Construct a Turing machine that computes the function:

$$f(w) = ww \qquad \text{where} \qquad w \in \{0,1\}^*$$

⋯	B	0	1	1	B	B	B	B	⋯

1: **while** there are input symbols **do**
2: Find and Replace 0 (or 1) with Z
3: Find and Fill the first blank with X (or Y) for 0 (or 1)
4: Roll back Z to the original 0 (or 1)
5: **end while**
6: Replace X's and Y's with 0's and 1's
7: Go to the first input symbol

Construct a Turing machine that computes the function:

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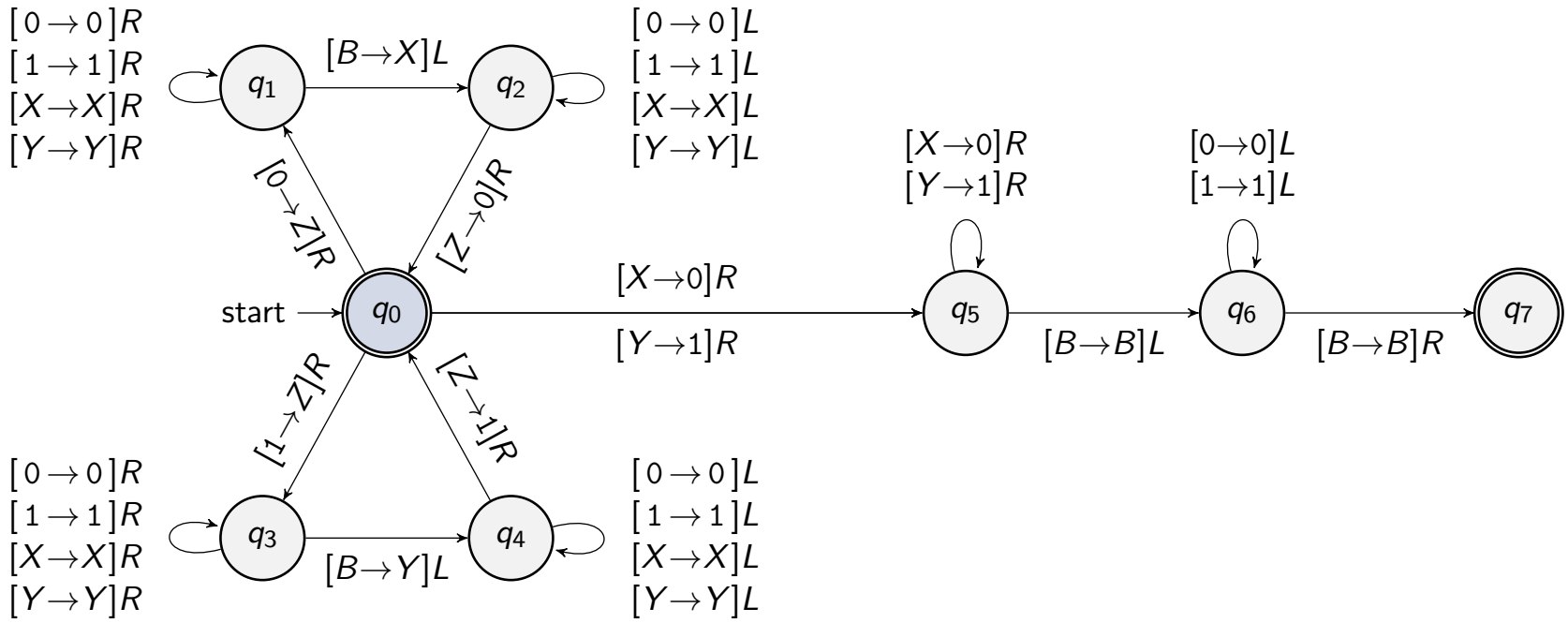

Find and Replace 0 (or 1) with Z.

Construct a Turing machine that computes the function:

$$f(w) = ww \qquad \text{where} \qquad w \in \{0,1\}^*$$

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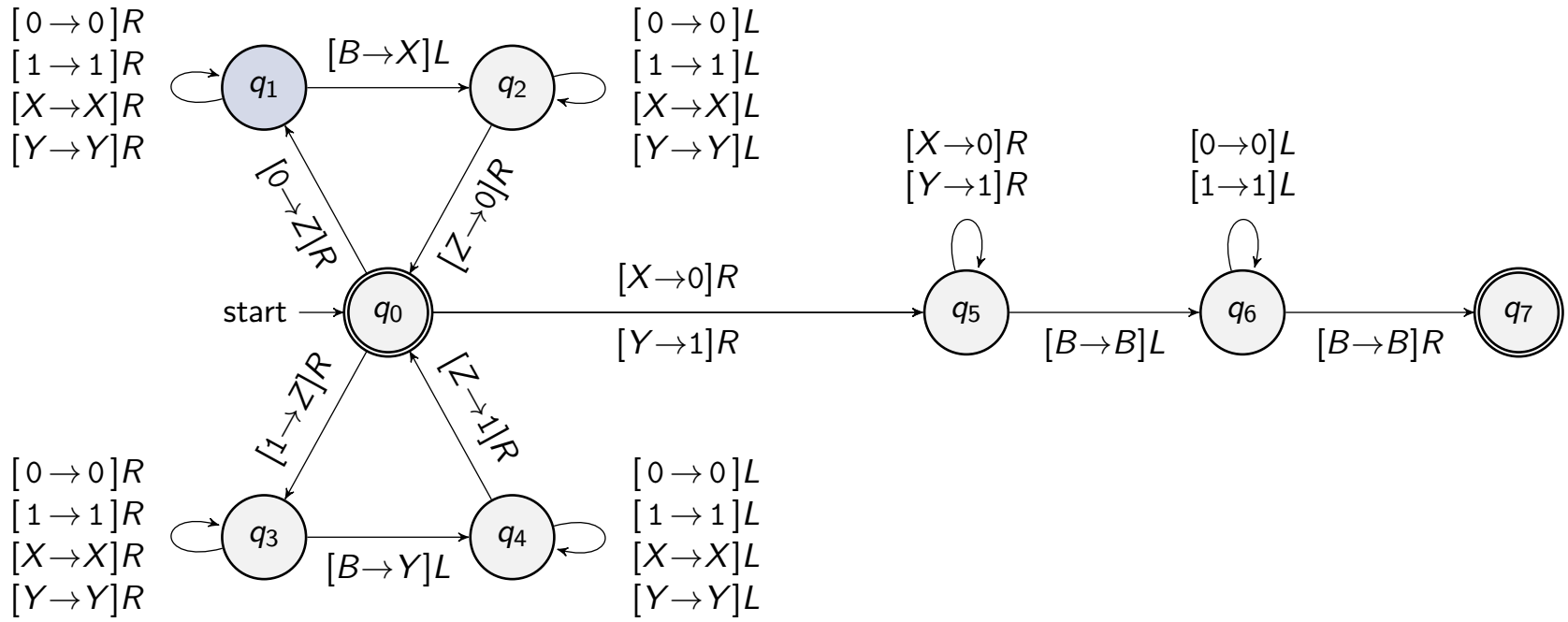

Find and Fill the first blank with X (or Y) for 0 (or 1).

Construct a Turing machine that computes the function:

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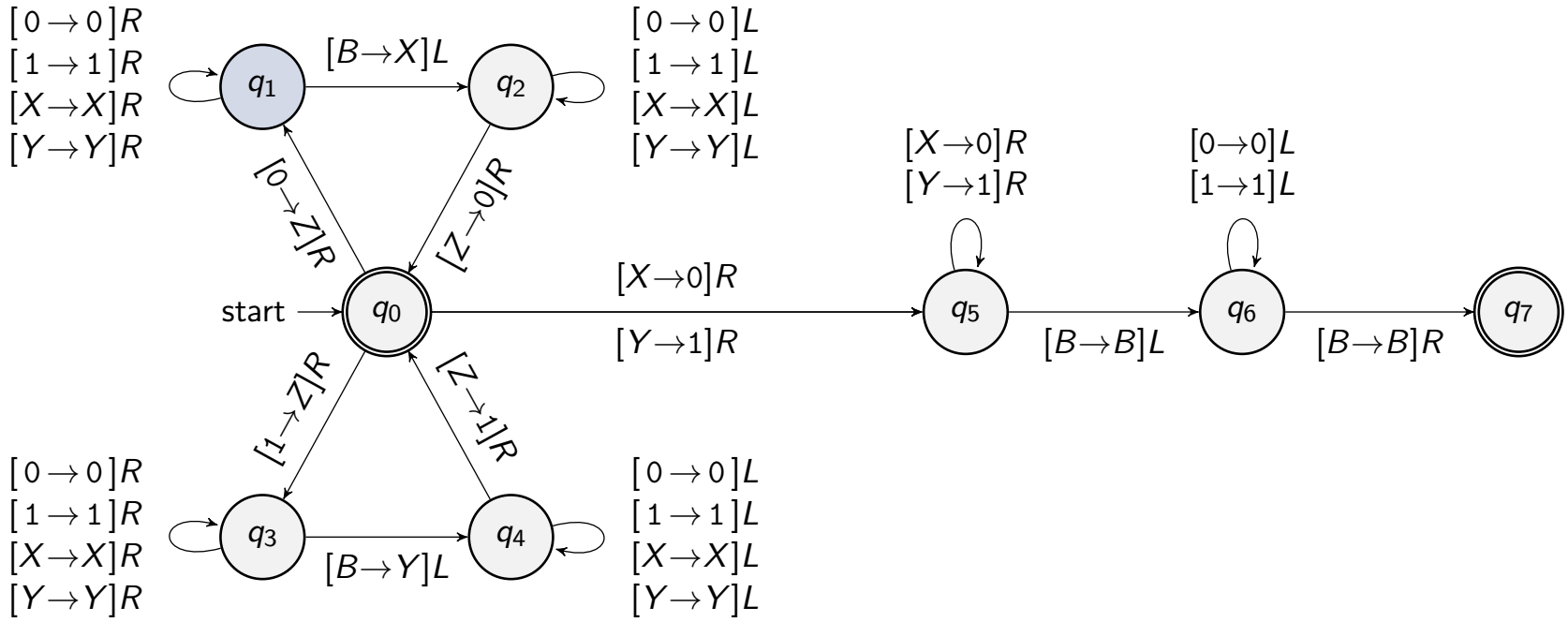

