

Construct a **Turing machine** that **accepts** the language:

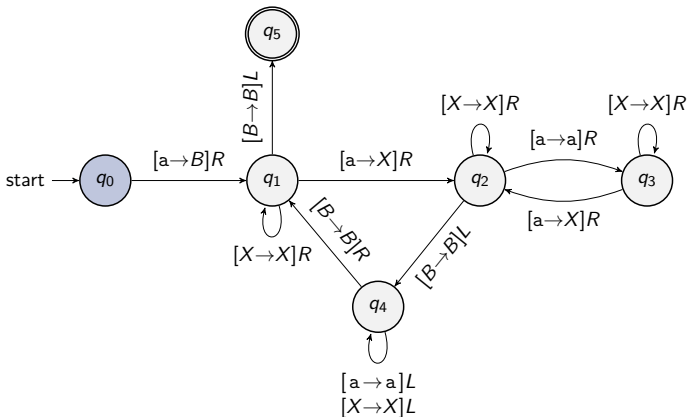
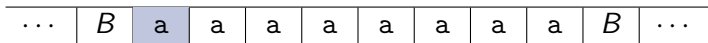
$$L(M) = \{a^{2^n} \mid n \geq 0\}$$

...	<i>B</i>	a	a	a	a	a	a	a	a	<i>B</i>	...
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- 1: Erase the leftmost a
- 2: **while** a's remain on the tape **do**
- 3:     Replace every other a with *X* from left to right
- 4:     **if** the number of a's in this pass is even **then**
- 5:         Reject
- 6:     Return to the start

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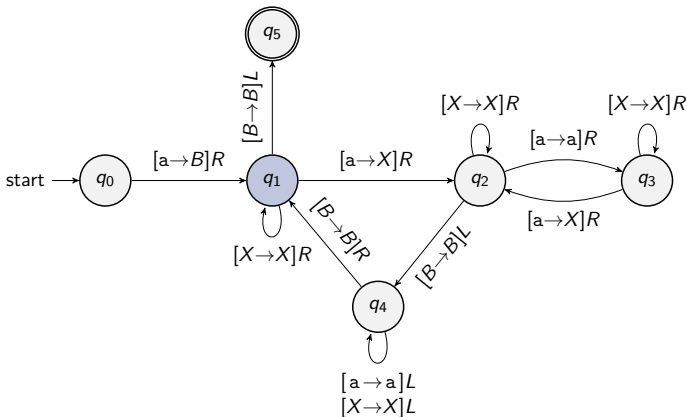
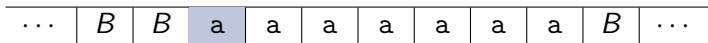
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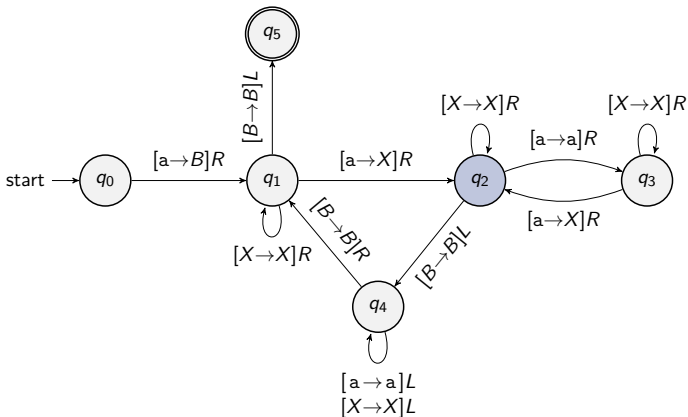
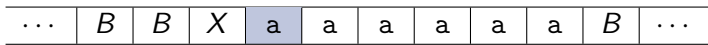
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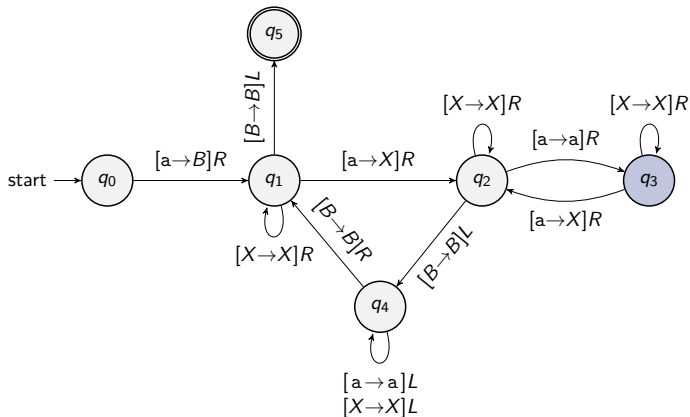
