

# **Autómatas Determinísticos de Estados Finitos**

Compiladores e Intérpretes

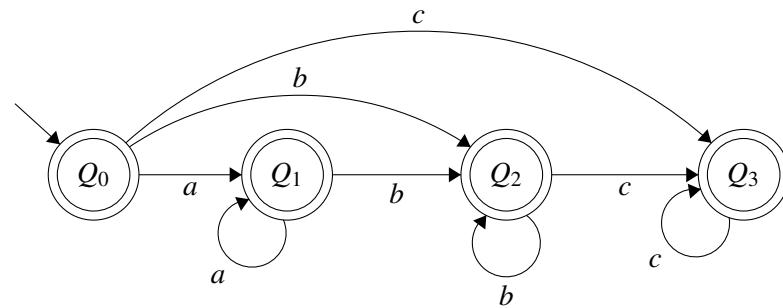
Tecnológico de Costa Rica

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### 0.1 Automaton 12

The set of strings over  $\{a,b,c\}$  in which all the a's precede the b's, which in turn precede the c's. It is possible that there are no a's, b's or c's.

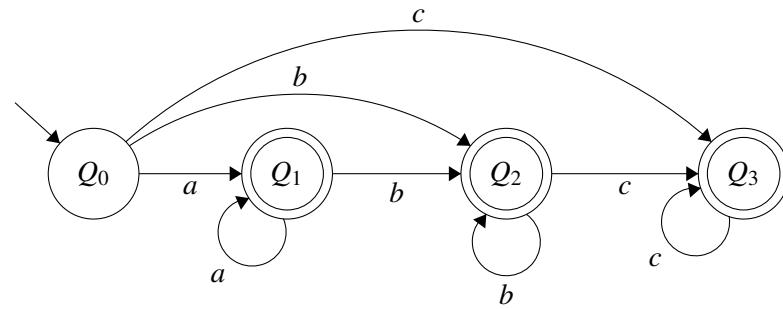
SOLUTION



### 0.2 Automaton 13

The same set as Exercise 12 without null string.

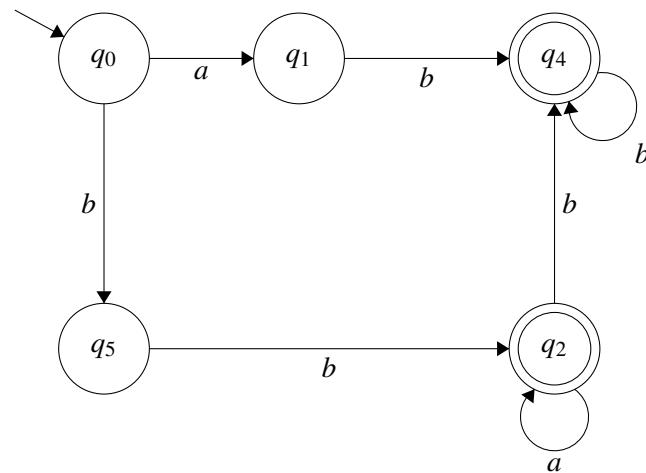
SOLUTION



### 0.3 Automaton 14

The set of string of length two or more over  $\{a,b\}$  in which all the  $a$ 's precede the  $b$ 's.

