

Exercício 4

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Introduction to the Theory of Computation

ISBN: 9781133187790

[Índice](#)**Solução**  Certificado

Passo 1

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In part a) we explain the whole process of construction. Otherwise we give only state diagrams for DFAs, since construction is analogous. Note that we also make possible reductions of diagrams (nothing special, we maybe eliminate few unnecessary states).

Formally, DFA which recognizes the intersection of languages recognized by DFAs $M_1 = (Q_1, \Sigma, \delta_1, q_1, F_1)$ and $M_2 = (Q_2, \Sigma, \delta_2, q_2, F_2)$ is new machine

$$M = (Q_1 \times Q_2, \Sigma, \delta, (q_1, q_2), F_1 \times F_2),$$

where $\delta(q', q'') = (\delta_1(q'), \delta_2(q''))$.

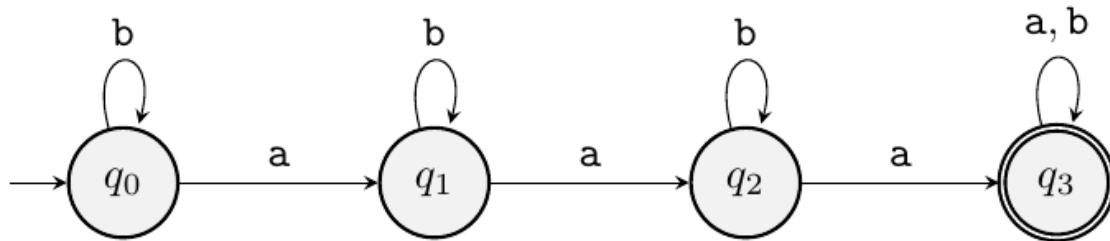
Part (a)

Given language $L = \{w \mid w \text{ has at least three a's and at least two b's}\}$ is an intersection of language $L_1 = \{w \mid w \text{ has at least three a's}\}$ with language $L_2 = \{w \mid w \text{ has at least two b's}\}$.

Passo 2

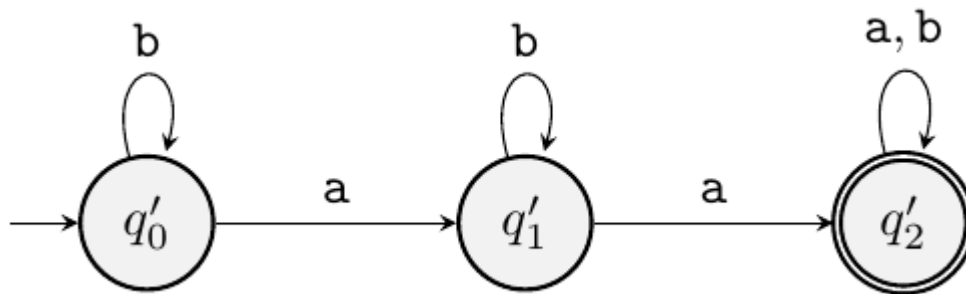
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Diagram of machine which recognizes language L_1 is easy to construct, since we only need to count number of **a**'s encountered so far; if the number is three we are in accepting state, and remain there.

**Passo 3**

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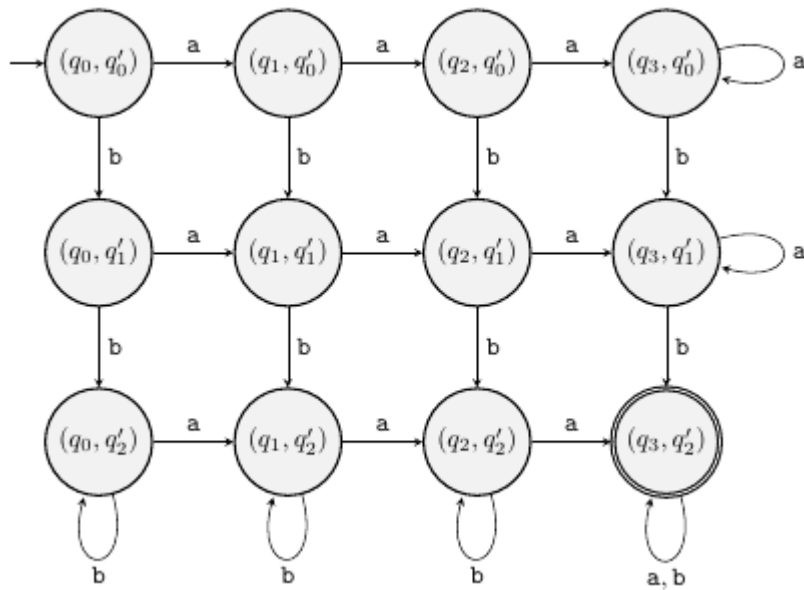
Analogously we construct machine for language L_2 .