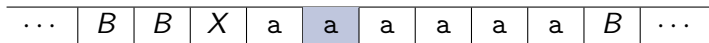
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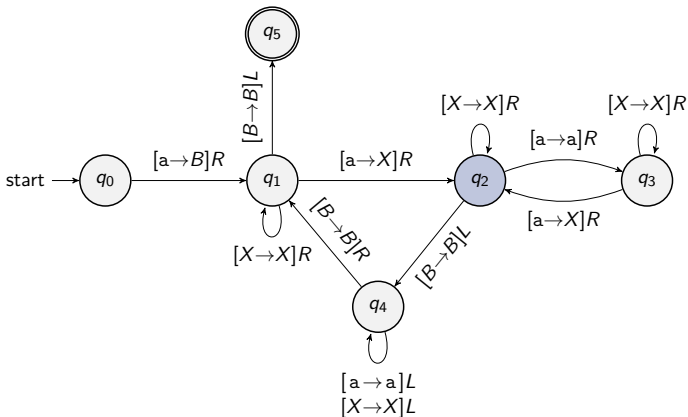
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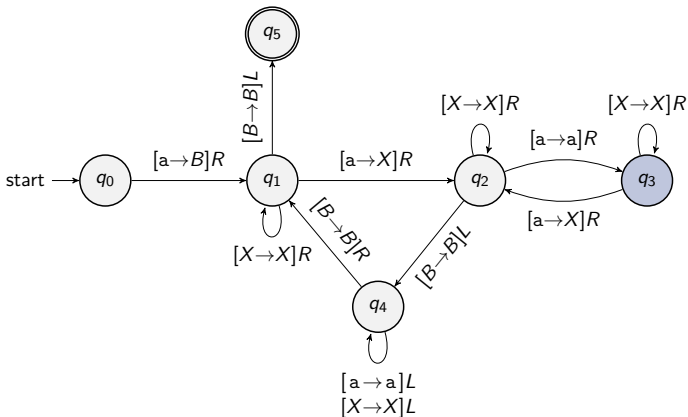
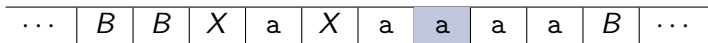
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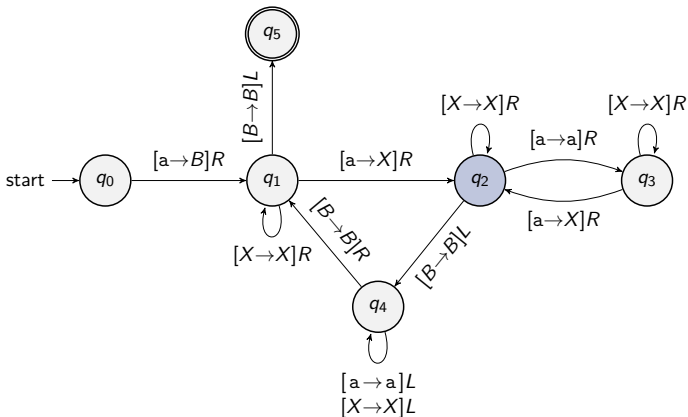
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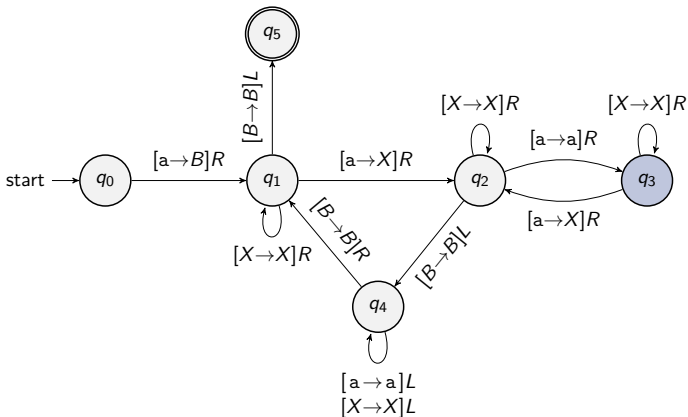
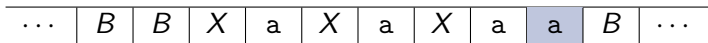
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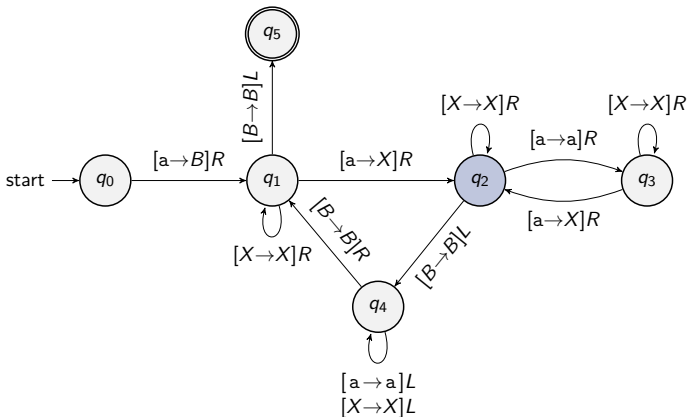
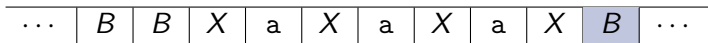
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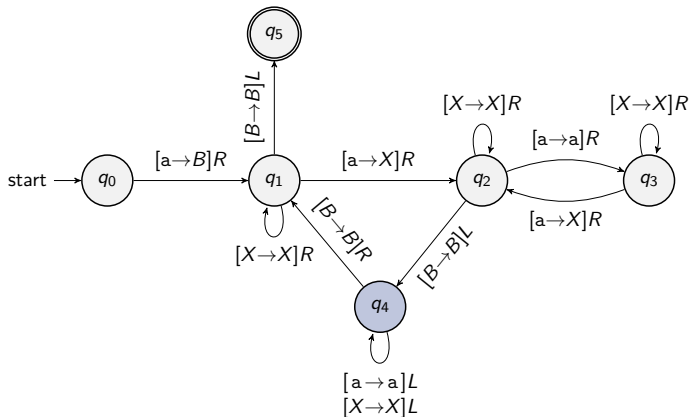
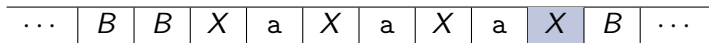
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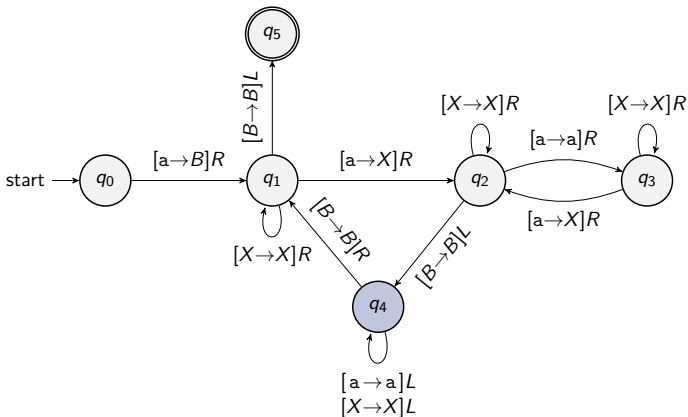
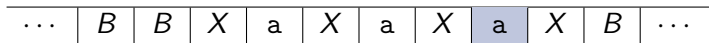
