

CSE 350 Theory of Computation: Honors

HW 4

Due: March 12, 2008

1. Consider the alphabet $\Sigma = \{0, 1\}$ and the languages

$$A = \{w \mid w \text{ begins with 1 and ends with 0}\}$$

$$B = \{w \mid w \text{ contains at least three 1s}\}$$

$$C = \{w \mid w = x0101y, \text{ where } x, y \in \Sigma^*\}$$

$$D = \{w \mid w \text{ does not contain the substring 110}\}$$

Using the construction given in the proof of theorem 1.45 give the state diagrams recognizing the languages $A \cup B$ and $C \cup D$.

2. Consider the alphabet $\Sigma = \{0, 1\}$ and the languages

$$A = \{w \mid |w| \leq 5\}$$

$$B = \{w \mid \text{every odd position of } w \text{ is 1}\}$$

$$C = \{w \mid w \text{ contains at least three 1s}\}$$

$$D = \{\varepsilon\}$$

Using the construction given in the proof of theorem 1.47 give the state diagrams recognizing the languages $A \circ B$ and $C \circ D$, where \circ is the concatenation operation.

3. Consider the alphabet $\Sigma = \{0, 1\}$ and the languages

$$A = \{w \mid w \text{ contains at least three 1s}\}$$

$$B = \{w \mid w \text{ contains at least two 0s and at most one 1}\}$$

$$C = \{\varepsilon\}$$

Using the construction given in the proof of theorem 1.49 give the state diagrams recognizing the languages A^* , B^* and C^* .

4. Consider the alphabet $\Sigma = \{0, 1\}$ and the languages

$$A = \{w \mid |w| \leq 5\}$$

$$B = \{w \mid w = x0101y, \text{ where } x, y \in \Sigma^*\}$$

$$C = \{\varepsilon\}$$

Give the state diagrams recognizing the complement of the languages A , B , and C .