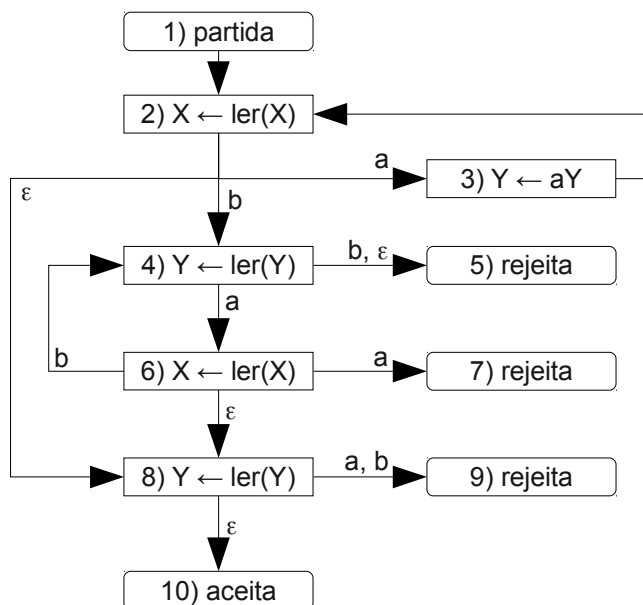


01. [Diverio, 2000] Desenvolver uma máquina com Pilhas, sobre o alfabeto  $\{a, b\}$ , que verifique o duplo balanceamento da entrada fornecida pelo usuário, ou seja,  $D = \{a^n b^n \mid n \geq 0\}$ . A seguir, são apresentados alguns exemplos de entradas possíveis de serem fornecidas pelo usuário com seus respectivos resultados.

Entrada – X	Saída – Y	Status
aabb	indiferente	aceita
bbaa	indiferente	rejeita
abab	indiferente	rejeita
ab	indiferente	aceita
$\epsilon$	indiferente	aceita