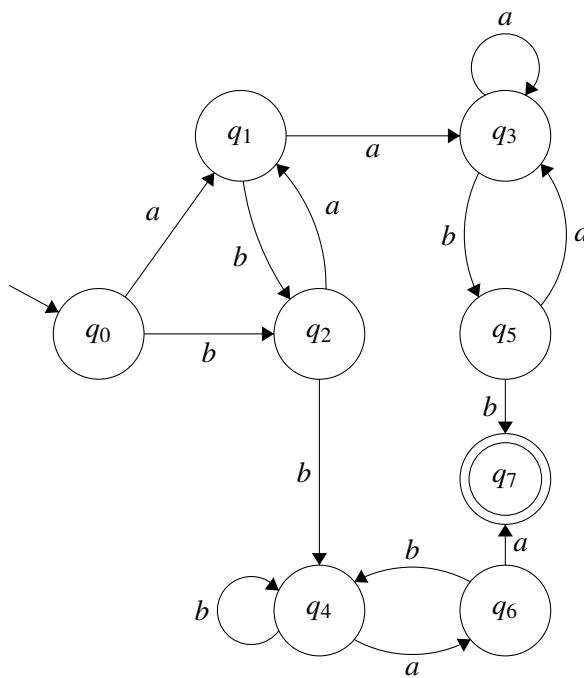
SOLUTION



### 0.4 Automaton 15

The set of strings over  $\{a,b\}$  that contain the substring  $aa$  and the substring  $bb$ .

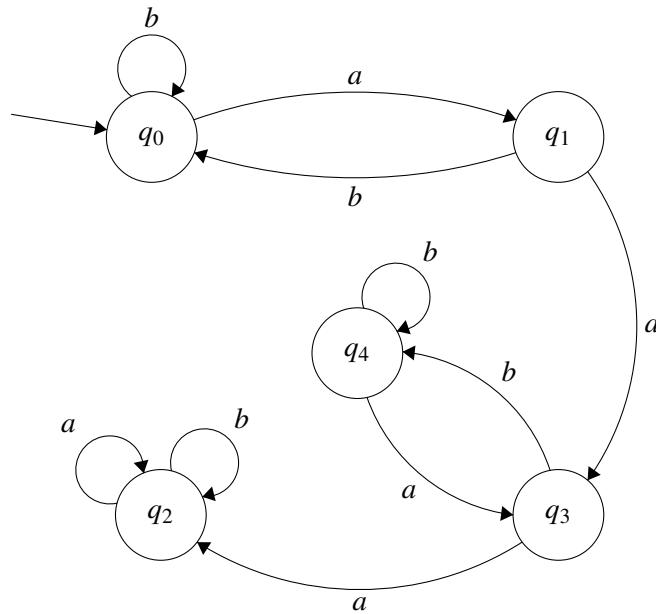
SOLUTION



### 0.5 Automaton 16

The set of string over {a,b} in which the substring  $aa$  occurs at least twice. *Hint:* Beware of the substring  $aaa$ .

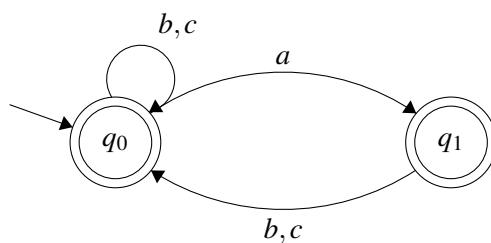
SOLUTION



### 0.6 Automaton 17

The set of strings over {a,b,c} that do not contain the substring  $aa$ .

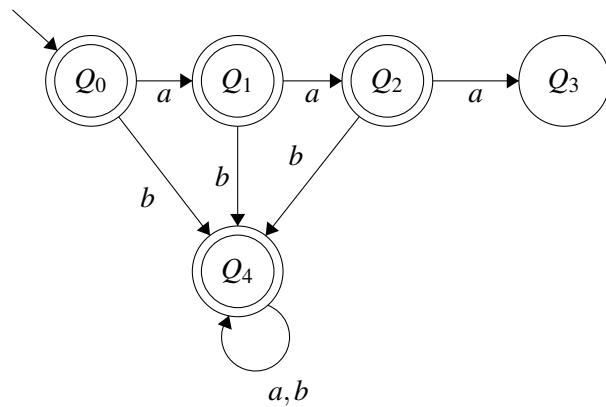
SOLUTION



**0.7 Automaton 18**

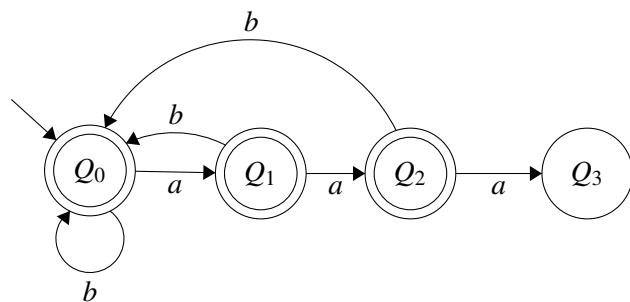
The set of strings over {a,b} that do not begin with the substring *aaa*.