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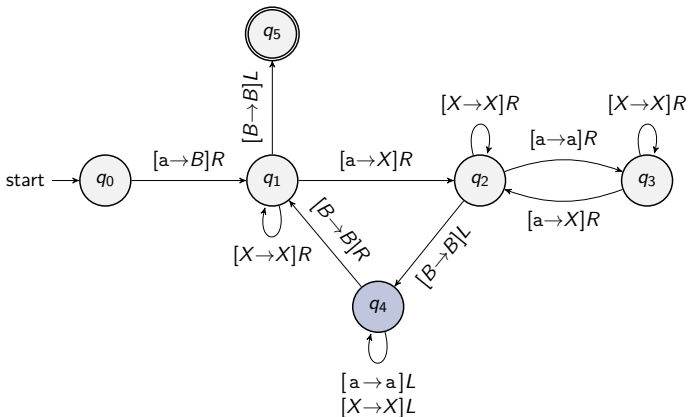
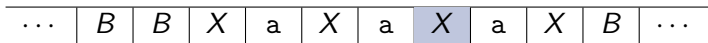
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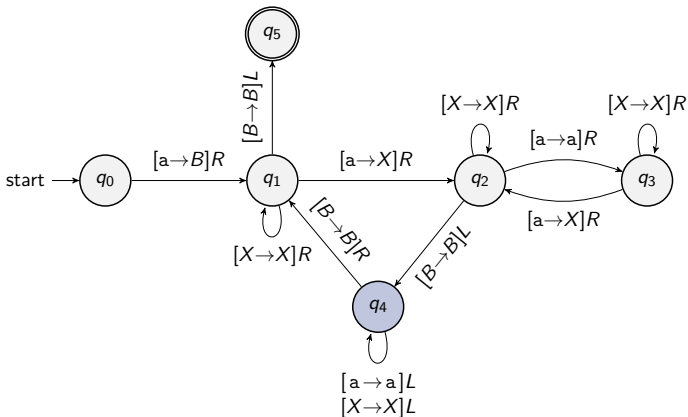
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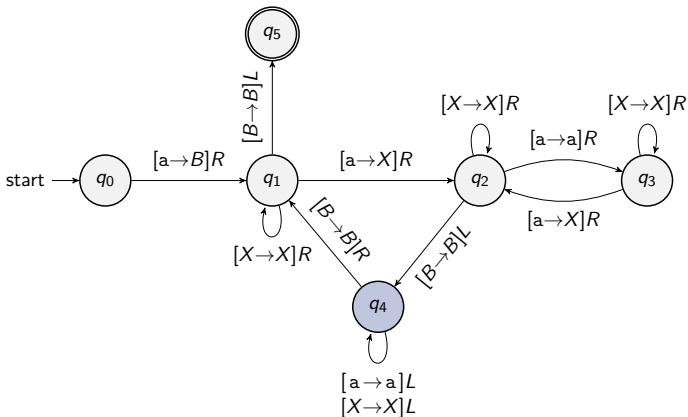
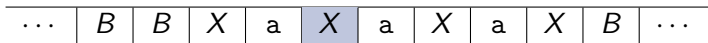
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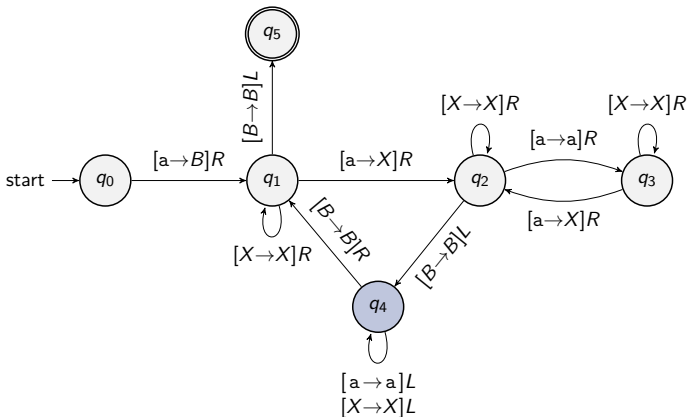
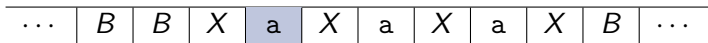
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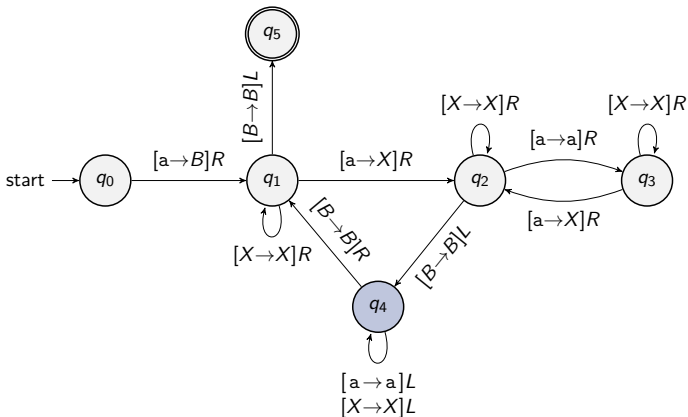
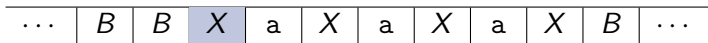
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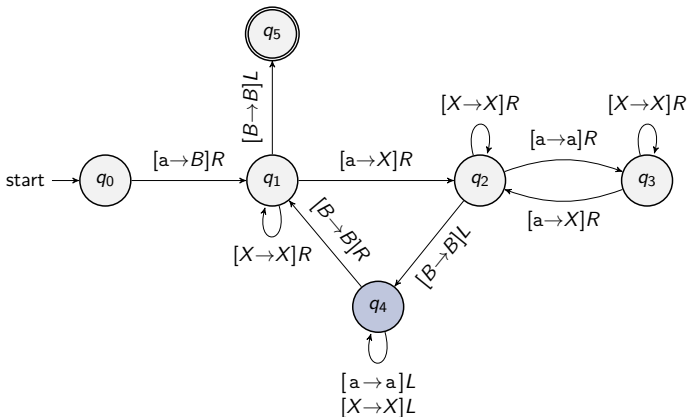
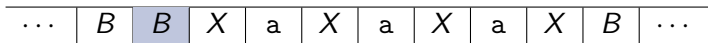
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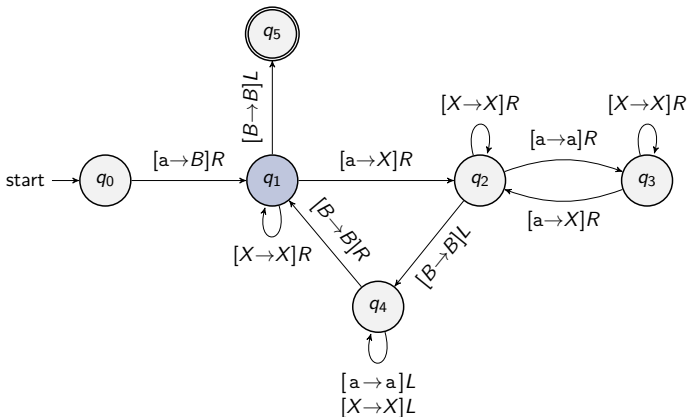