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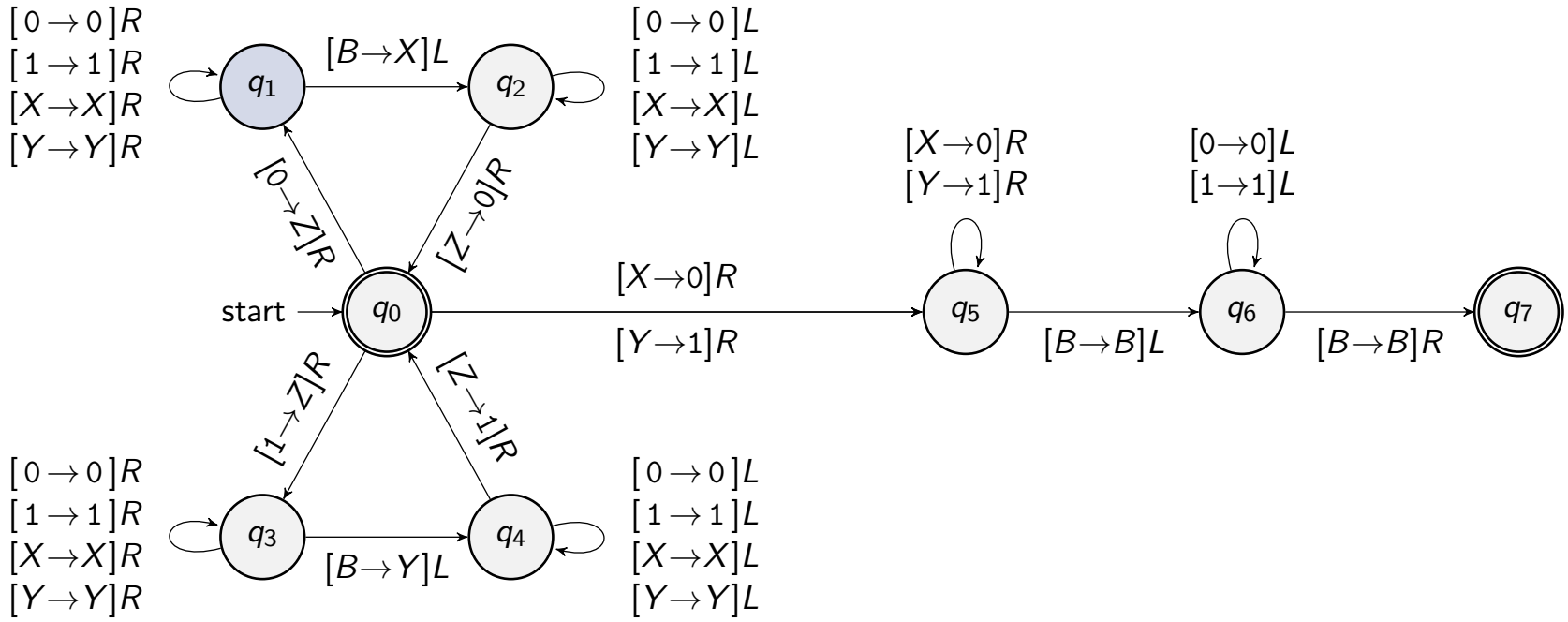

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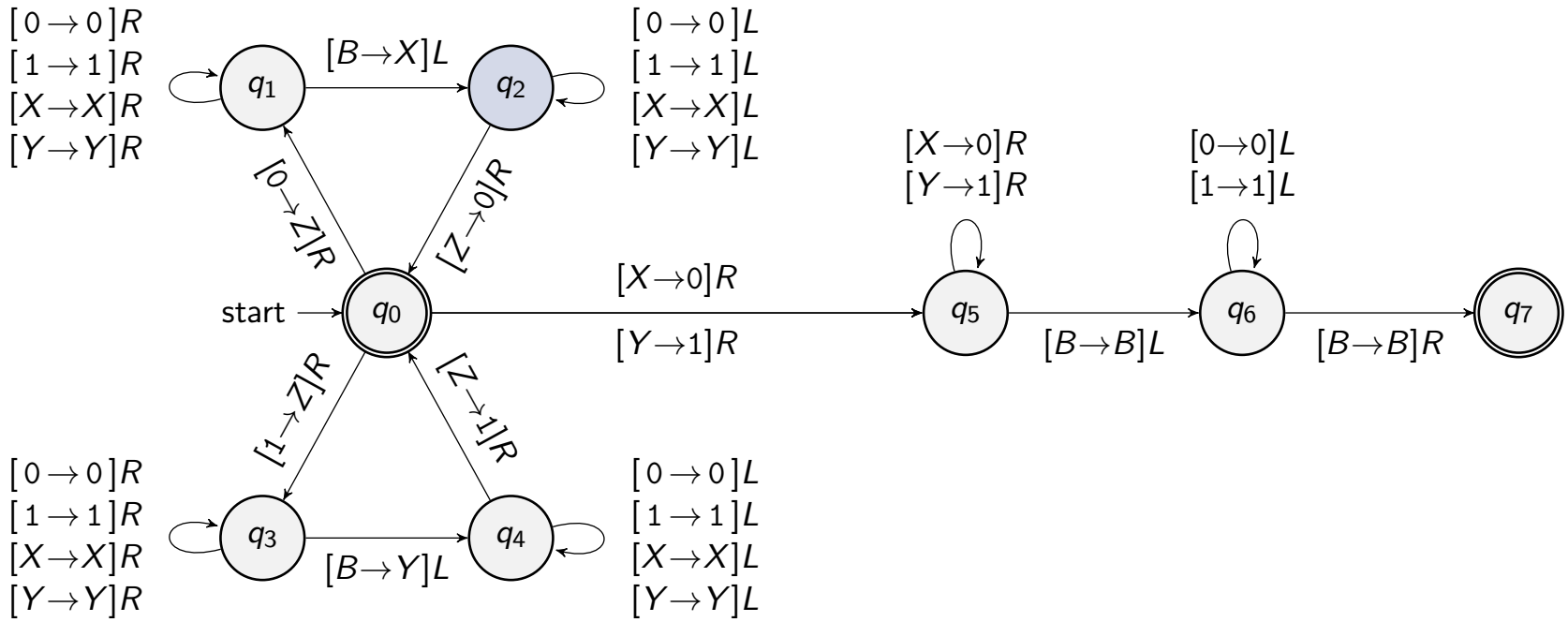

Roll back Z to the original 0 (or 1).

Construct a Turing machine that computes the function:

$$f(w) = ww \qquad \text{where} \qquad w \in \{0,1\}^*$$

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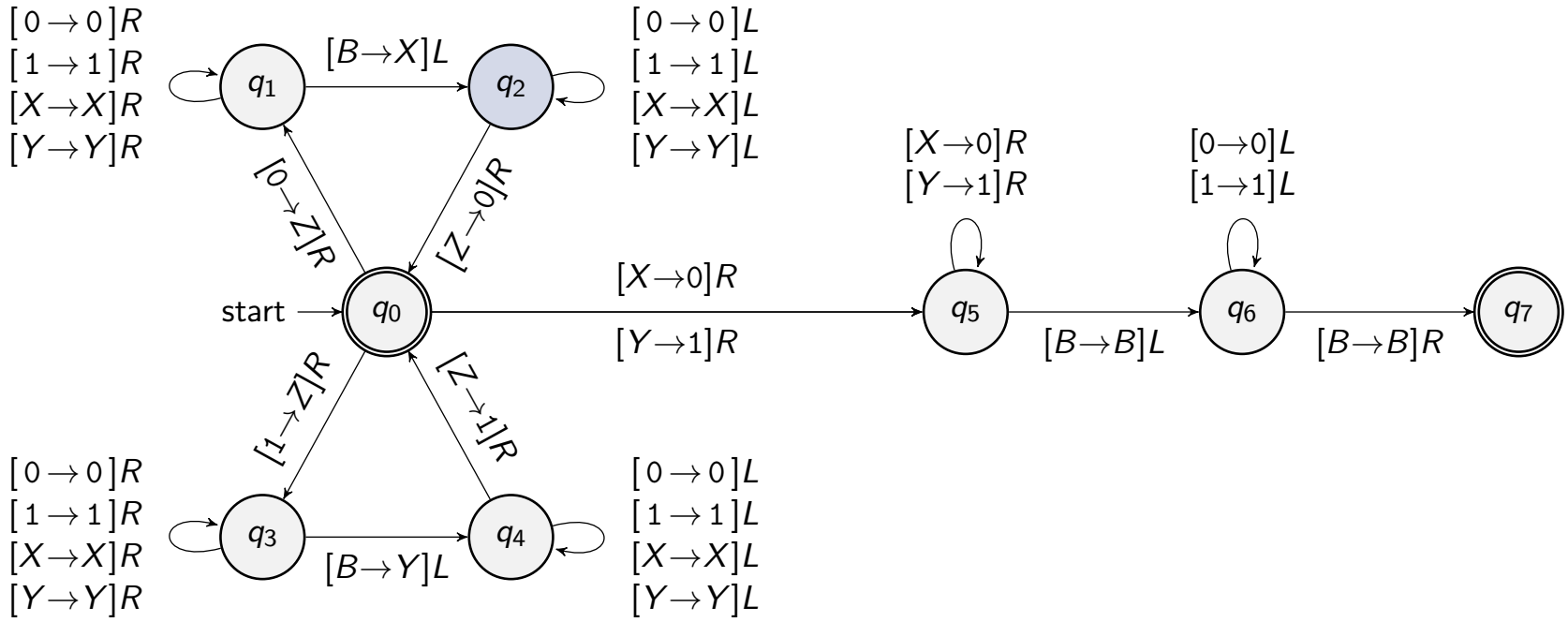

