Prework 1.2a: Nondeterminism

Write your preliminary solutions to each problem and submit a PDF on Canvas. The names in brackets indicate the subset responsible for presenting the problem.

1. [Grace, Andrew, David, Allie] Refer to questions 1–3 of the last prework assignment. Use your DFA's from questions 1 and 2 and the construction in Figure 1.46 (page 59) to construct a state diagram for an NFA that recognizes the language

$$A = \{w \mid w \text{ ends in } 01\} \cup \{w \mid w \text{ has an odd number of symbols}\}.$$

   Does this NFA have the same number of states as the DFA for A that you constructed in question 3 of the last prework? Will this always happen? Explain.

2. [Connor, Curtis, Ky, Levi] Construct a state diagram for a DFA that recognizes the language $A = \{01, 001, 010\}$, then use the construction in Figure 1.50 (page 62) to convert it to a DFA that recognizes A^*. Check that your DFA works on a non-trivial element of A^*.

3. [Joshua, Micah, Benjamin, Meghan, Todd] The power set $\mathscr{P}(A)$ is the set of all subsets of A. Fact: If A has n elements, then $\mathscr{P}(A)$ has 2^n elements. Write down all of the elements of $\mathscr{P}(\{c, u, b, s\})$ in an organized way that illustrates this fact.

BEGIN YOUR SOLUTIONS BELOW THIS LINE