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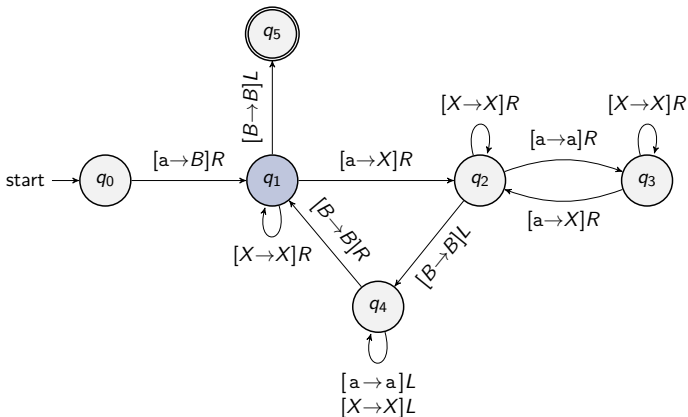
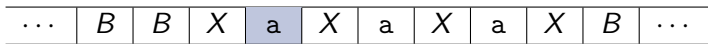
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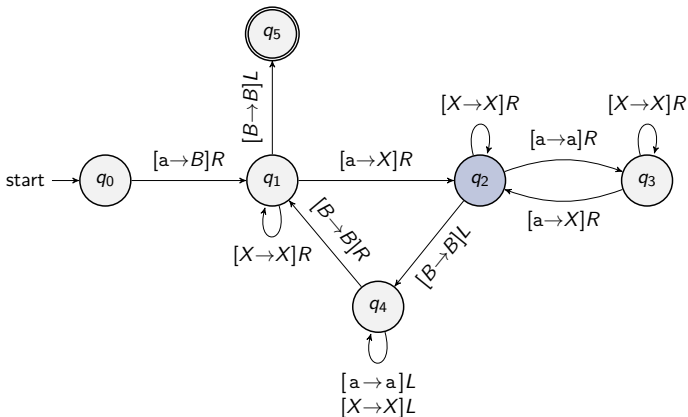
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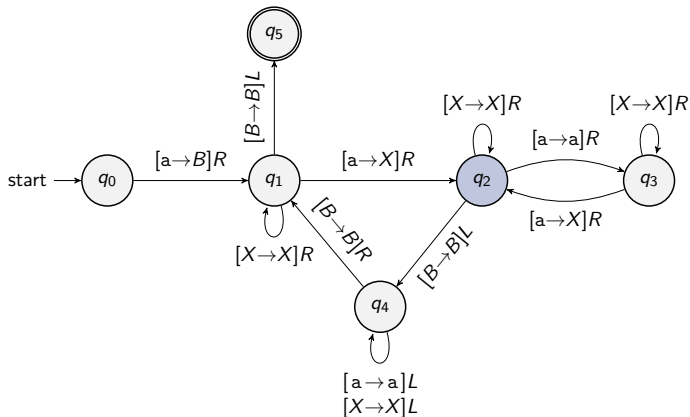
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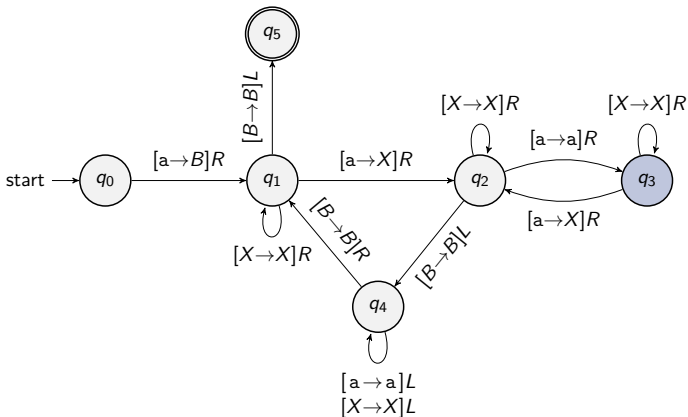
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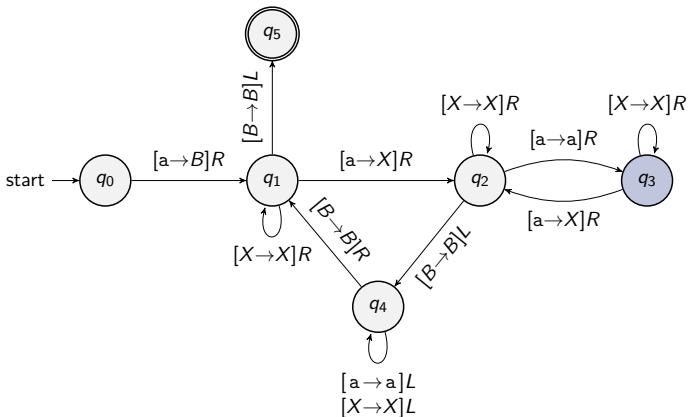
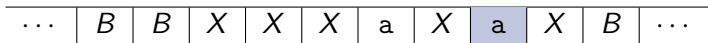
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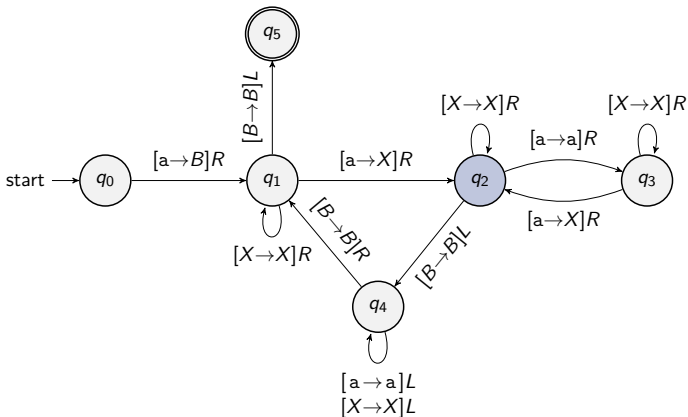
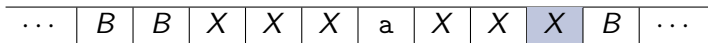
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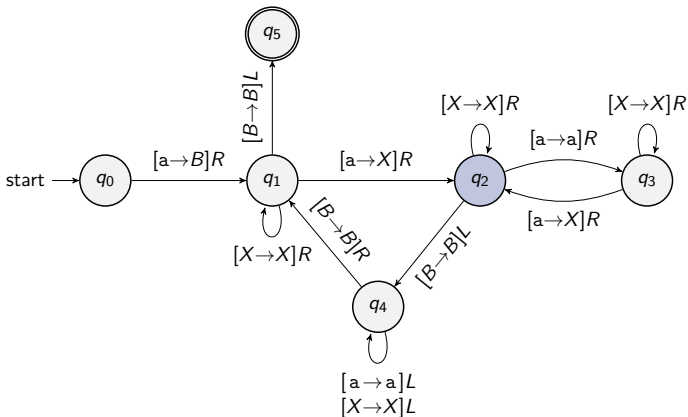
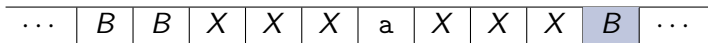
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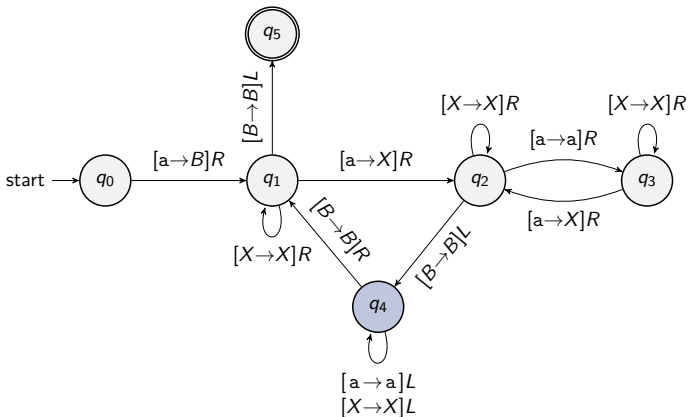