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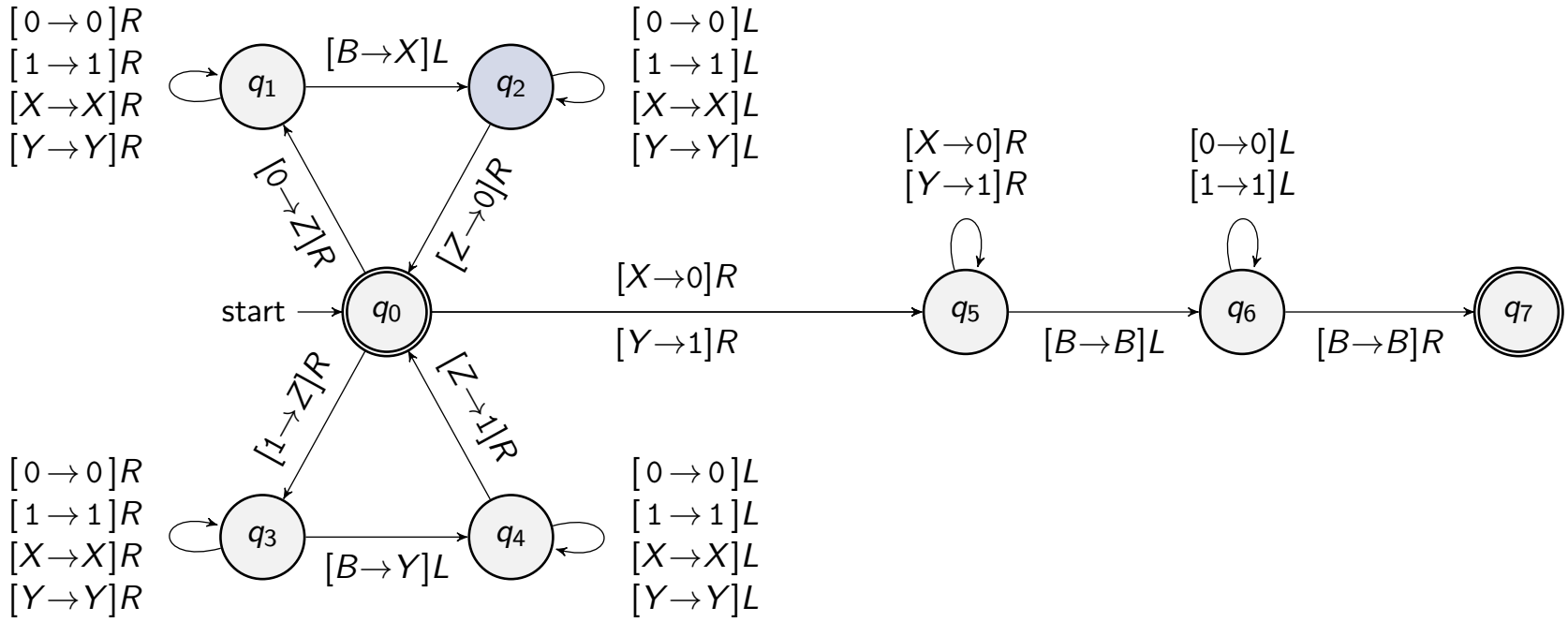

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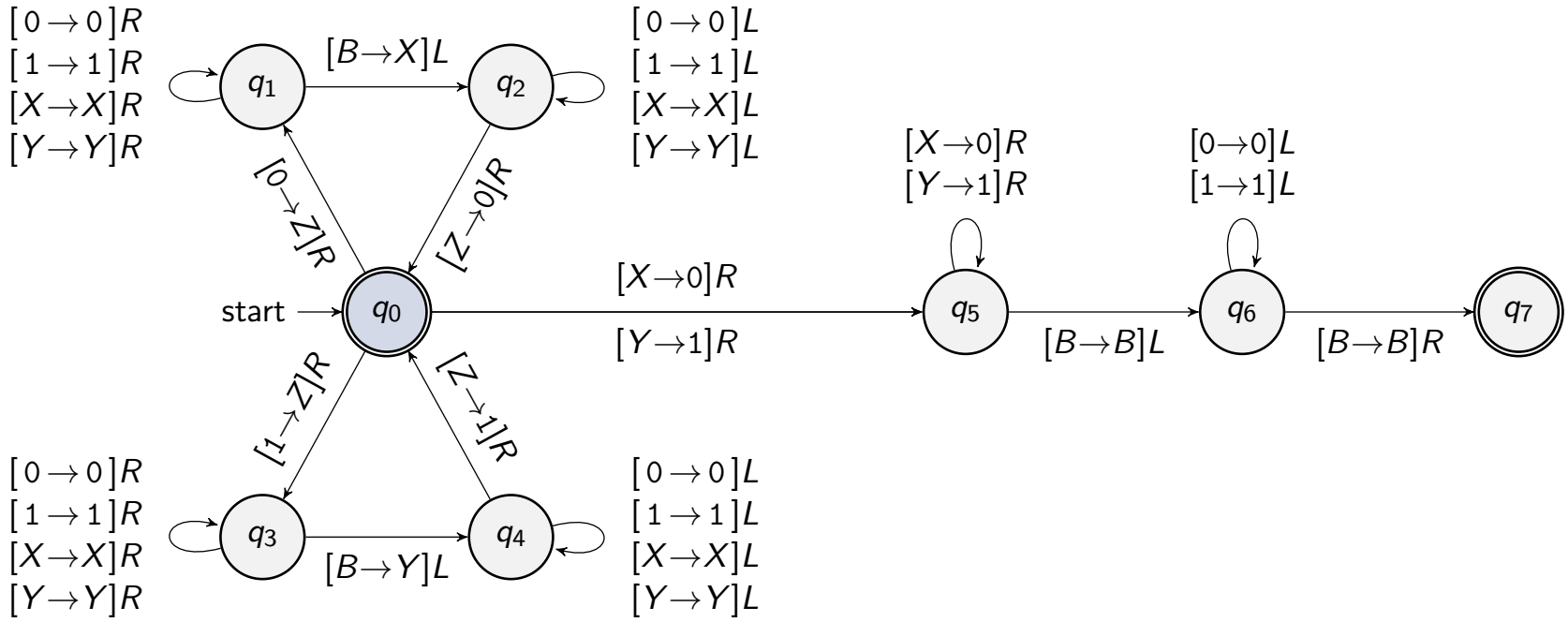
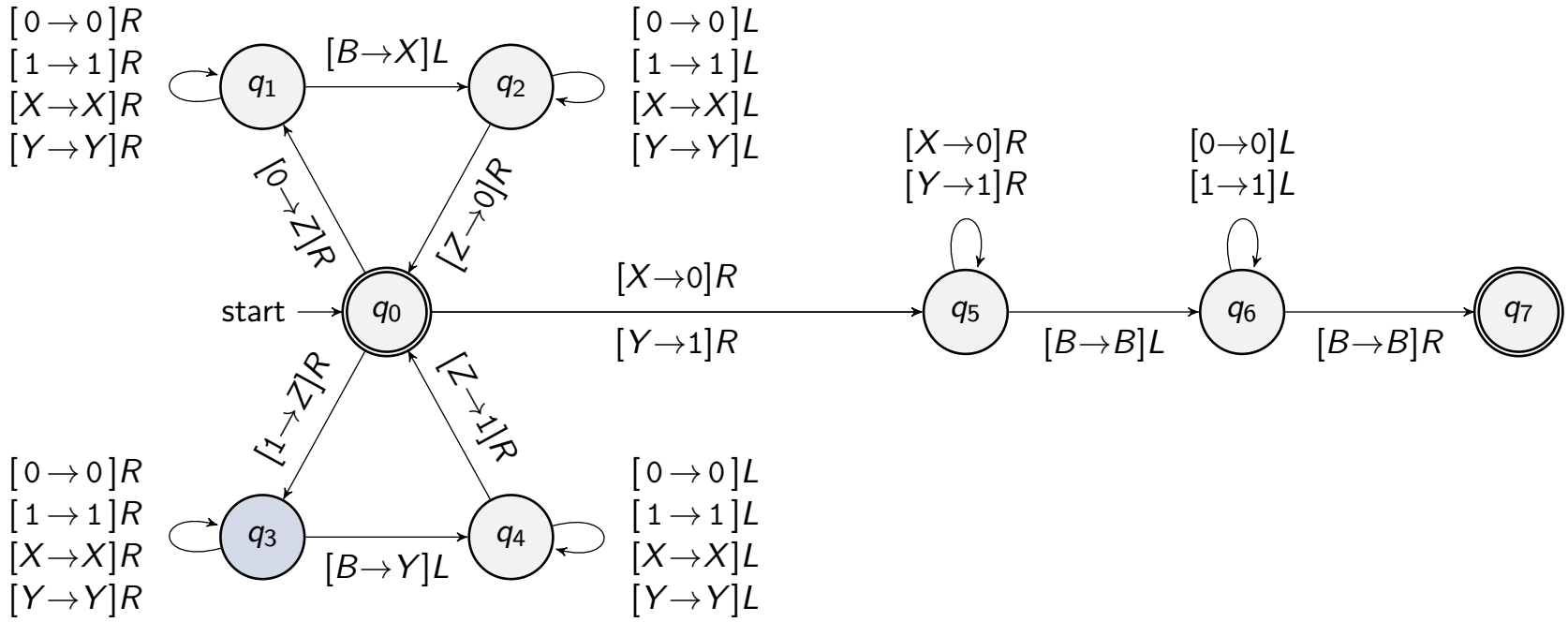


Repeat until no input symbols left.