SOLUTION

**0.8 Automaton 19**

The set of strings over {a,b} that do not contain the substring *aaa*.

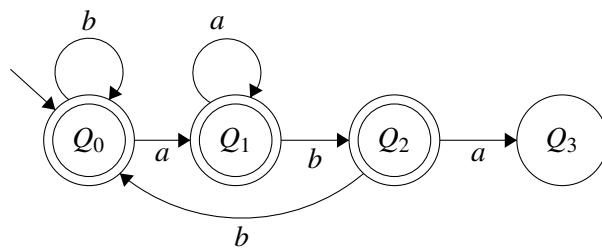
SOLUTION



**0.9 Automaton 20**

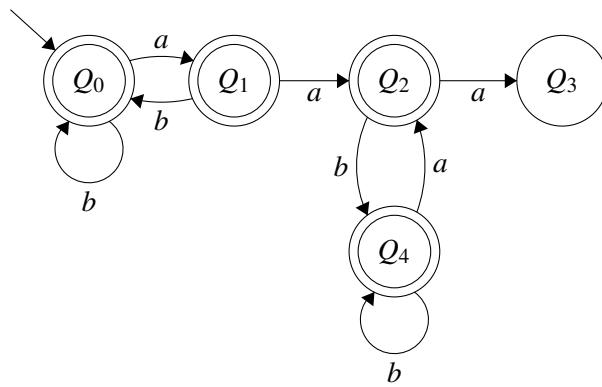
The set of strings over {a,b} that do not contain the substring *aba*.

SOLUTION

**0.10 Automaton 21**

The set of strings over {a,b} in which the substring *aa* occurs exactly once.

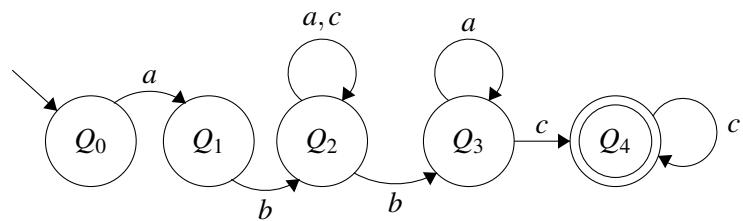
SOLUTION



**0.11 Automaton 22**

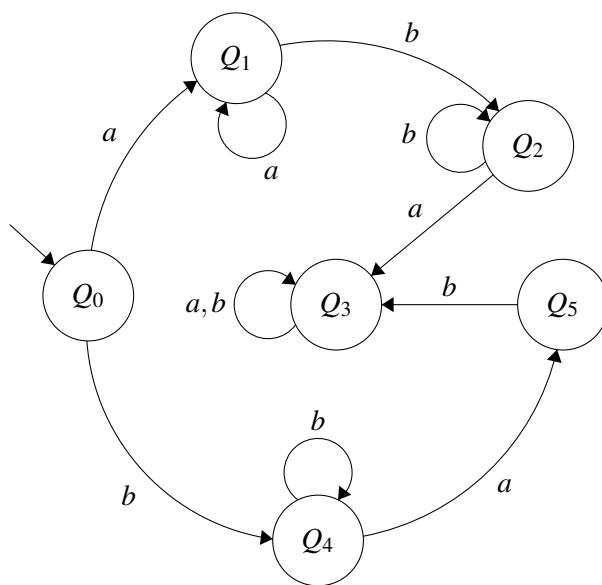
The set of strings over {a,b, c} that begin with *a*, contain exactly two *b*'s and end with *cc*.

