^*)$
2. $L(\texttt{(a|b)*a(b|c)(a|b|c)})$

Exercise 1: Design NFAs to recognize each of the above two regular languages. Is each of the NFAs designed by you also a DFA? [20 points]

Exercise 2: Convert the above two regular expressions to NFAs using the Thompson's Construction Algorithm (Algorithm 3.23 in the dragon book). Please put down the detailed steps and **DO NOT** optimize the NFAs. [40 points]

Exercise 3: Convert the NFAs in Exercise 2 to DFAs using the Subset Construction Algorithm (Algorithm 3.20 in the dragon book). Please put down the detailed steps. [40 points]