CS 454: Theory of Computation
Problem Solving Session #01

Questions

Design the following DFAs

Q1. Alphabet $\Sigma = \{0, 1\}$. Accepts strings with odd number of 1’s.

Q2. Alphabet $\Sigma = \{a, b, c\}$. Accepts strings that include $aab$ as a substring.

Q3. Alphabet $\Sigma = \{a, b\}$. Accepts any strings that include $aababba$ as a substring.

Q4. Alphabet $\Sigma \{a, b, /, *\}$. Accepts strings inside C-style comments. e.g. accepts $/ *abab* /$ but rejects $ab* /$.

Q5. * Alphabet $\Sigma = \{a, b, /, *\}$. Accepts strings that are not inside C-style comments.

Q6. Alphabet $\Sigma = \{0, 1\}$. Accepts any strings with two consecutive zeros.

Q7. Alphabet $\Sigma = \{0, 1\}$. Accepts all strings that start with 00.

Q8. Alphabet $\Sigma = \{a, b\}$. Accepts all strings where as and bs alternate.

Q9. Alphabet $\Sigma = \{a, b\}$. Accepts all strings that start and end with the same symbol, i.e.,
$L = \{w | w \in \Sigma^*, w = a\{a, b\}*a \cup b\{a, b\}*b\}$.

Q10. Alphabet $\Sigma = \{a, b\}$. Accepts strings that have at least one $a$ and exactly 2 bs.

Q11. Alphabet $\Sigma = \{a, b\}$. Accepts the language $L = \{w | |w| \mod 3 = 0\}$.

Q12. Alphabet $\Sigma = \{a, b\}$. Show that the language $L = \{vwv | v, w \in \Sigma^*, |v| = 2\}$.