SOLUTION

**0.12 Automaton 23**

The set of strings over {a,b} that contain the substring *ab* and the substring *ba*.

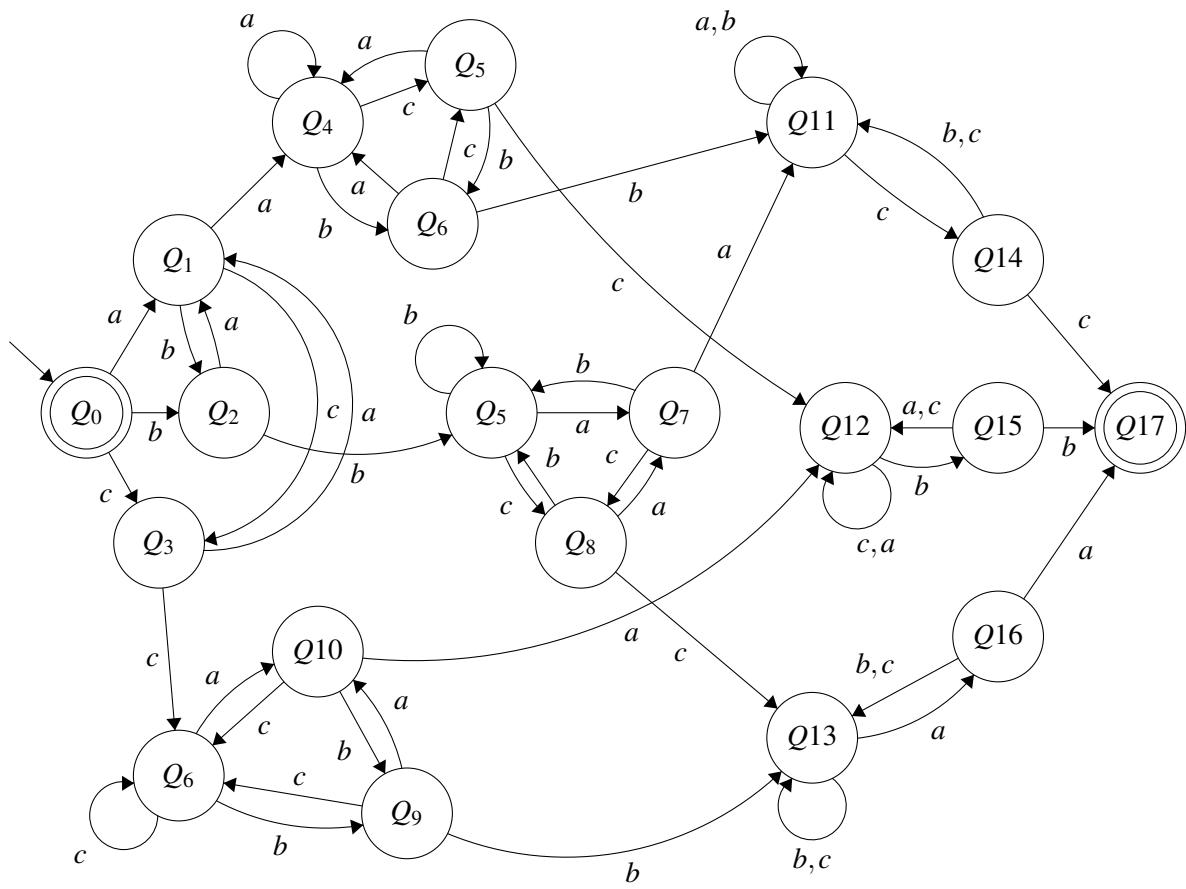
SOLUTION



### 0.13 Automaton 24

The set of strings over {a,b,c} that contain the substrings aa, bb and cc.