Construct a Turing machine that computes the function:

$$f(w) = ww \qquad \text{where} \qquad w \in \{0,1\}^*$$

⋯	B	0	Z	1	X	B	B	B	⋯



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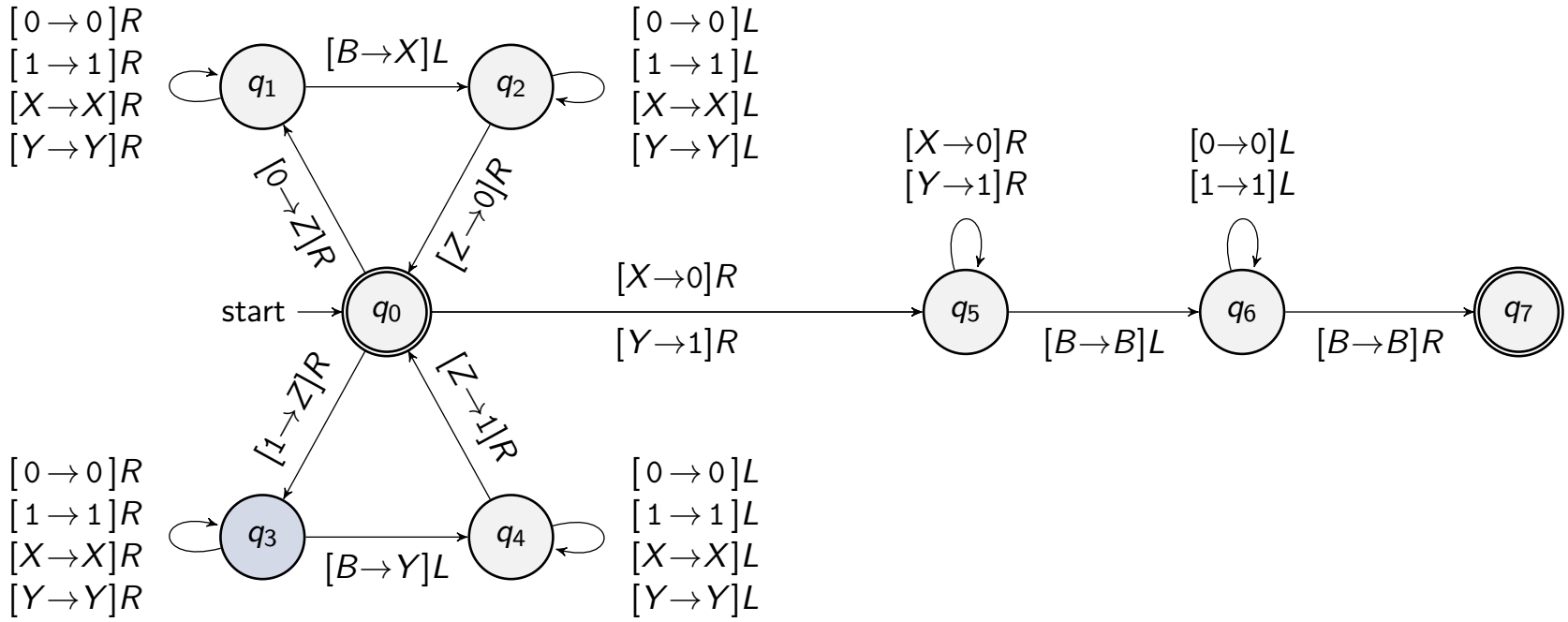

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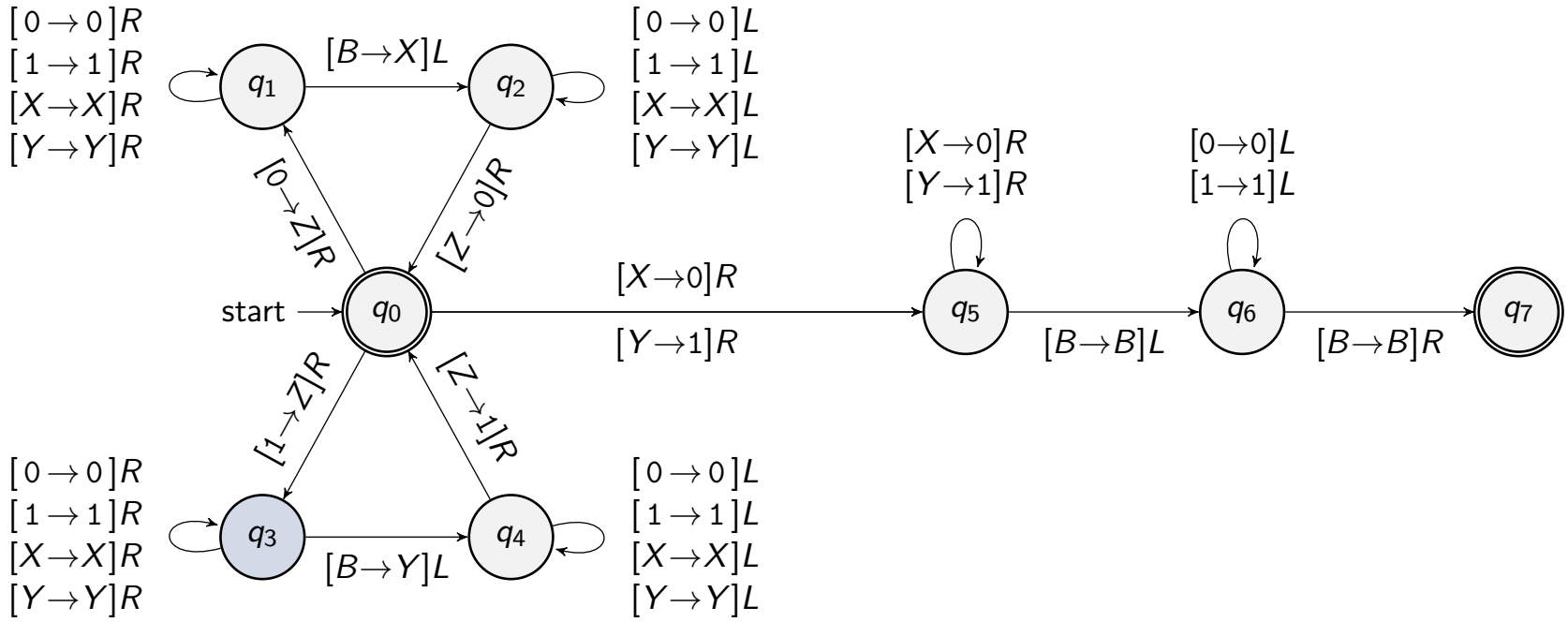

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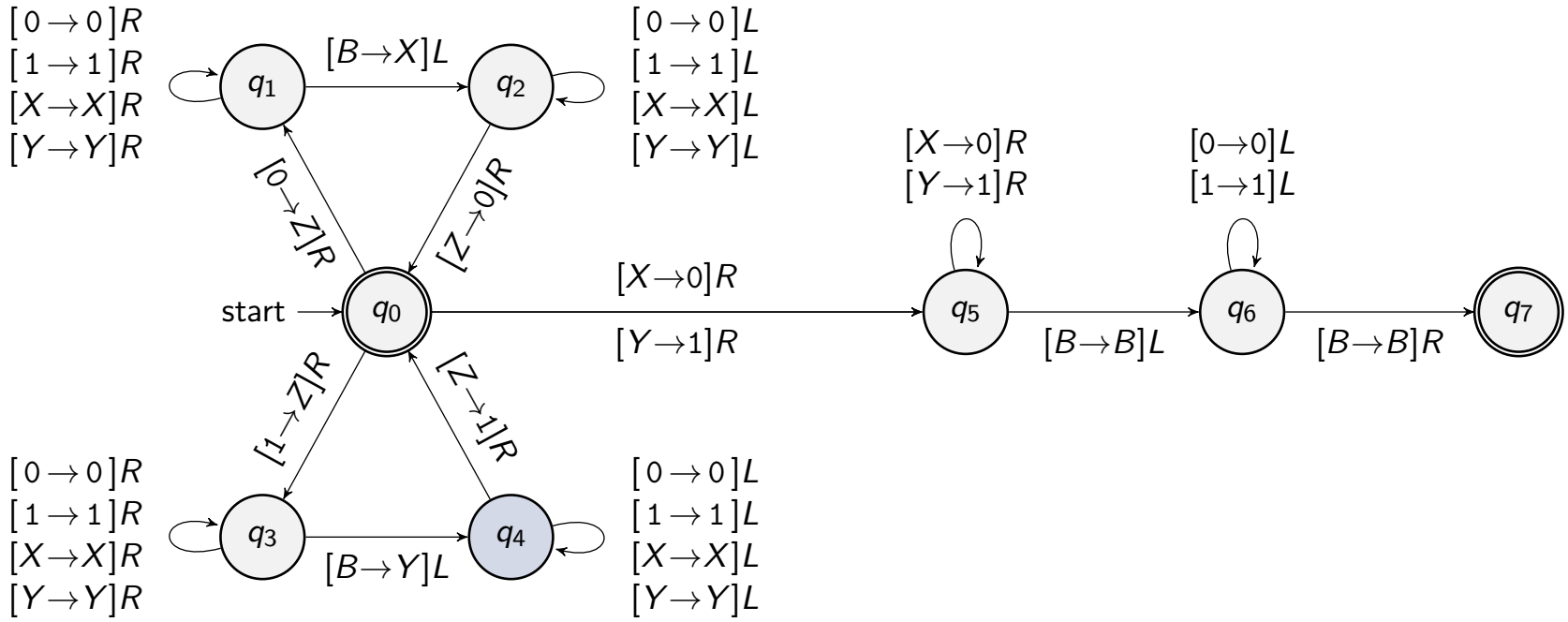