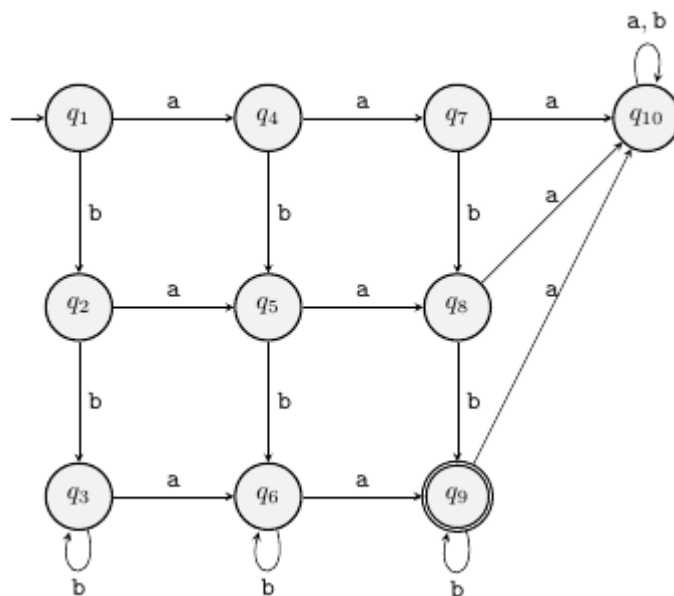
Passo 4

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Now machine which accepts language $L = L_1 \cap L_2$ is:

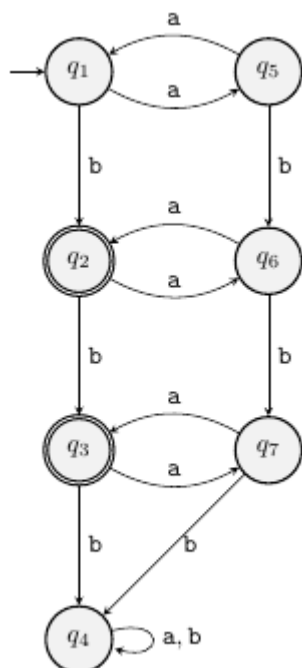
**Passo 5**

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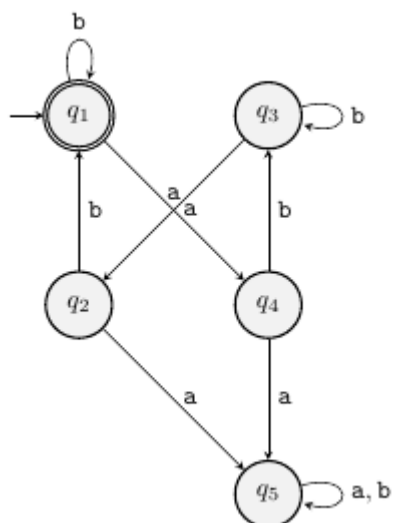
Part (b)

Passo 6

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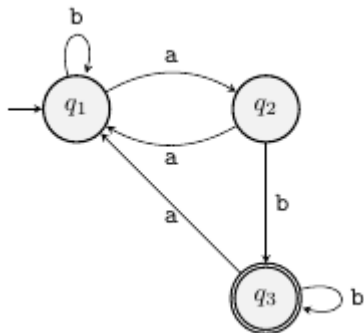
Part (c)**Passo 7**

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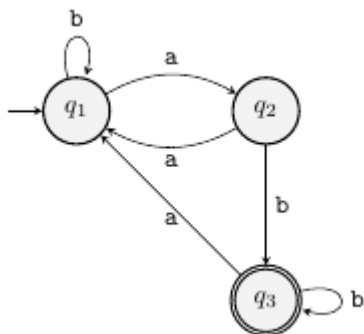
Part (d)

Passo 8

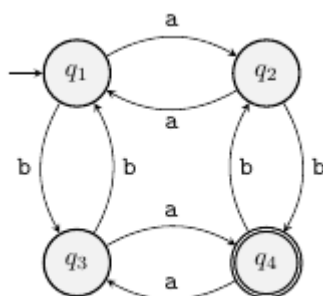
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Part (e)**Passo 9**

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Part (f)**Passo 10**

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Part (g)

Resultado

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We provide diagrams, after explanation for part a.

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