$M = (\{a, b\}, D)$



- |            |   |   |   |            |            |          |          |   |   |  |  |            |  |
|------------|---|---|---|------------|------------|----------|----------|---|---|--|--|------------|--|
| 1)         | X | = | <table border="1" style="display: inline-table; border-collapse: collapse;"><tr><td style="padding: 2px 10px;">a</td><td style="padding: 2px 10px;">a</td><td style="padding: 2px 10px;">b</td><td style="padding: 2px 10px;">b</td></tr></table> | a          | a          | b        | b        |   | Y   | =  | <table border="1" style="display: inline-table; border-collapse: collapse;"><tr><td style="padding: 2px 10px;"><math>\epsilon</math></td></tr></table> | $\epsilon$ |  |
| a          | a | b | b   |            |            |          |          |   |   |  |  |            |  |
| $\epsilon$ |   |   |   |            |            |          |          |   |   |  |  |            |  |
| 2)         | X | = | <table border="1" style="display: inline-table; border-collapse: collapse;"><tr><td style="padding: 2px 10px;">a</td><td style="padding: 2px 10px;">b</td><td style="padding: 2px 10px;">b</td></tr></table>                                      | a          | b          | b        | <b>a</b> | Y   | =   | <table border="1" style="display: inline-table; border-collapse: collapse;"><tr><td style="padding: 2px 10px;"><math>\epsilon</math></td></tr></table> | $\epsilon$   |            |  |
| a          | b | b |   |            |            |          |          |   |   |  |  |            |  |
| $\epsilon$ |   |   |   |            |            |          |          |   |   |  |  |            |  |
| 3)         | X | = | <table border="1" style="display: inline-table; border-collapse: collapse;"><tr><td style="padding: 2px 10px;">a</td><td style="padding: 2px 10px;">b</td><td style="padding: 2px 10px;">b</td></tr></table>                                      | a          | b          | b        |          | Y   | =   | <table border="1" style="display: inline-table; border-collapse: collapse;"><tr><td style="padding: 2px 10px;">a</td></tr></table>                     | a  |            |  |
| a          | b | b |   |            |            |          |          |   |   |  |  |            |  |
| a          |   |   |   |            |            |          |          |   |   |  |  |            |  |
| 2)         | X | = | <table border="1" style="display: inline-table; border-collapse: collapse;"><tr><td style="padding: 2px 10px;">b</td><td style="padding: 2px 10px;">b</td></tr></table>   | b          | b          | <b>a</b> | Y        | =   | <table border="1" style="display: inline-table; border-collapse: collapse;"><tr><td style="padding: 2px 10px;">a</td></tr></table>                                      | a  |  |            |  |
| b          | b |   |   |            |            |          |          |   |   |  |  |            |  |
| a          |   |   |   |            |            |          |          |   |   |  |  |            |  |
| 3)         | X | = | <table border="1" style="display: inline-table; border-collapse: collapse;"><tr><td style="padding: 2px 10px;">b</td><td style="padding: 2px 10px;">b</td></tr></table>   | b          | b          |          | Y        | =   | <table border="1" style="display: inline-table; border-collapse: collapse;"><tr><td style="padding: 2px 10px;">a</td><td style="padding: 2px 10px;">a</td></tr></table> | a  | a  |            |  |
| b          | b |   |   |            |            |          |          |   |   |  |  |            |  |
| a          | a |   |   |            |            |          |          |   |   |  |  |            |  |
| 2)         | X | = | <table border="1" style="display: inline-table; border-collapse: collapse;"><tr><td style="padding: 2px 10px;">b</td></tr></table>  | b          | <b>b</b>   | Y        | =        | <table border="1" style="display: inline-table; border-collapse: collapse;"><tr><td style="padding: 2px 10px;">a</td><td style="padding: 2px 10px;">a</td></tr></table> | a   | a  |  |            |  |
| b          |   |   |   |            |            |          |          |   |   |  |  |            |  |
| a          | a |   |   |            |            |          |          |   |   |  |  |            |  |
| 4)         | X | = | <table border="1" style="display: inline-table; border-collapse: collapse;"><tr><td style="padding: 2px 10px;">b</td></tr></table>  | b          |            | Y        | =        | <table border="1" style="display: inline-table; border-collapse: collapse;"><tr><td style="padding: 2px 10px;">a</td></tr></table>                                      | a   | <b>a</b>   |  |            |  |
| b          |   |   |   |            |            |          |          |   |   |  |  |            |  |
| a          |   |   |   |            |            |          |          |   |   |  |  |            |  |
| 6)         | X | = | <table border="1" style="display: inline-table; border-collapse: collapse;"><tr><td style="padding: 2px 10px;"><math>\epsilon</math></td></tr></table>  | $\epsilon$ | <b>b</b>   | Y        | =        | <table border="1" style="display: inline-table; border-collapse: collapse;"><tr><td style="padding: 2px 10px;">a</td></tr></table>                                      | a   |  |  |            |  |
| $\epsilon$ |   |   |   |            |            |          |          |   |   |  |  |            |  |
| a          |   |   |   |            |            |          |          |   |   |  |  |            |  |
| 4)         | X | = | <table border="1" style="display: inline-table; border-collapse: collapse;"><tr><td style="padding: 2px 10px;"><math>\epsilon</math></td></tr></table>  | $\epsilon$ |            | Y        | =        | <table border="1" style="display: inline-table; border-collapse: collapse;"><tr><td style="padding: 2px 10px;"><math>\epsilon</math></td></tr></table>                  | $\epsilon$  | <b>a</b>   |  |            |  |
| $\epsilon$ |   |   |   |            |            |          |          |   |   |  |  |            |  |
| $\epsilon$ |   |   |   |            |            |          |          |   |   |  |  |            |  |
| 6)         | X | = | <table border="1" style="display: inline-table; border-collapse: collapse;"><tr><td style="padding: 2px 10px;"><math>\epsilon</math></td></tr></table>  | $\epsilon$ | $\epsilon$ | Y        | =        | <table border="1" style="display: inline-table; border-collapse: collapse;"><tr><td style="padding: 2px 10px;"><math>\epsilon</math></td></tr></table>                  | $\epsilon$  |  |  |            |  |
| $\epsilon$ |   |   |   |            |            |          |          |   |   |  |  |            |  |
| $\epsilon$ |   |   |   |            |            |          |          |   |   |  |  |            |  |
| 8)         | X | = | <table border="1" style="display: inline-table; border-collapse: collapse;"><tr><td style="padding: 2px 10px;"><math>\epsilon</math></td></tr></table>  | $\epsilon$ |            | Y        | =        | <table border="1" style="display: inline-table; border-collapse: collapse;"><tr><td style="padding: 2px 10px;"><math>\epsilon</math></td></tr></table>                  | $\epsilon$  | $\epsilon$   |  |            |  |
| $\epsilon$ |   |   |   |            |            |          |          |   |   |  |  |            |  |
| $\epsilon$ |   |   |   |            |            |          |          |   |   |  |  |            |  |
- 10) aceita