Discussion 1

1. Consider the DFA, $M$, with the following state diagram.

(a) Write the formal definition of $M = (Q, \Sigma, \delta, q_0, F)$. Use a table to define $\delta$.

(b) Give an example of a string $x$ such that both $x$ and $x^R$ are in $L(M)$.

(c) Give an example of a string $y$ such that neither $y$ nor $y^R$ are in $L(M)$.

(d) Can you find an example of a string $w$ such that $w$ is in $L(M)$ but $w^R$ is not in $L(M)$?

(e) What is the language recognized by $M$?
2. (Interview question) You have an incoming bitstream (sequence of 0s and 1s) that might be truncated at any time. How can you efficiently determine if the number represented is a multiple of three?