Homework Assignment #4
Due: October 22, 4:00 p.m.

1. Let $\Sigma = \{a, d, D, e, E, f, F, +, -, .\}$. Draw the transition diagram of a DFA that accepts the language described by the regular expression

$$(aa^*(. \cup \varepsilon)a^* \cup .a^*a)(e \cup E)(+ \cup - \cup \varepsilon)a^*a(f \cup F \cup d \cup D \cup \varepsilon) \cup (aa^*. \cup .a)a^*$$

(This regular expression describes the set of syntactically legal Java floating point literals, where the symbol a stands for any digit from 0 to 9.)

2.

(a) Let $L_1 = \{x1^k : x \in \{0,1\}^*$ and x contains at least k 1's$\}$. Write down a regular expression for the set L_1.

(b) Let $L_2 = \{x1^k : x \in \{0,1\}^*$ and x contains at most k 1's$\}$. Prove that L_2 is not regular.