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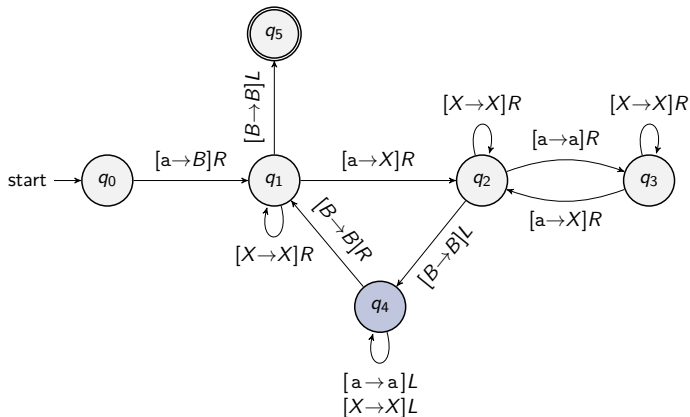
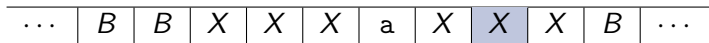
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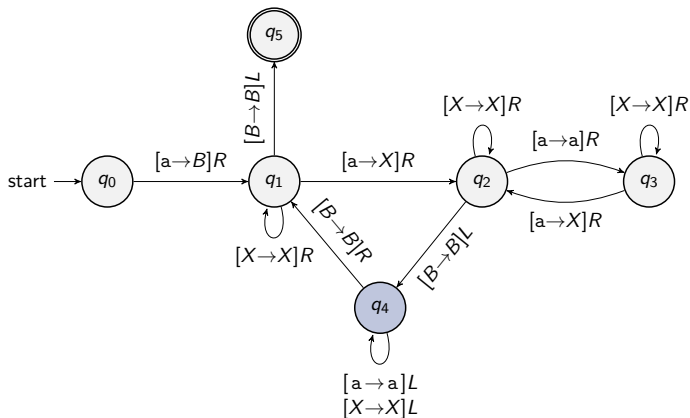
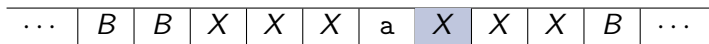
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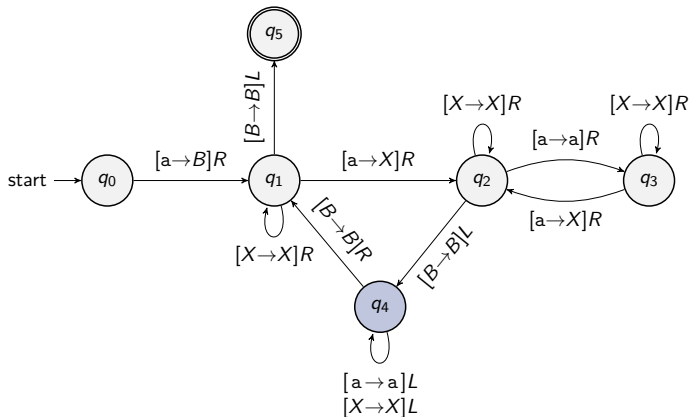
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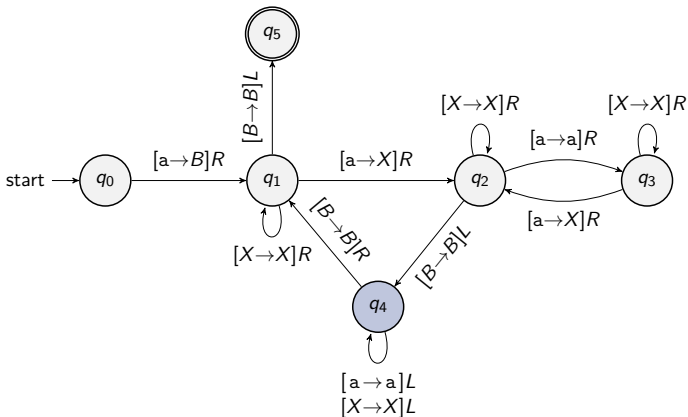
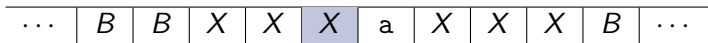
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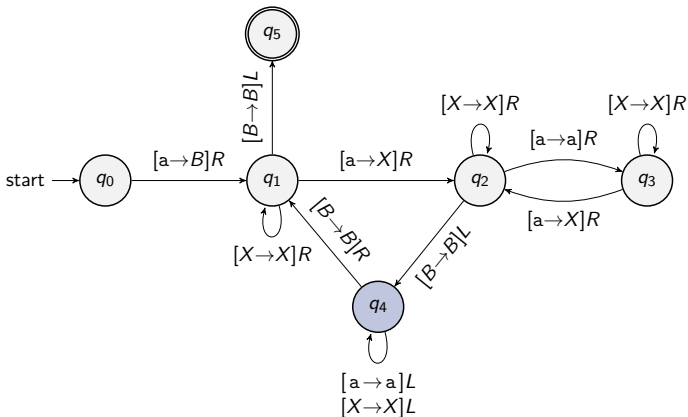
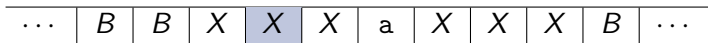
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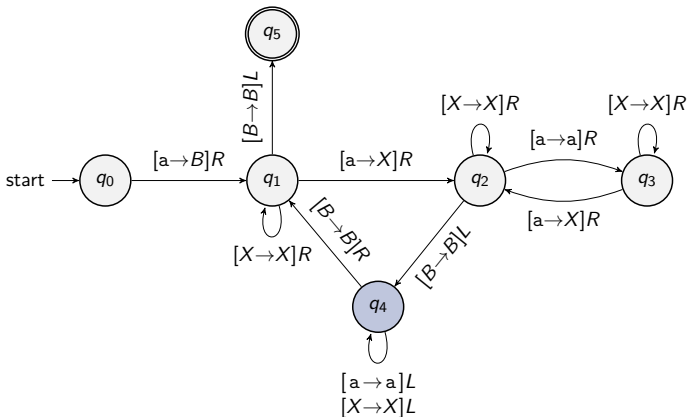
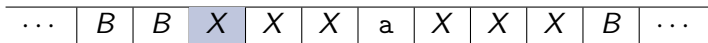
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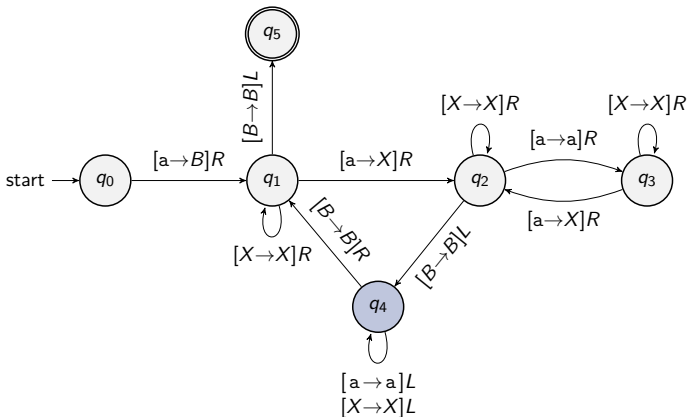
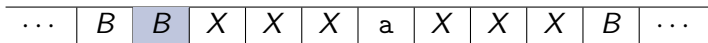
