Quiz 1

1. Draw a DFA that accepts $L = \{x \in \{1,2\}^* : \ x \text{ has exactly two 2's}\}$.

2. List, in order, the lexicographically-first four strings of $(111)^*(11111)^*$.

3. Write a regular expression for the language $\overline{(\text{aa})^*}$. The complement is relative to the alphabet $\Sigma = \{\text{a}\}$.

4. Every NFA-acceptable language can be accepted by an NFA with just a single final state.
True **False**

5. Every subset of a regular language is regular. **True** **False**

6. L^* is infinite. **True** **False**

7. If $M = (Q, \Sigma, \delta, q_0, F)$ is a DFA and $F = Q$ then $L(M) = \Sigma^*$. **True** **False**

8. If L is accepted by an n-state NFA then L is accepted by some 3^n-state DFA.
True **False**

9. If L is a not-regular language and F is a finite language then $L \cap F$ is a regular language.
True **False**

10. $(L^*)^* = L^*$. **True** **False**

11. For α a regular expression, there is an algorithm to decide if $x \in L(\alpha)$ that is efficient enough to run in a reasonable amount of time on reasonable length x, α.
True **False**

12. Let $M = (Q, \{0,1\}, \delta, q_0, F)$ be a DFA and suppose that $\delta^*(q_0, x) = \delta^*(q_0, y)$. Then $x \in L(M)$ if and only if $y \in L(M)$. **True** **False**