COMP 4200 - Formal Languages: Homework #3

Due on Monday, February 12, 2024, at 10:00 pm
Instructor: Hugh Kwon

Instructions:

- Submit your work as a single PDF through GradeScope (link on Canvas). You will need to match your solution to each question (click for the instruction). Failure to match your solution to the appropriate question will result in a grade of 0 for each unmatched question.
- 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: 30 points (10 points each)
Construct NFAs that recognizes the following languages:

1. All binary numbers that contain a 1 in the 3rd location from the right (e.g. **1**00, 10**1**11, ...)
2. All binary numbers that contain at most two 1's or contain at most two 0's (e.g. ϵ, 1111**0**1, 0**1**000, ...)
3. All binary numbers that can be divided by 4.

Problem 2

Total: 30 points
Via subset construction, construct DFAs from all three NFAs that were constructed in problem 1. You must show the transition tables of the DFAs you construct and their state diagram.