PS 1 - 15.02.17

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

a) \{w \mid w\text{ begins with a 1 and ends with a 0}\}

d) \{w \mid w\text{ has length at least 3 and its third symbol is a 0}\}

f) \{w \mid w\text{ doesn’t contain the substring 110}\}

h) \{w \mid w\text{ is any string except 11 and 111}\}

i) \{w \mid \text{ every odd position of } w \text{ is a 1}\}

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

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

- Proving methods