CMPE 350 - Spring 2018

PS 1 - 12.02.18

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$\}$

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

f) $\{w|w$ doesn't contain the substring 110$\}$

h) $\{w|w$ is any string except 11 and 111$\}$

i) $\{w|$ every odd position of w is a 1$\}$

1.36 Let $B_n = \{a^k|k$ is a multiple of $n\}$. Show that for each $n > 1$, the language B_n, is regular. ($\Sigma = \{a\}$ and a^k means a string of k a's. n is an integer.)

• Let $A_n = \{(a^n b^n)^k | k \geq 1\}$. Show that for each $n \geq 1$, the language A_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 $L_A = \{x | \exists$ a string z such that $xz \in A\}$. Prove that L_A is regular.

• Proving methods