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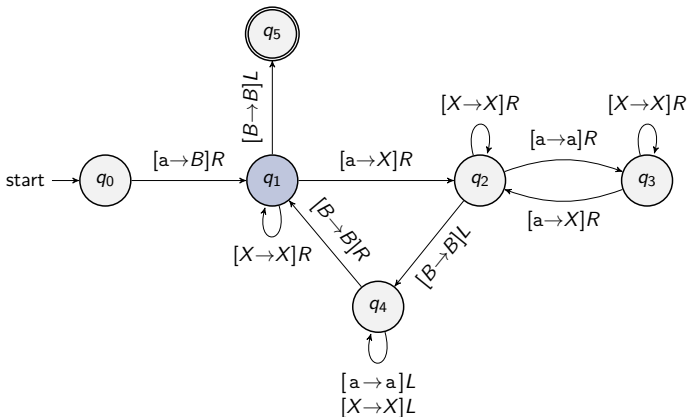
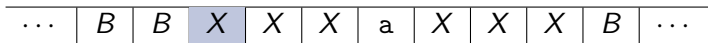
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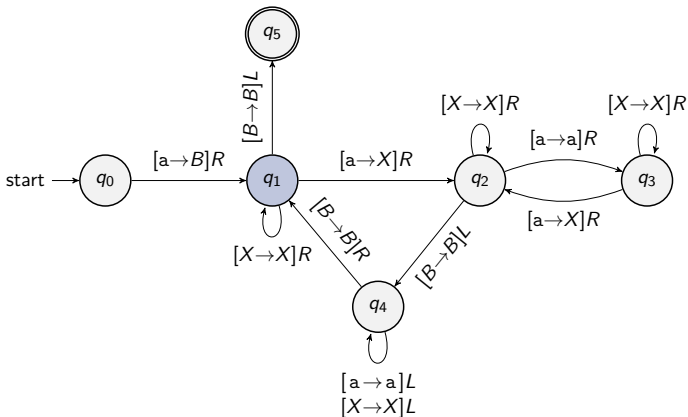
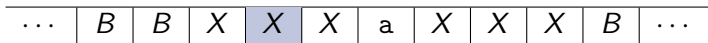
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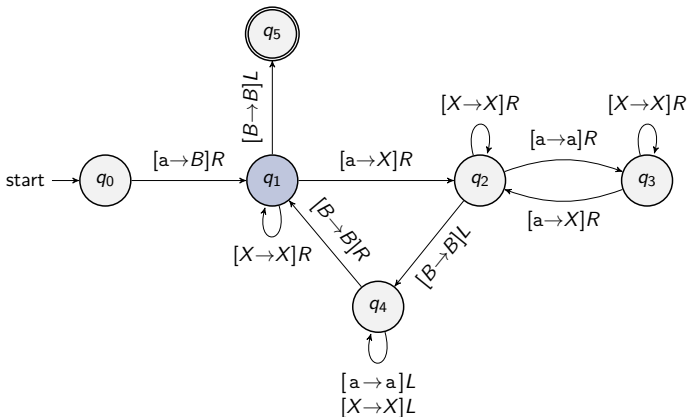
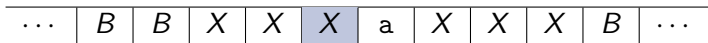
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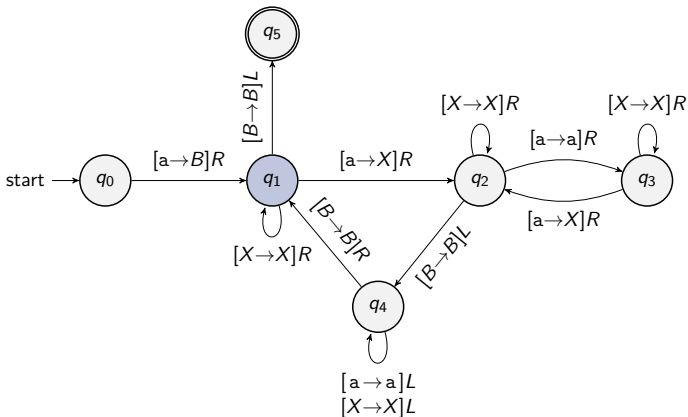
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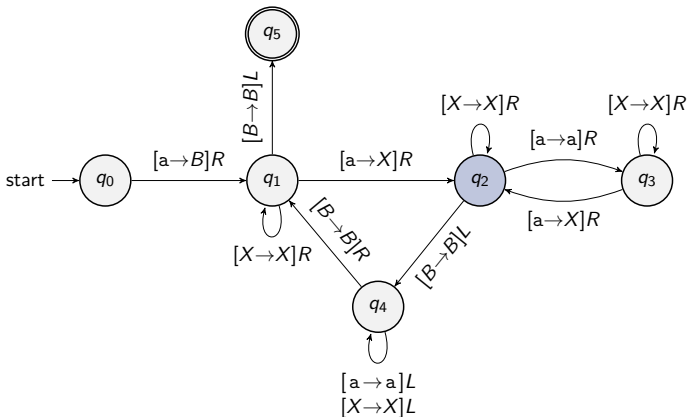
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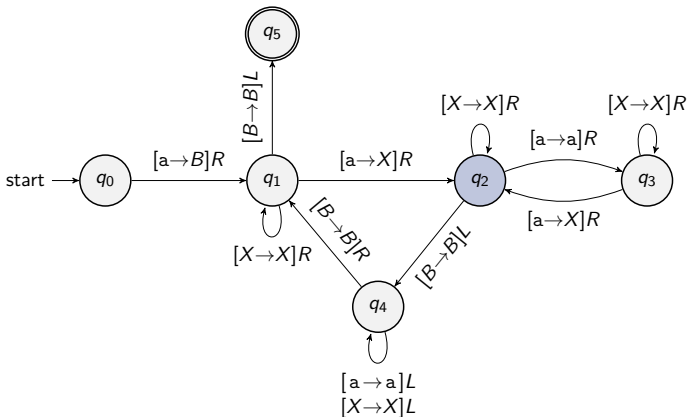
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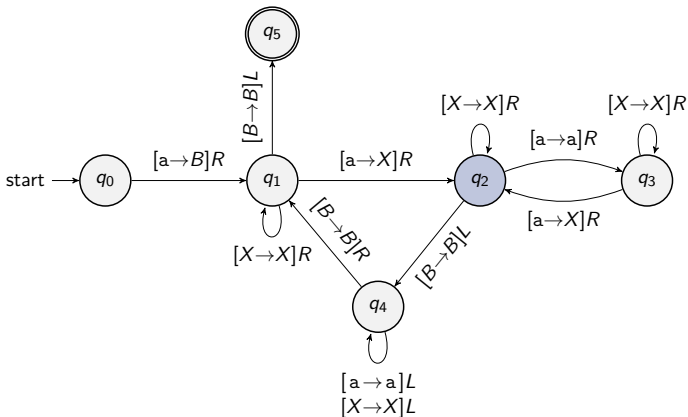
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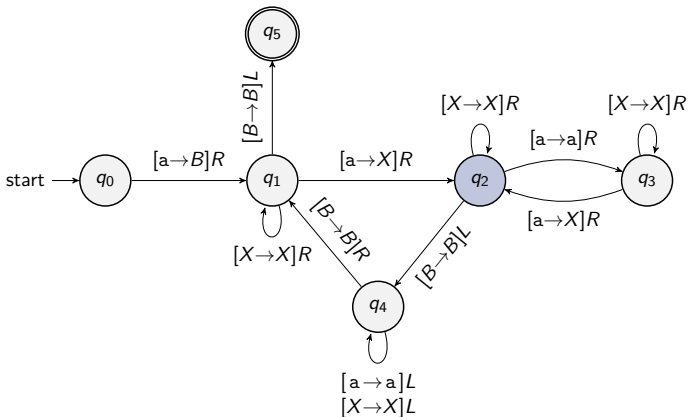
