Assignment 3
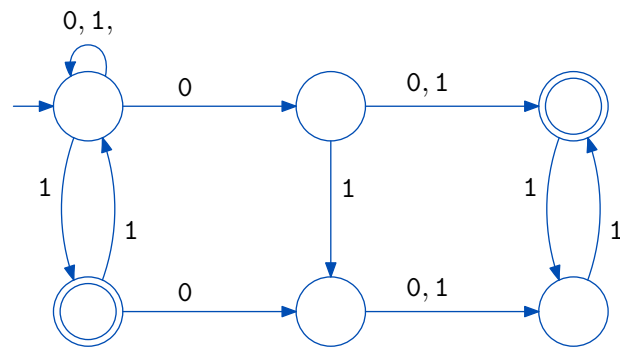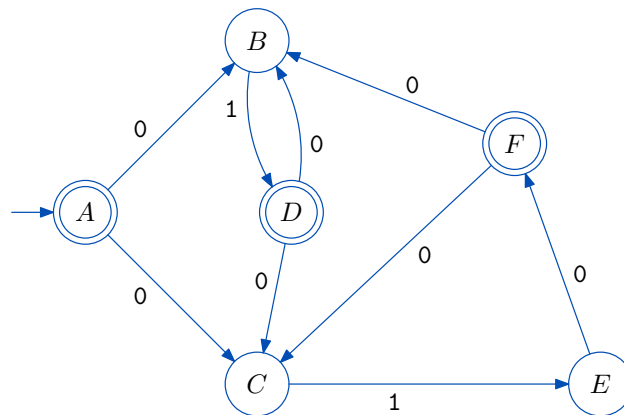
(Please work in groups of two or three and submit one answer sheet for the group.)

1. Consider the following NFA with language W.

(a) Give two examples of strings in W.
(b) Give two examples of strings not in W.
(c) Describe in English W. Be precise.

2. Provide an algorithm to tell if the language is infinite or not if the input is

(a) an RE

(b) an NFA.

3. Use the subset construction to produce a DFA equivalent to the following NFA.

4. Let E be the language of all strings of $\{\mathtt{a}, \mathtt{b}, \mathtt{c}\}$ such that each symbol appears an even number of times. For example, E includes the string `aababa`.

   (a) Explain how one can use the product construction to provide a DFA for E that has eight states.

   (b) Explain why there is no DFA for E with fewer than eight states.

5. In a spell checker, it is useful to check whether the given word is one symbol away from a word in the dictionary. For a language L, define L' to the set of all strings obtainable by altering at most one symbol in a string of L. For example, if L is $\{CAT, DOG\}$, then L' is $\{AAT, BAT, CAT, \ldots, ZAT, \ldots, AOG, \ldots, DOZ\}$.

   Describe an algorithm that on input an FA for a general regular language L converts it into an FA for L'.

Due: Wednesday September 18