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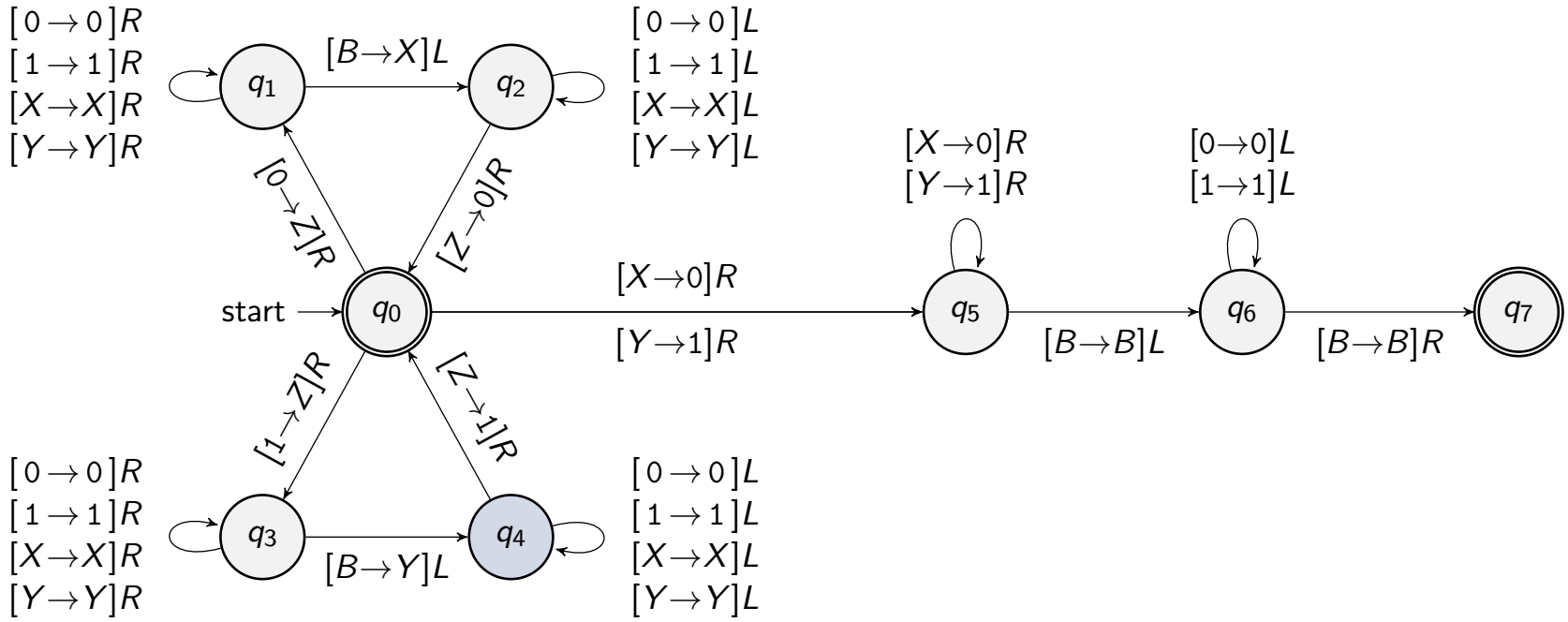

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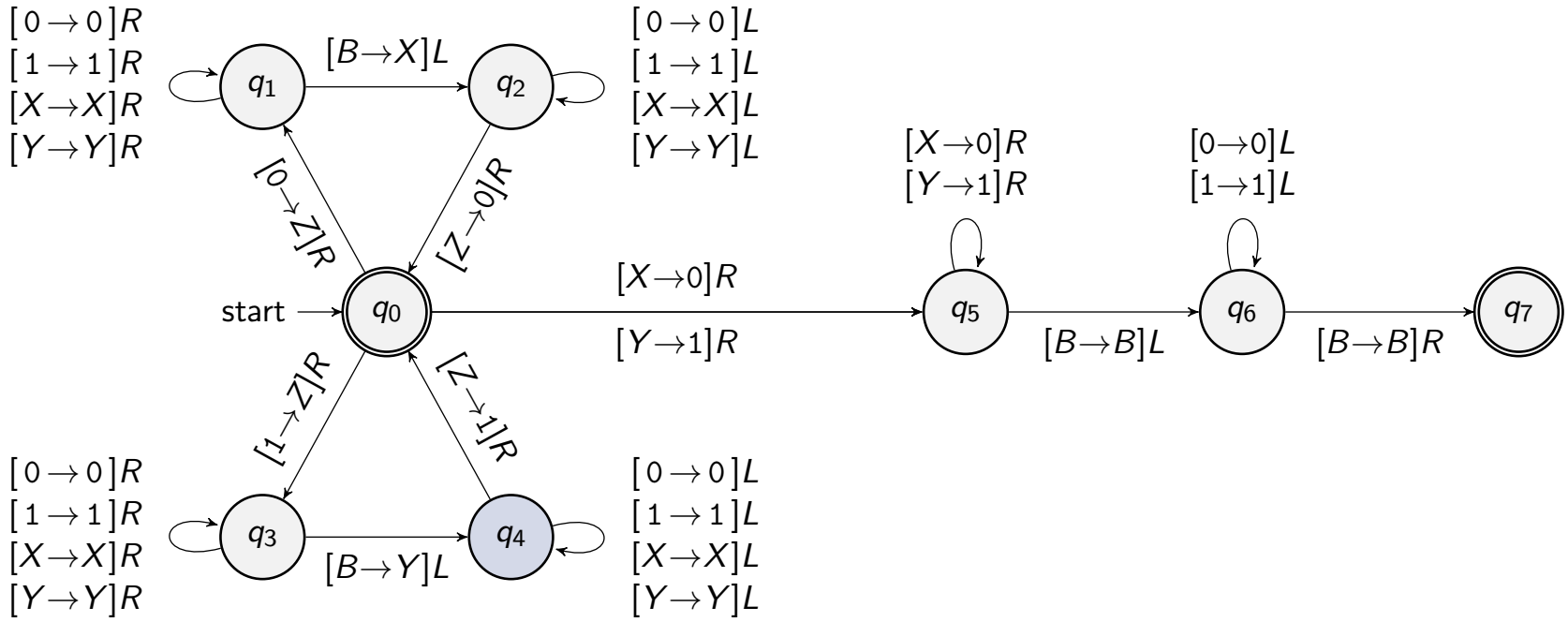

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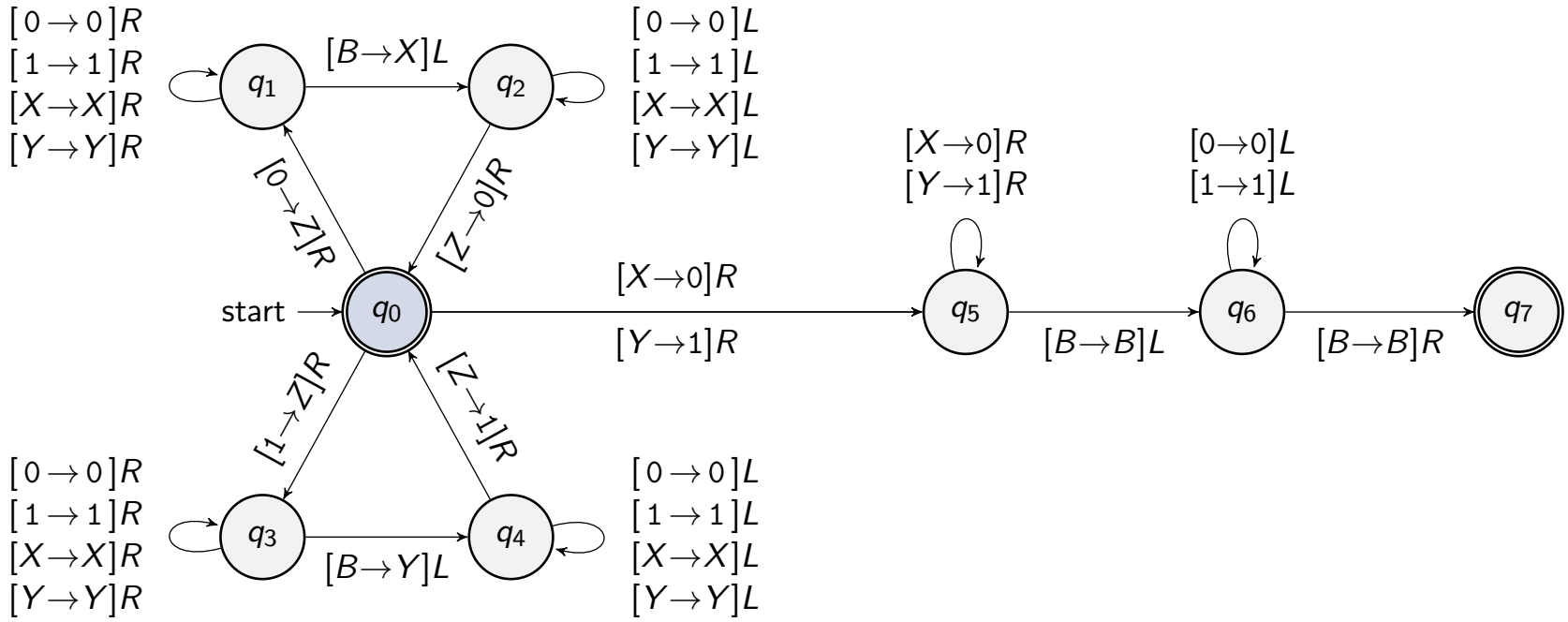