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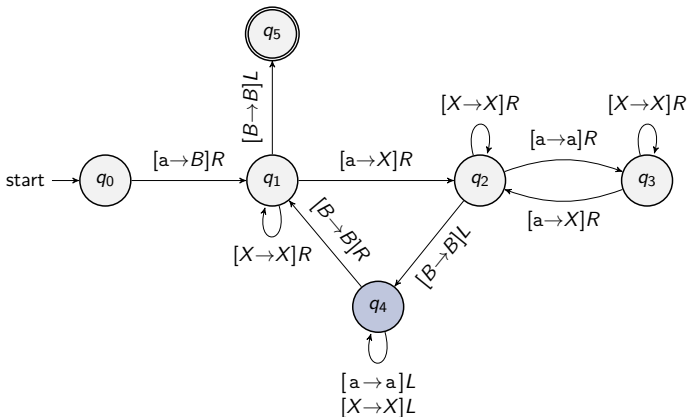
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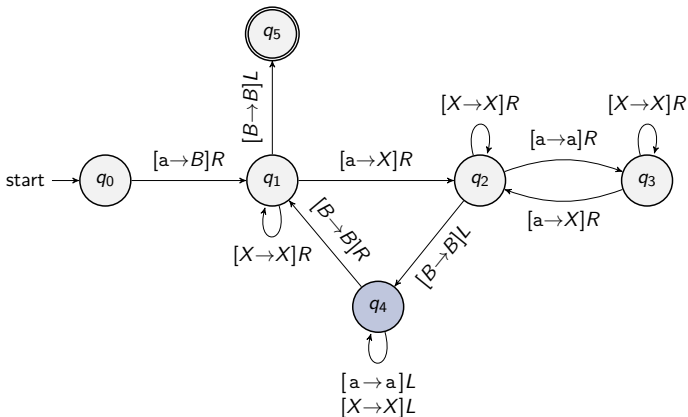
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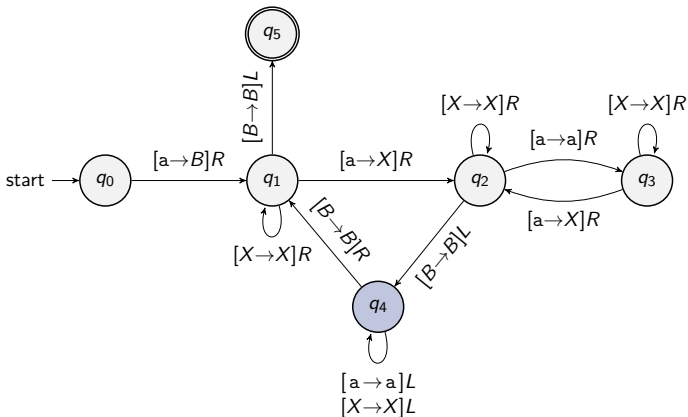
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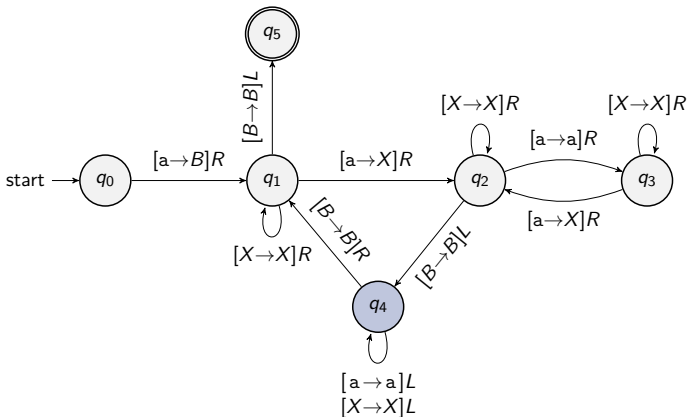
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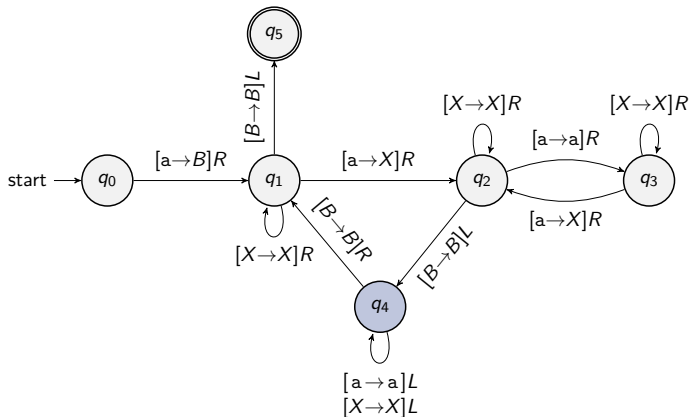
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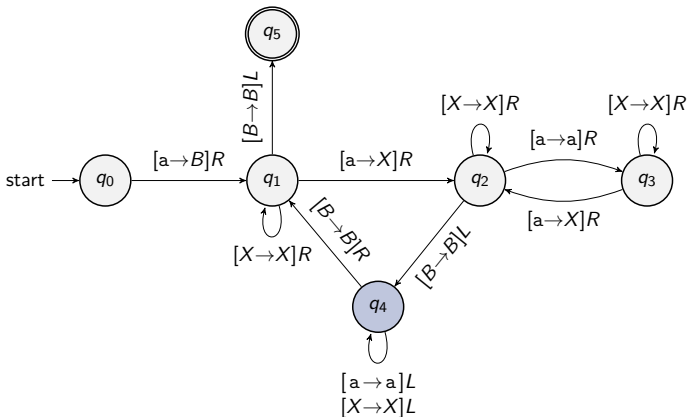
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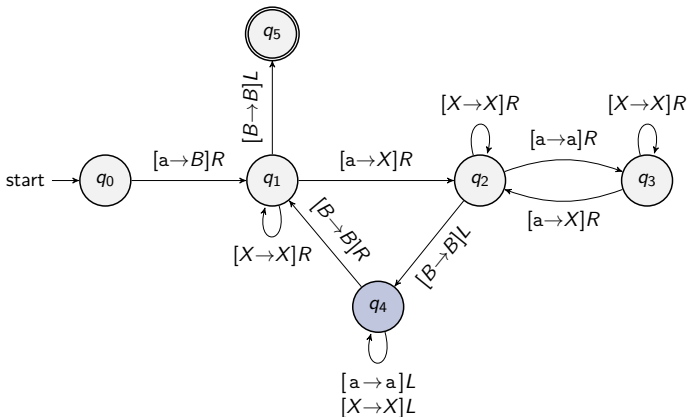
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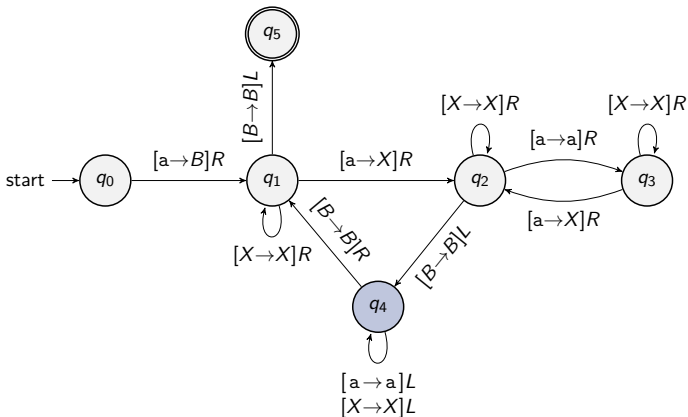
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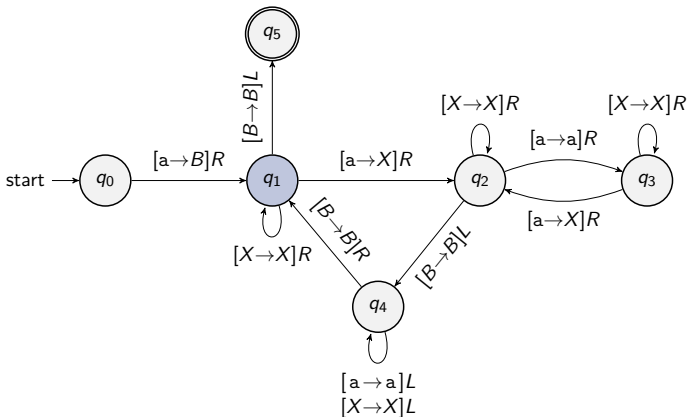
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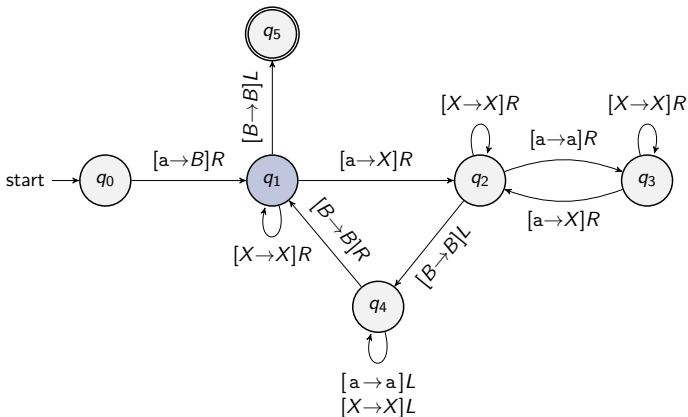
