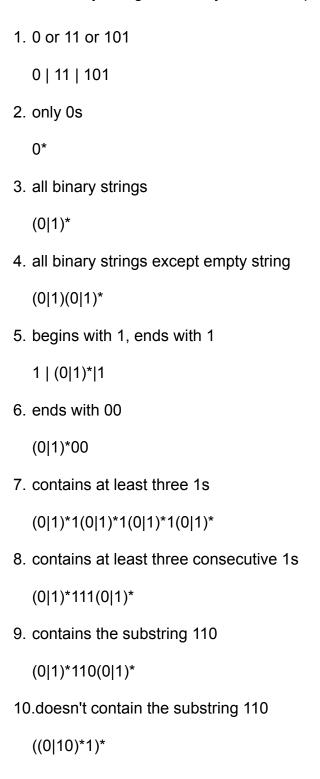
Regular Expressions Solution

Exercise 1: Write a regular expression and give the corresponding automata for each of the following sets of binary strings. Use only the basic operations.



11.contains at least two 0s but not consecutive 0s

12.has at least 3 characters, and the third character is 0

$$(0|1)(0|1)0(0|1)^*$$

13. number of 0s is a multiple of 3

14. starts and ends with the same character

$$(1(0|1)*1)|(0(0|1)*0)$$

15. starts with 0 and has odd length, or starts with 1 and has even length

$$O((0|1)(0|1))*|1(0|1)((0|1)(0|1))*$$

Exercise 2: For each of the following, indicate how many bit strings of length exactly 1000 are matched by the regular expression: $0(0 \mid 1)*1$, 0*101*, $(1 \mid 01)*$.