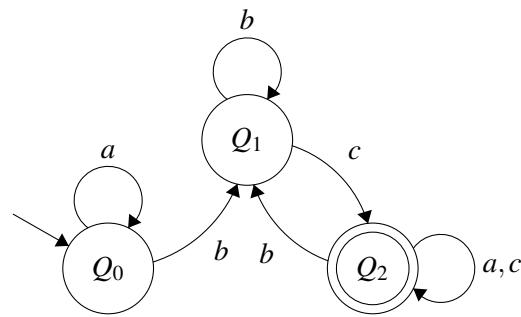
SOLUTION



**0.14 Automaton 25**

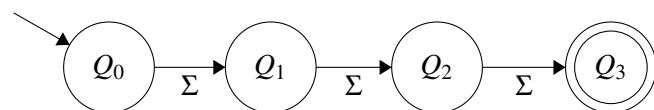
The set of strings over {a,b,c} in which every b is immediately followed by at least one c.

SOLUTION

**0.15 Automaton 26**

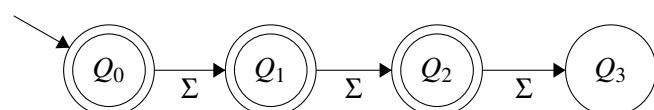
The set of strings over {a,b,c} with length three.

SOLUTION

**0.16 Automaton 27**

The set of strings over {a,b,c} with length less than three.

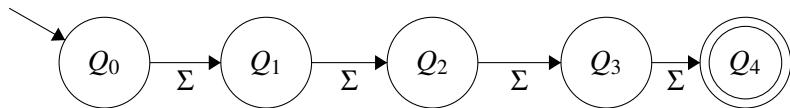
SOLUTION



**0.17 Automaton 28**

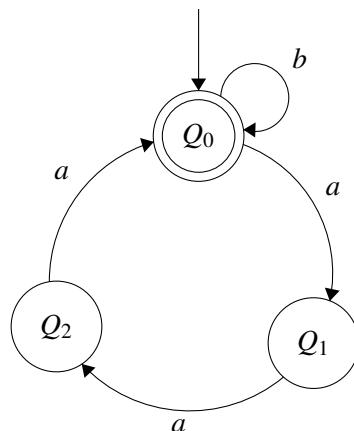
The set of strings over  $\{a,b,c\}$  with length greater than three.

SOLUTION

**0.18 Automaton 29**

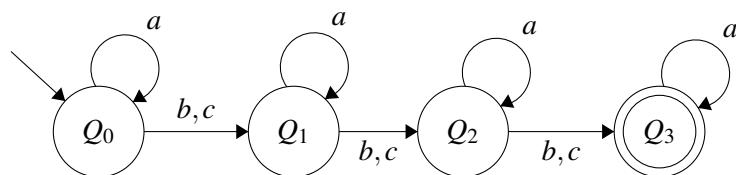
The set of strings over  $\{a,b\}$  in which the number of  $a$ 's is divisible by three.

SOLUTION

**0.19 Automaton 30**

The set of strings over  $\{a,b,c\}$  in which the total number of  $b$ 's and  $c$ 's is three.

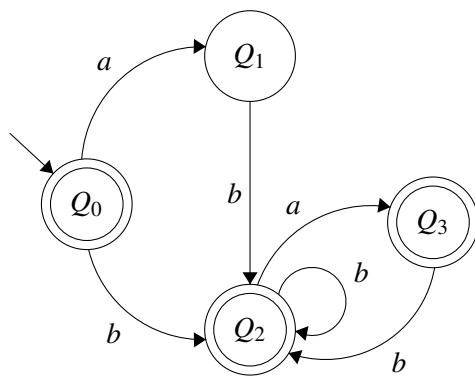
SOLUTION



## 0.20 Automaton 31

The set of strings over  $\{a,b\}$  in which every  $a$  is either immediately preceded or immediately followed by  $b$ , for example,  $baab, aba$  and **b**

