Daily Questions

(due September 21, 2005) Here is a pattern that matches Java floating point constants:

$$
\begin{array}{rcll}
\alpha & = & \texttt{0} + \texttt{1} + \texttt{2} + \texttt{3} + \texttt{4} + \texttt{5} + \texttt{6} + \texttt{7} + \texttt{8} + \texttt{9} & \text{, any digit} \\
p & = & \texttt{.} & \text{, the character for a period} \\
\sigma & = & \texttt{+} + \texttt{-} + \epsilon & \text{, plus or minus characters (or nothing)} \\
\mu & = & \alpha^*(\epsilon + p)\alpha^* \cap (@\alpha@) & \text{, the mantissa} \\
\lambda & = & \texttt{e}\sigma\alpha^+ & \text{, the exponent} \\
\gamma & = & (\mu(\epsilon + \lambda)) \cap (@(p + \texttt{e})@) & \text{, a Java floating point constant}
\end{array}
$$

Translate the pattern γ into the state transition diagram for a NFA. You may label arcs with α and/or μ for brevity. What is the reason for including $\cap(@\alpha@)$ in the expression for μ?