(1) Convert the following DFA into a regular expression.

(2) Convert the following NFA into an equivalent DFA.

(3) Show that \( \{a^ib^jc^k : i + j = k, i, j, k \geq 0\} \) is a CFL.

(4) Convert this NFA to DFA.

(5) Prove or disprove: \( \{a^ib^j : i \leq j \text{ or } i \text{ is a perfect square}\} \) is not regular.

(6) Give a CFG \( G_1 \) such that \( L(G_1) = (a \cup b)^*(b \cup c)^* \).

(7) Prove that if \( L_1 \) is a regular language then \( L_2 = \{w : w^R \in L_1\} \) is regular. [Hint: Two approaches are possible: (1) induction on regular expressions or (2) convert on FA for \( L_1 \) into an DFA for \( L_2 \).]