CS4248
AY 2012/13 Semester 1
Problem Set 1

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August 22, 2012

1. $(ab(a+\epsilon))+$
2. Let the DFA be $M = (Q, \Sigma, \delta, q_0, F)$.

$$
\begin{aligned}
Q = \{ & \\
& q_0, && \text{both even} \\
& q_1, && \text{0s odd} \\
& q_2, && \text{1s odd} \\
& q_3 && \text{both odd} \\
\} & \\
F = \{q_0\} & \\
\delta(q_0, 0) = q_1 & \\
\delta(q_0, 1) = q_2 & \\
\delta(q_1, 0) = q_0 & \\
\delta(q_1, 1) = q_3 & \\
\delta(q_2, 0) = q_3 & \\
\delta(q_2, 1) = q_0 & \\
\delta(q_3, 0) = q_2 & \\
\delta(q_3, 1) = q_1 &
\end{aligned}
$$

3. Let $M' = (Q, \Sigma, \delta, q_0, F')$ be the DFA that produces the complement of $L(M)$, then $F' = Q - F$.

4. (a)

$$\begin{Bmatrix} a \\ b \\ c \\ e \\ f \\ g \end{Bmatrix} \rightarrow \begin{Bmatrix} a \\ b \\ c \\ e \\ f \\ g \end{Bmatrix} /\_\Sigma$$

$$\begin{Bmatrix} a \\ e \end{Bmatrix} \rightarrow \epsilon / \Sigma \_ \Sigma$$

(b)

$$b \rightarrow 1 / \Sigma \_ \Sigma$$
$$c \rightarrow 1 / \Sigma \_ \Sigma$$
$$f \rightarrow 2 / \Sigma \_ \Sigma$$
$$g \rightarrow 2 / \Sigma \_ \Sigma$$

(c) $x \rightarrow \epsilon / x \_ \Sigma$