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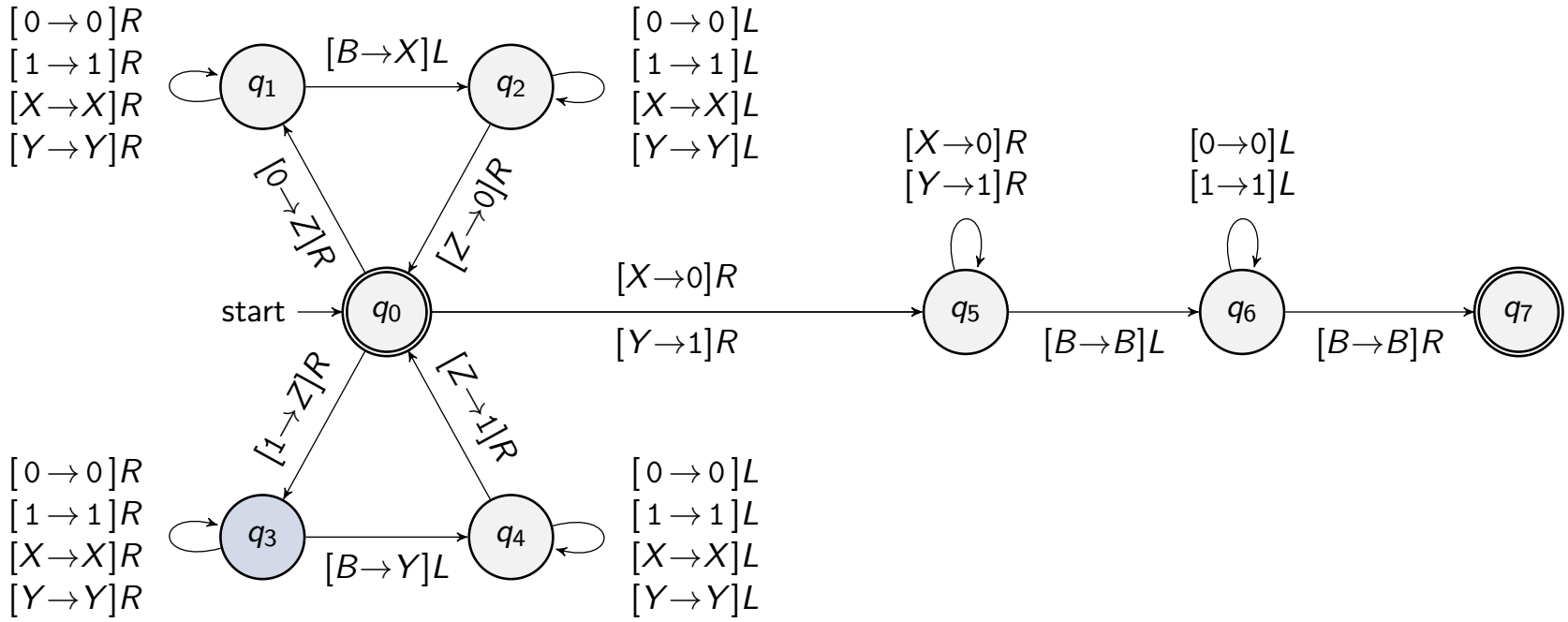

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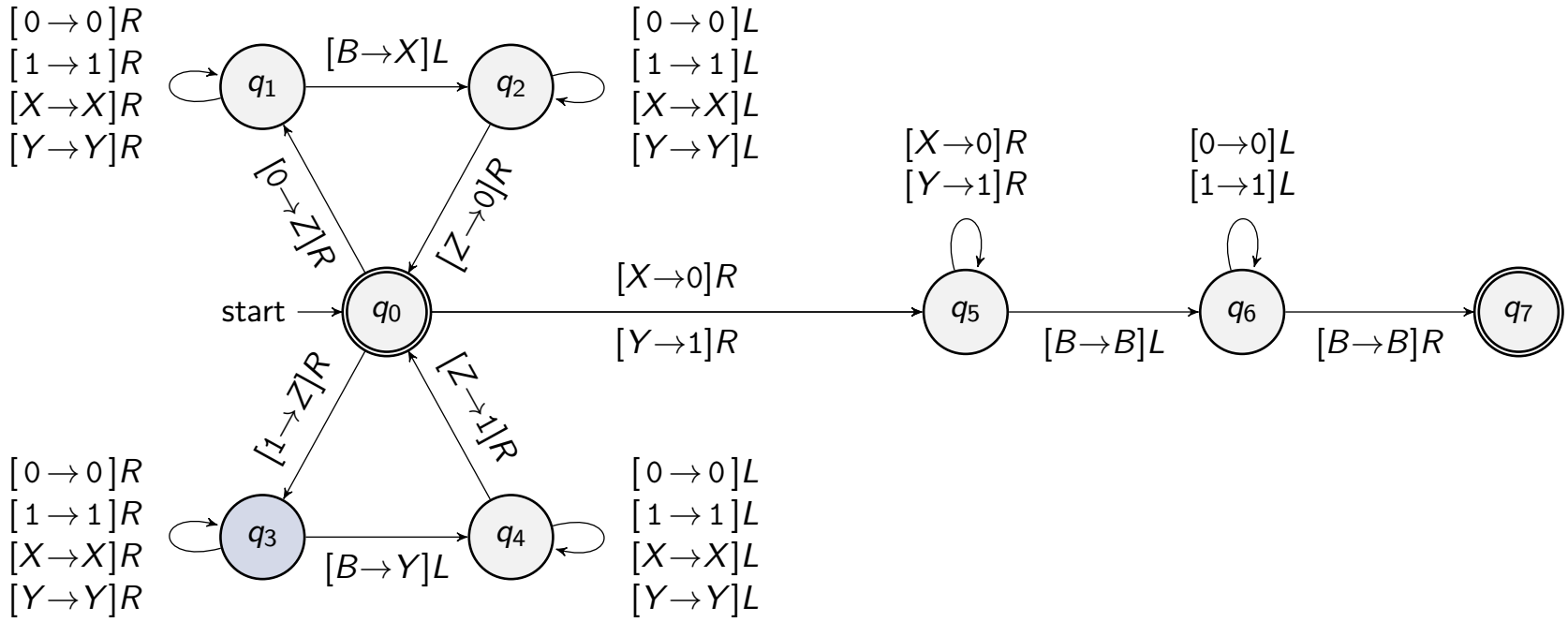

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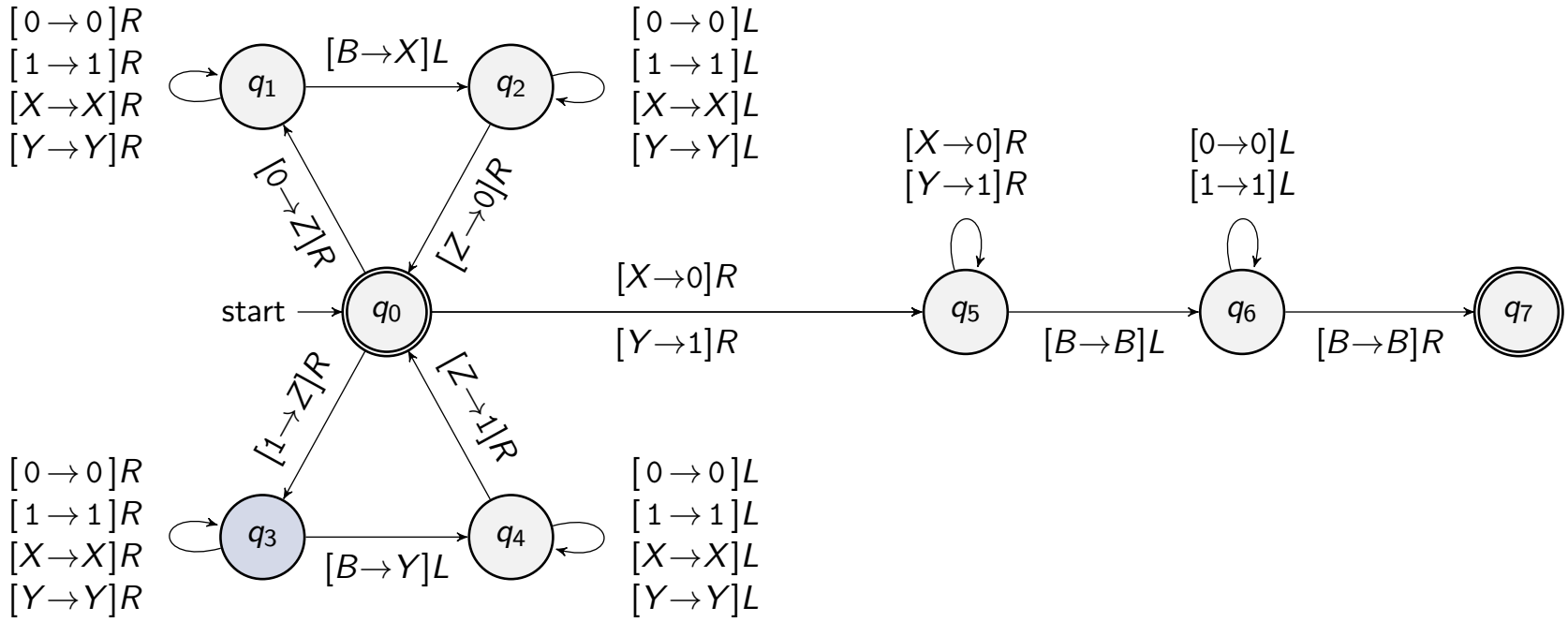

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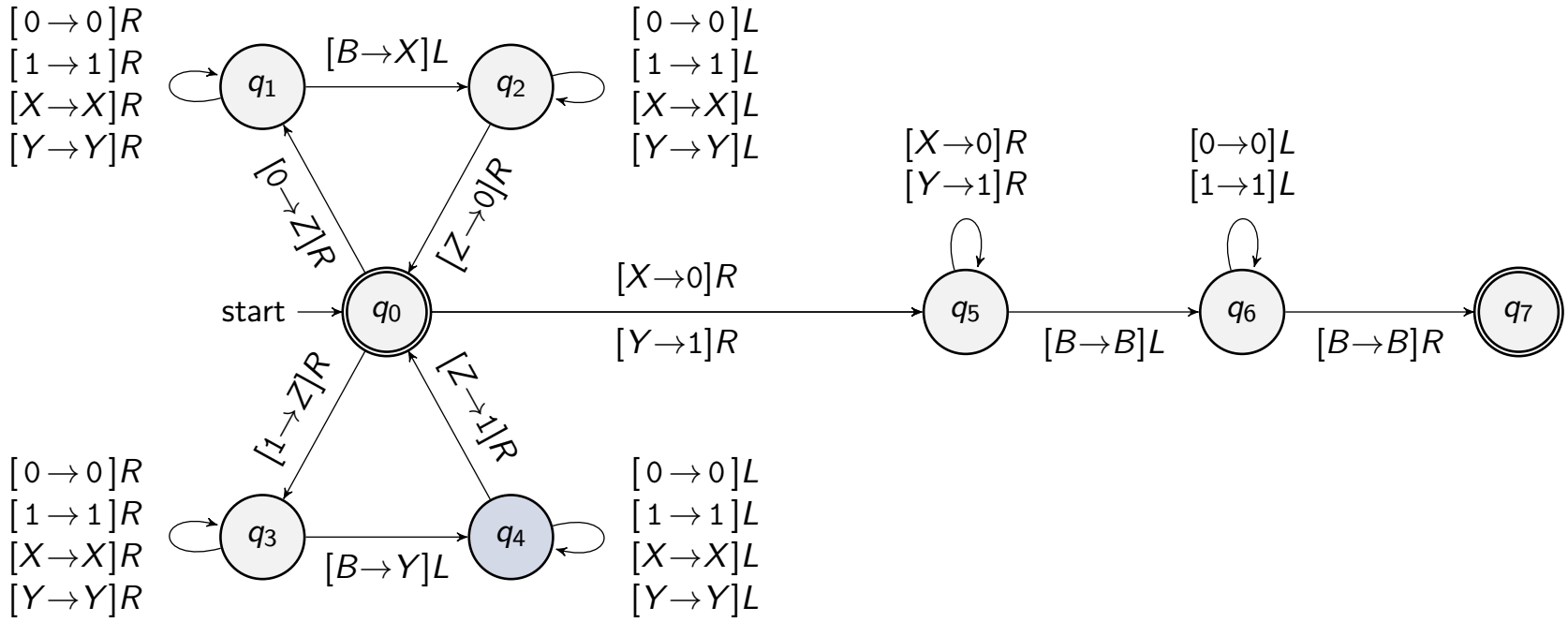

