

CMPE 350 - Spring 2019

PS 1 - 18.02.19

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

- a) $\{w | w \text{ begins with a 1 and ends with a 0}\}$
- d) $\{w | w \text{ has length at least 3 and its third symbol is a 0}\}$
- f) $\{w | w \text{ doesn't contain the substring 110}\}$
- h) $\{w | w \text{ is any string except 11 and 111}\}$
- i) $\{w | \text{every odd position of } w \text{ is a 1}\}$

1.36 Let $B_n = \{a^k | k \text{ is a multiple of } n\}$. 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 $L_A = \{x | \exists \text{ a string } z \text{ such that } xz \in A\}$. Prove that L_A is regular.