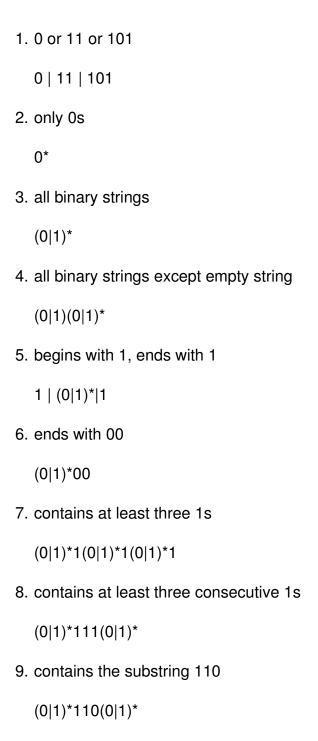
Regular Expressions Solution

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.



```
10.doesn't contain the substring 110
  (0|10)*1*
11.contains at least two 0s but not consecutive 0s
  (1*011*(0+011*))*
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
  1*|(1*01*01*01)*
14.starts and ends with the same character
  1(0|1)*1|0(0|1)*0
15.odd length
  (0|1)((0|1)(0|1))^*
16.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))^*
17.length is at least 1 and at most 3
  (0|1)|(0|1)(0|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^* , $(1 \mid 01)^*$.