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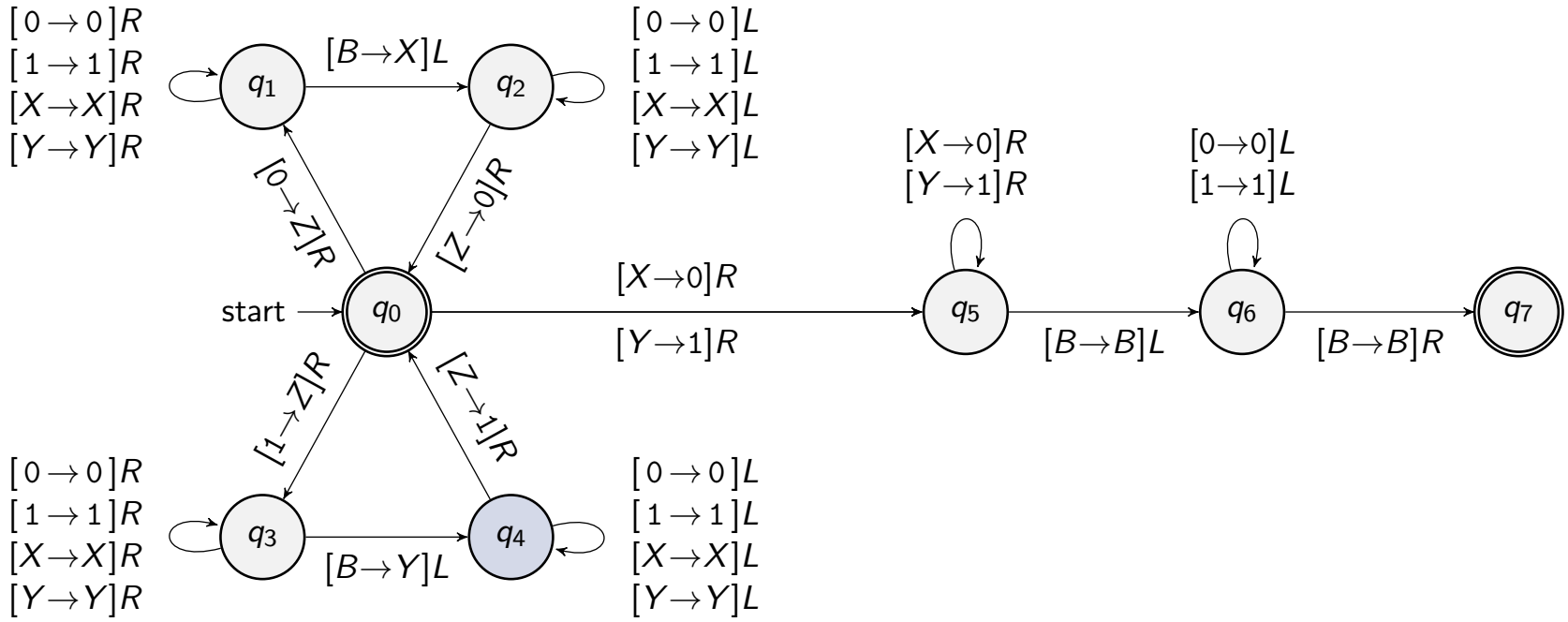

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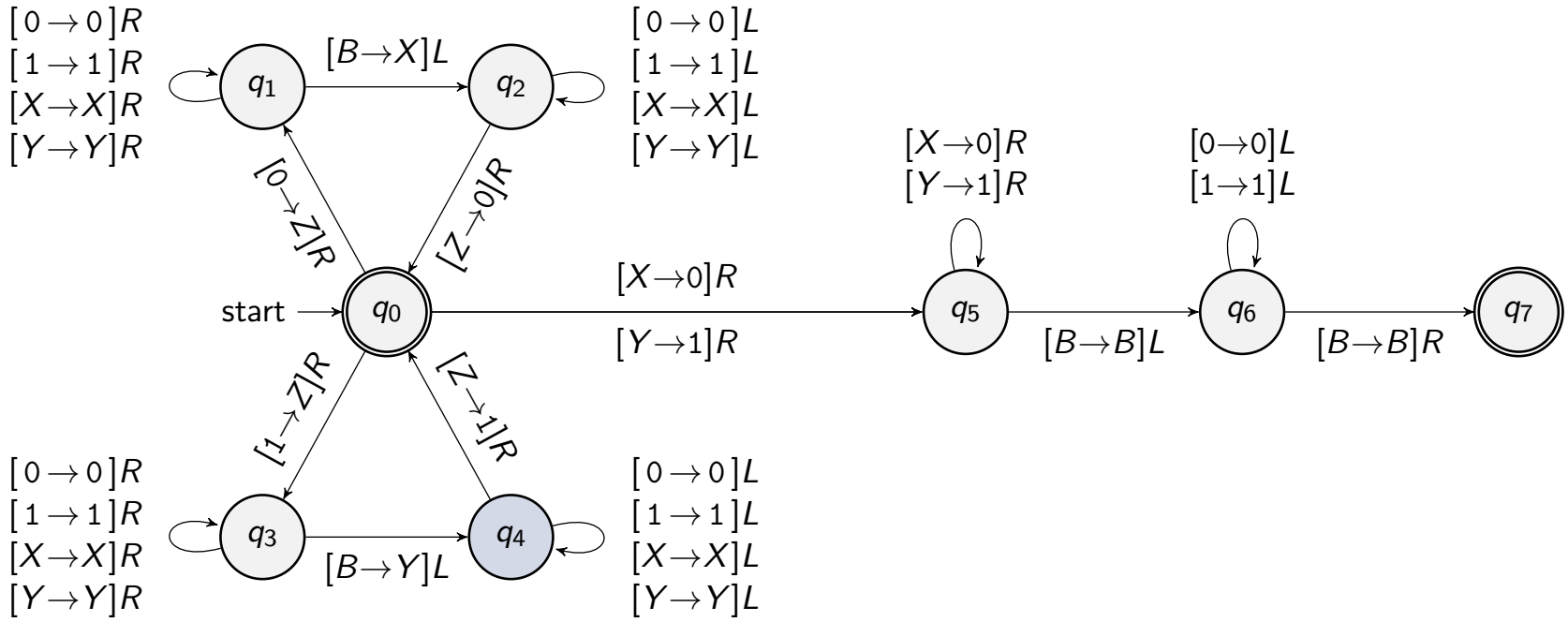

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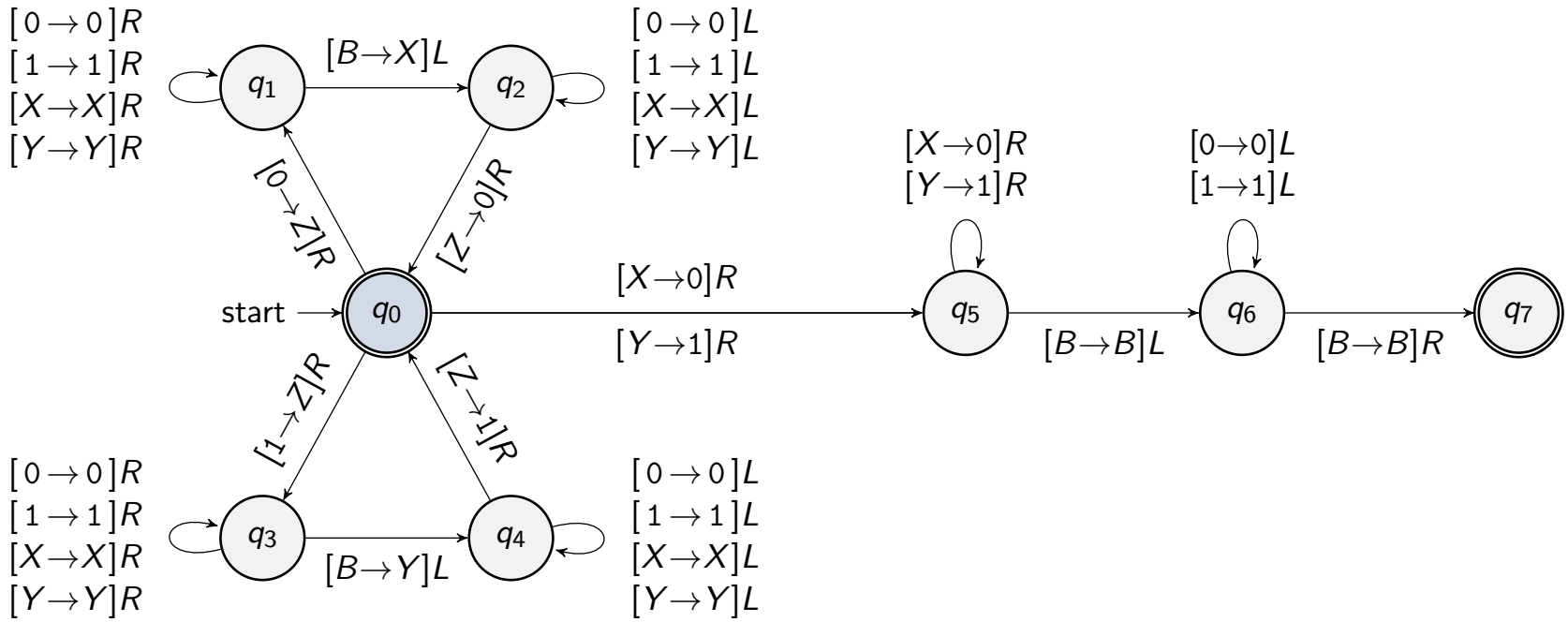

Replace X's and Y's with 0's and 1's.

