13.4 Language Recognition

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Determine whether 0101 belongs to each of these regular sets.

a) 01*0*  
b) 0(11)*(01)*  
c) 0(10)*1*  
d) 0*10(0 ∪ 1)  
e) (10)*(11)*

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Express each of these sets using a regular expression.

a) the set consisting of the strings 0, 11, and 010  
b) the set of strings of three 0s followed by two or more 0s  
c) the set of strings of odd length  
d) the set of strings that contain exactly one 1  
e) the set of strings ending in 1 and not containing 000

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Express each of these sets using a regular expression.

a) the set of strings of one or more 0s followed by a 1  
b) the set of strings of two or more symbols followed by three or more 0s  
c) the set of strings with either no 1 preceding a 0 or no 0 preceding a 1

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Construct a regular grammar $G = (V, T, S, P)$ that generates the language recognized by the given finite-state machine.