CS323 Written Assignment 2

1   Requirements

You are expected to complete all required homework exercises. 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_HW#"** (e.g., 30003554_HW1). **The submission deadline is 10:00 PM, October 12, 2025.** Late submissions are allowed within three days after the deadline (grace period). If you submit your assignment during the grace period, your score will be 60% of the score you could get if the submission was made in time. Assignments submitted after the grace period will not be graded.

2   Exercises (100 points)

Exercise 1: Given the alphabet $\Sigma = \{a, b, c\}$ and the regular language $L_1 = L((a|b|c) * abc)$:

- Apply Thompson's construction algorithm to construct an NFA to recognize L_1. Provide intermediate steps. [10 points]

- Can the NFA accept the string *abcabc*? If yes, please put down the sequence of the states the NFA traverses when processing the string. [5 points]

- Apply subset construction algorithm to convert the NFA to an equivalent DFA. [15 points]

- Can the DFA accept the string *abcabc*? If yes, please put down the sequence of the states the DFA traverses when processing the string. [5 points]

Exercise 2: Given the alphabet $\Sigma = \{0, 1\}$ and the language $L_2 = L((0|1(01 * 0) * 1)*)$:

- Apply Thompson's construction algorithm to construct an NFA to recognize L_2. Provide intermediate steps. [20 points]

- Please give a string that can be accepted by the NFA. [5 points]

- Apply subset construction algorithm to convert the NFA to an equivalent DFA. [35 points]

- Please give a string that will be rejected by the DFA. [5 points]