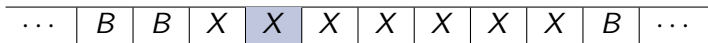
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If a's remain, replace every other a with X from left to right

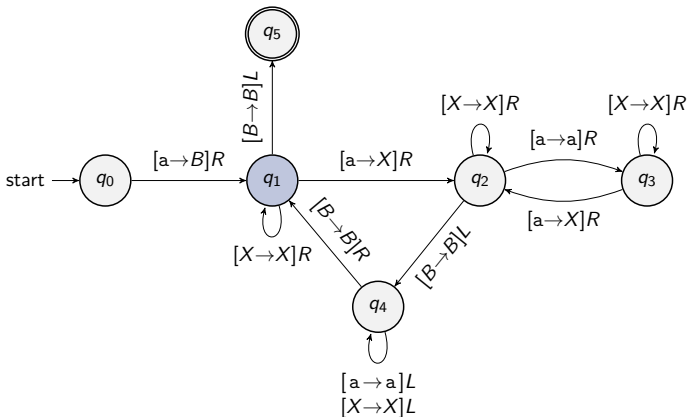
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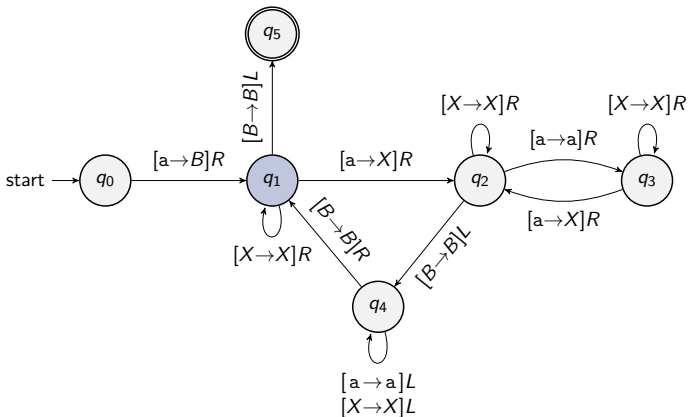
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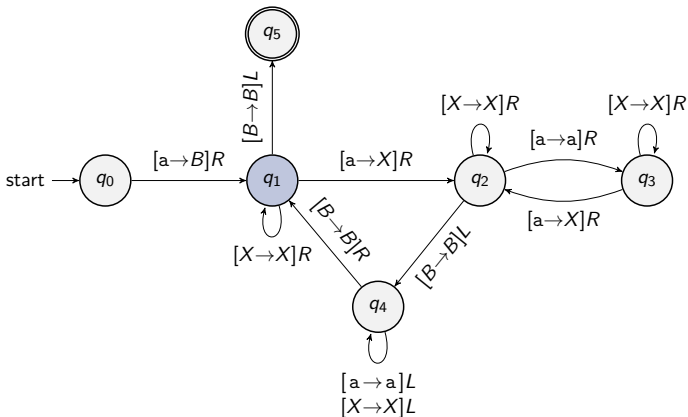
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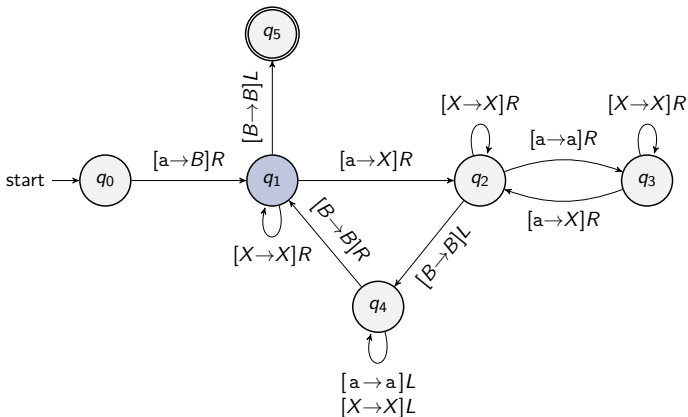
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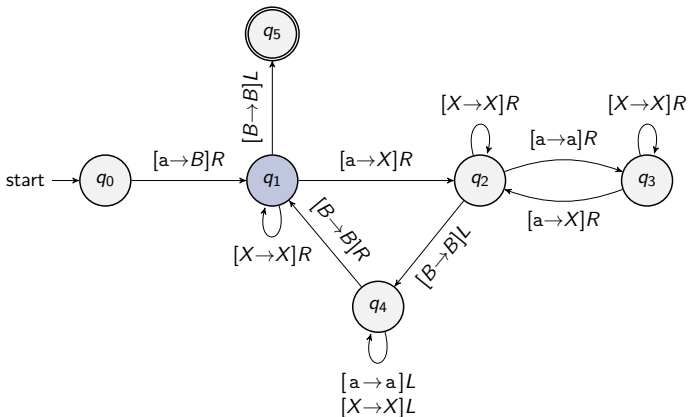
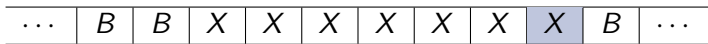
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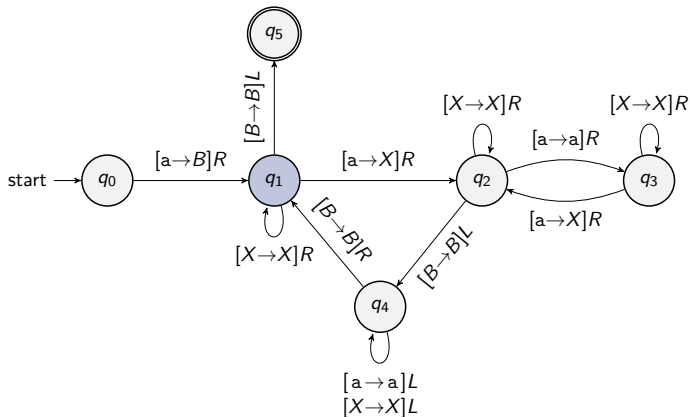
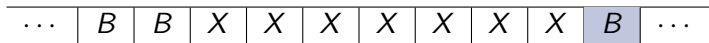
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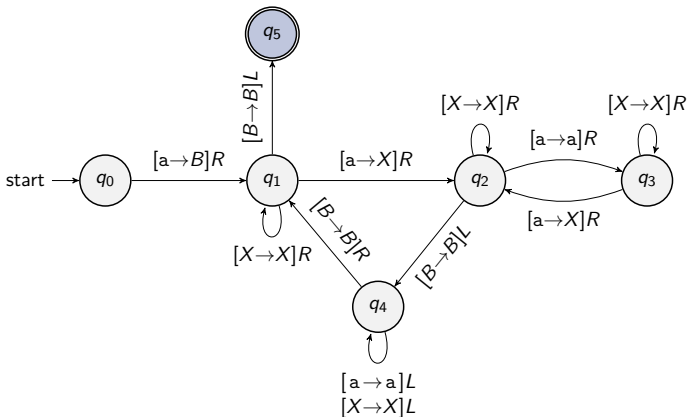
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