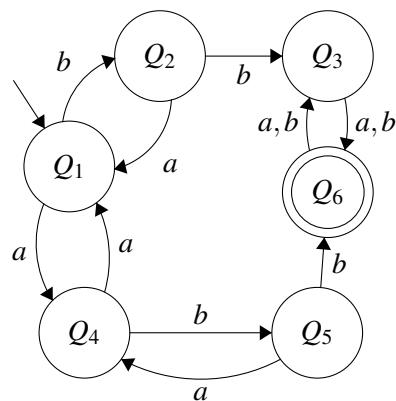
SOLUTION



## 0.21 Automaton 32

The set of strings over  $\{a,b\}$  that contain the substring  $bb$ .

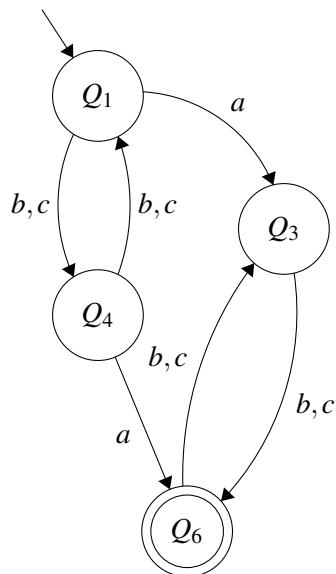
SOLUTION



### 0.22 Automaton 33

The set of strings over  $\{a,b,c\}$  that contain exactly one  $a$

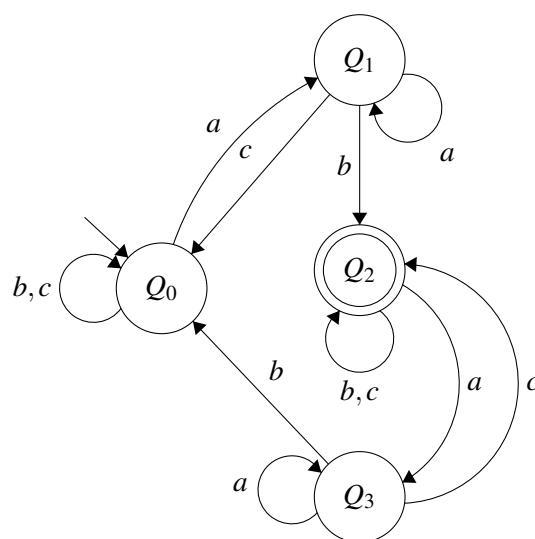
SOLUTION



### 0.23 Automaton 34

The set of strings over  $\{a,b,c\}$  with an odd number of occurrences of the substring  $ab$ .

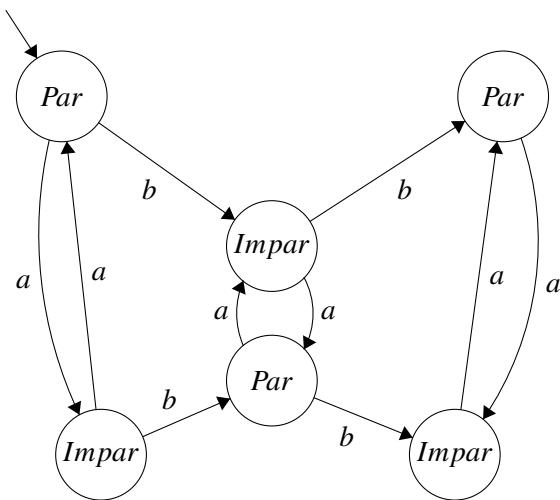
SOLUTION



**0.24 Automaton 35**

The set of odd length over {a,b} that contain exactly two b's.

SOLUTION

**0.25 Automaton 36**

The set of strings over {a,b} with an even number of a's or an odd number of b's.

SOLUTION

