CSC236 – Tutorial 12: NFAs and Regular Expressions

This is the last tutorial on languages and automata. We use this opportunity to introduce to you a set of slightly more interesting problems (compared to your assignment).

1. For each of the following languages, draw an DFA/NFA which accepts it:
   (a) $L_1 = \{w \in \{0, 1\}^* \mid w$ interpreted as a binary number is divisible by 3$\}$
   (b) $L_2 = \{w \in \{0, 1, 2\}^* \mid$ the final digit of $w$ has appeared before$\}$
   (c) $L_3 = \{w \in \{0, 1\}^* \mid w$ interpreted in reverse as a binary number is divisible by 5$\}$

2. For each of the following languages, write a regular expression that matches the language.
   (a) $L_1 = \{w \in \{0, 1\}^* \mid$ there are two 0’s that are separated by a number of positions that is a multiple of 4$\}$
   (b) $L_2 = \{w \in \{0, 1\}^* \mid$ every pair of adjacent 0’s appears before any pair of adjacent 1’s$\}$

3. Convert the following NFA into a DFA.

![NFA Diagram](image-url)