Notre Dame University
Computer Science Department

CSC 311 Theory of Computation

Homework 1

For each of the following languages over $\Sigma = \{0, 1\}$ build the DFA that recognizes it. Each exercise is worth 10 pts.

1. $L = \{w \in \{0, 1\}^* : w$ begins with a 1 and ends with a 0$\}$.

2. $L = \{w \in \{0, 1\}^* : w$ contains at least two 1's$\}$. Note: Not necessarily consecutive.

3. $L = \{w \in \{0, 1\}^* : w$ contains the substring 0110$\}$.

4. $L = \{w \in \{0, 1\}^* : |w| >= 1$ and every odd position of w is a 1$\}$.

5. $L = \{w \in \{0, 1\}^* :$ every 1 in w is preceded and followed by a 0$\}$. Note: ϵ is accepted.

6. $L = \{w \in \{0, 1\}^* : w$ does not contain 001 as substring$\}$.

7. $L = \{w \in \{0, 1\}^* : w$ contains at least one occurrence of two consecutive 1's not followed immediately by a 0$\}$. Examples: 111,011 accepted whereas 1101 is not.

8. $L = \{w \in \{0, 1\}^* : w$ contains at least two occurrences of a 1 not followed immediately by a 0$\}$.

9. $L = \{w \in \{0, 1\}^* :$ the number of 1's in w is divisible by 3$\}$.

10. $L = \{w \in \{0, 1\}^* :$ the number of 0's in w is not divisible by 2$\}$.