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Homework 2

CS 150 – 2022 SP [10 points]

1. (1 point) Give an NFA recognizing L = {w | w begins with 1 and ends with 0 over {0,1}*}.

2. (1 point) Give a DFA recognizing L = {w | every odd position of w is a 1 over {0,1}*}. For example, the "0" is in the 3rd (an odd position) for "a101" and "a" is in the 1st position (also odd), but the "1's" are in even positions.

3. (2 points) Draw an NFA accepting the set of strings over {0,1} whose 5th symbol from the right is 0. How many states would you say the equivalent DFA would take?

4. (2 points total) Give *either* a DFA or an NFA accepting the following languages over Σ= {0,1}. Please state which kind you provided (DFA or NFA).

    a. the set of strings with 011 as a substring

    b. {w | w does NOT contain the substring 110}

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5. (4 points) Give proof sketches that the regular languages are closed under:

   a. union

   b. intersection

   c. concatenation

   d. reversals

   e. complements

   f. Kleene star

6. (1 **bonus** point) Draw an NFA accepting the set of strings over {0,1} such that the number of 0's is divisible by 3 and the number of 1's is divisible by 2.