Chapter 1

1.6 Give state diagrams of DFAs recognizing the following languages. In all parts the alphabet is \{0, 1\}.

   a) \{w|w begins with a 1 and ends with a 0\}
   f) \{w|w doesn’t contain the substring 110\}

1.7 Give state diagrams of NFAs with the specified number of states recognizing each of the following languages. In all parts the alphabet is \{0, 1\}.

   e) The language 0*1*0* with three states.

1.21 Use the procedure described in Lemma 1.60 to convert the following finite automata to regular expressions.

   a) 

   ![Diagram]

1.31 For any string \(w_1w_2\ldots w_n\) the reverse of \(w\), written \(w^R\), is the string \(w\) in reverse order, \(w_n\ldots w_2w_1\). For any language \(A\), let \(A^R = \{w^R|w \in A\}\). Show that if \(A\) is regular, so is \(A^R\).

1.36 Let \(B_n = \{a^k|\text{where } k \text{ is a multiple of } n\}\). Show that for each \(n > 1\), the language \(B_n\), is regular.

   • Say that string \(x\) is a prefix of string \(y\) if a string \(z\) exists where \(xz = y\). Let \(A\) be a regular language and let \(L_A = \{x|x\text{ is a prefix of some string in } A\}\). Prove that \(L_A\) is regular.