Automata Theory - Scrimmage III

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1 Instructions

1. The Scrimmage will not be graded, i.e., there are no points.
2. Attempt as many problems as you can.

2 Problems

1. Minimize the states in the DFA depicted in the following diagram.

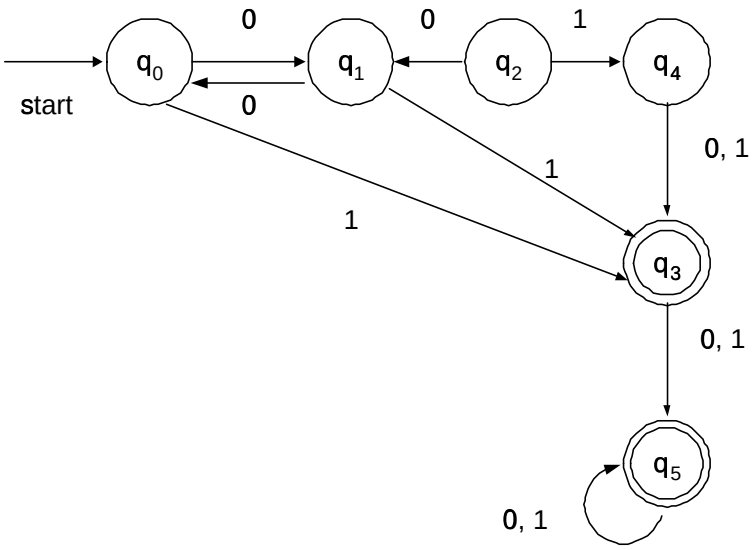

Figure 1: DFA

2. Convert the following regular expression to an NFA $a + b^n$ where $n \geq 1$.
3. Convert the following ϵ-NFA into an equivalent DFA.

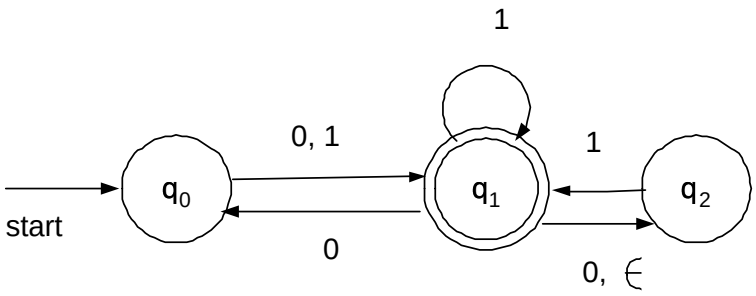

Figure 2: ϵ-NFA

4. Give a grammar for the following language $L = \{a^n b^m | n + m \ \ is \ \ even\}$.

5. Give a PDA that accepts the following language $L = \{a^n b^n | n \geq 0\}$.

6. Design a Turing Machine that accepts the language defined by the regular expression $a(a + b)^*$. Assume that $\Sigma = \{a, b\}$.