Construct a Turing machine that computes the function:

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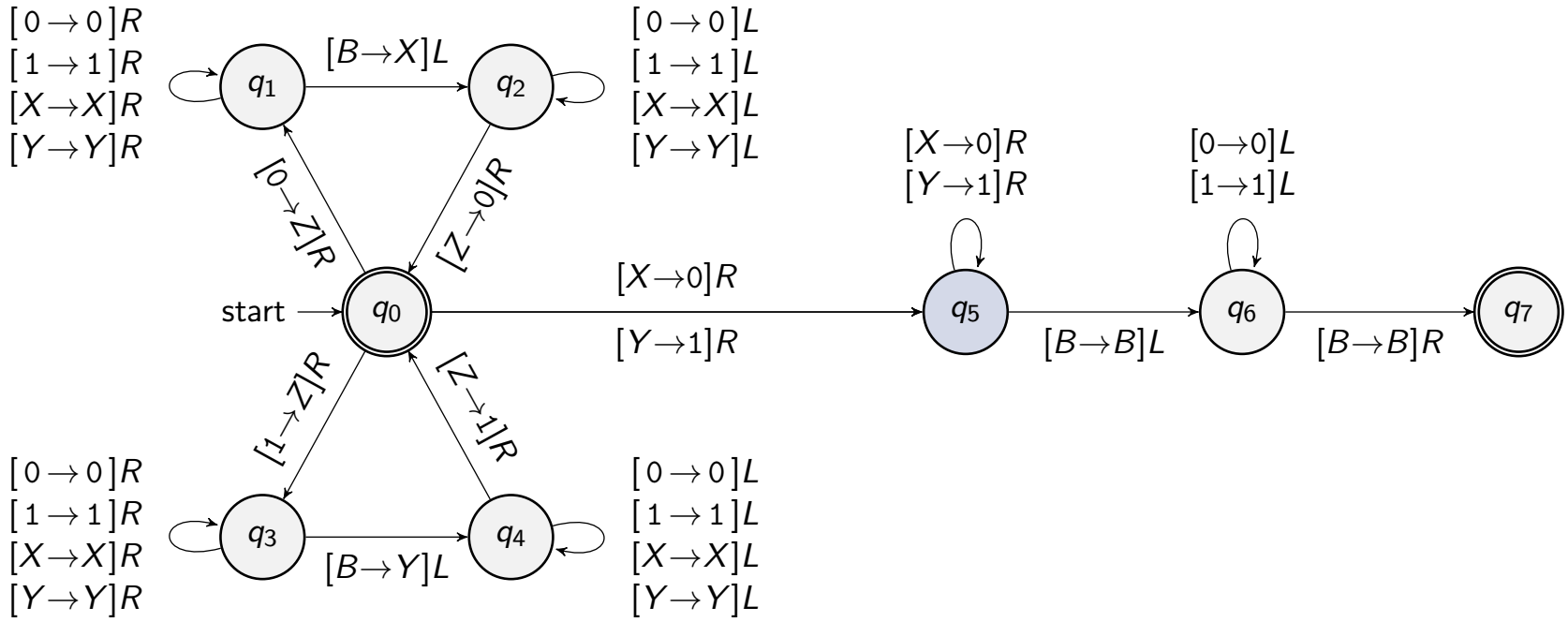

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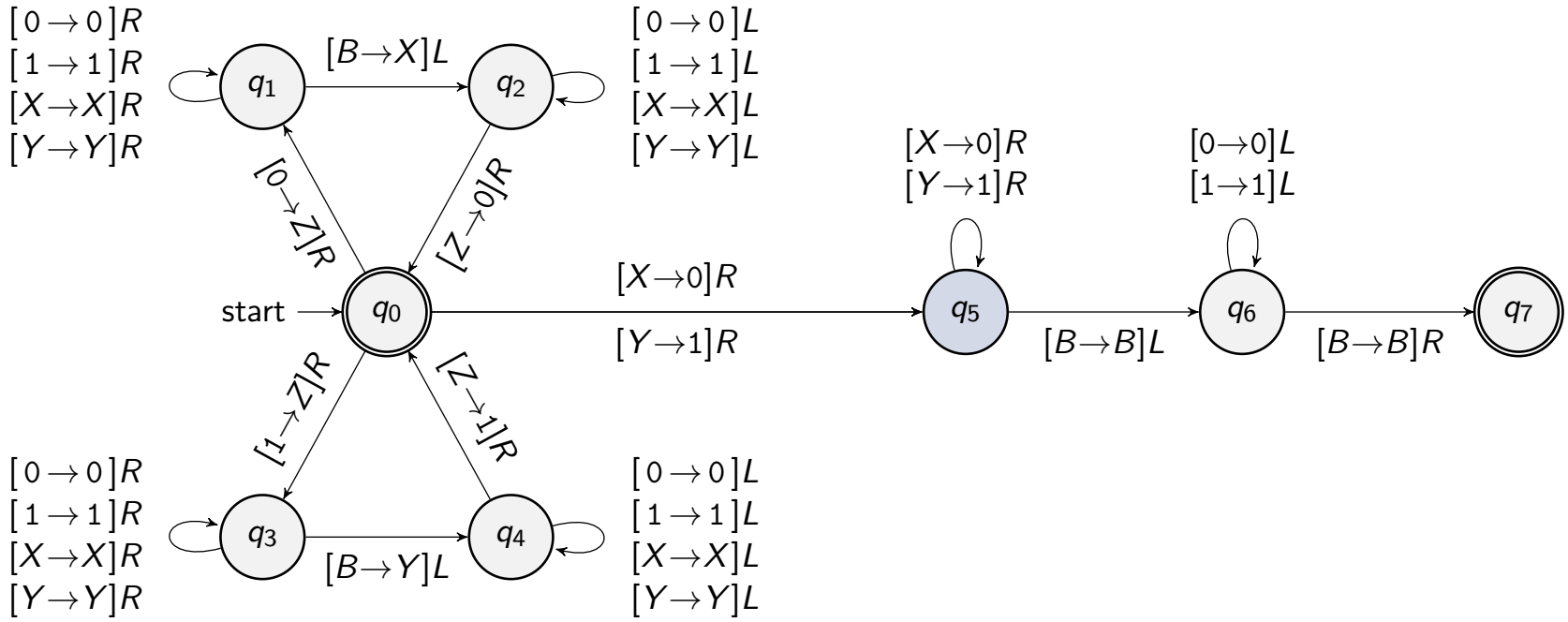

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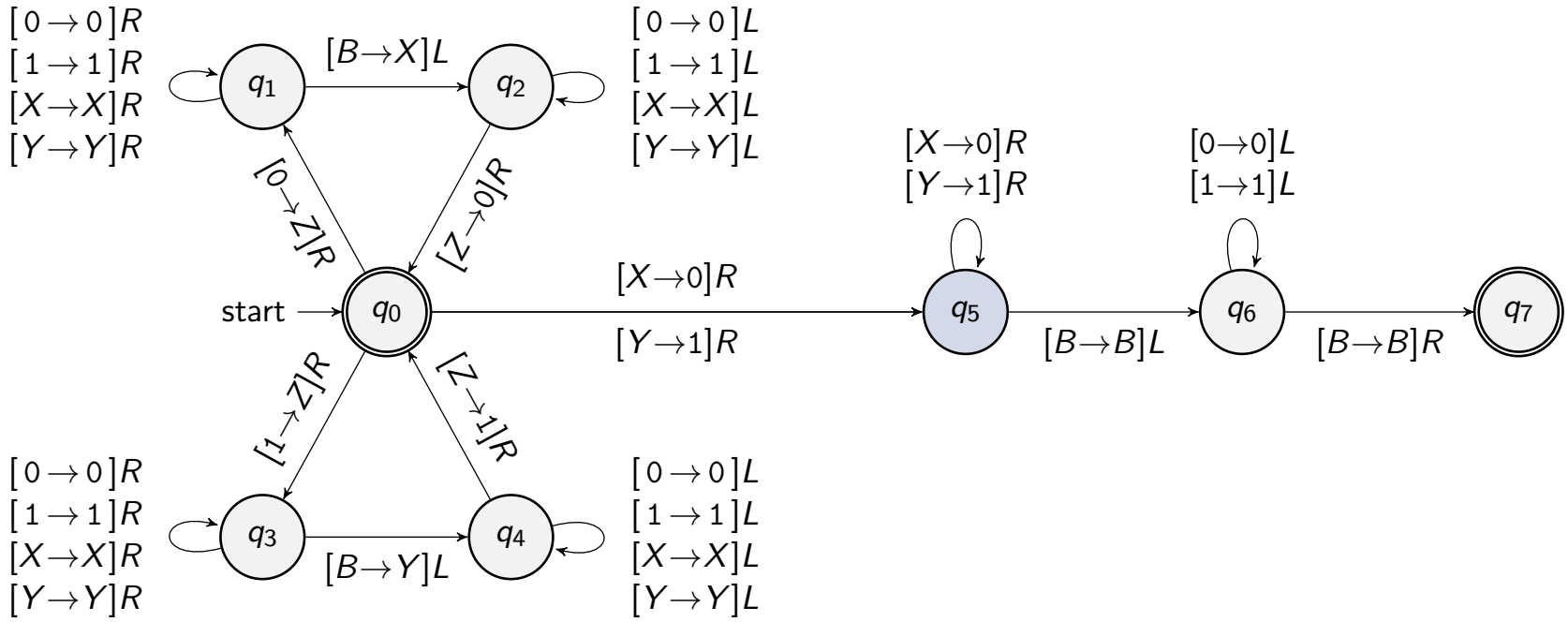

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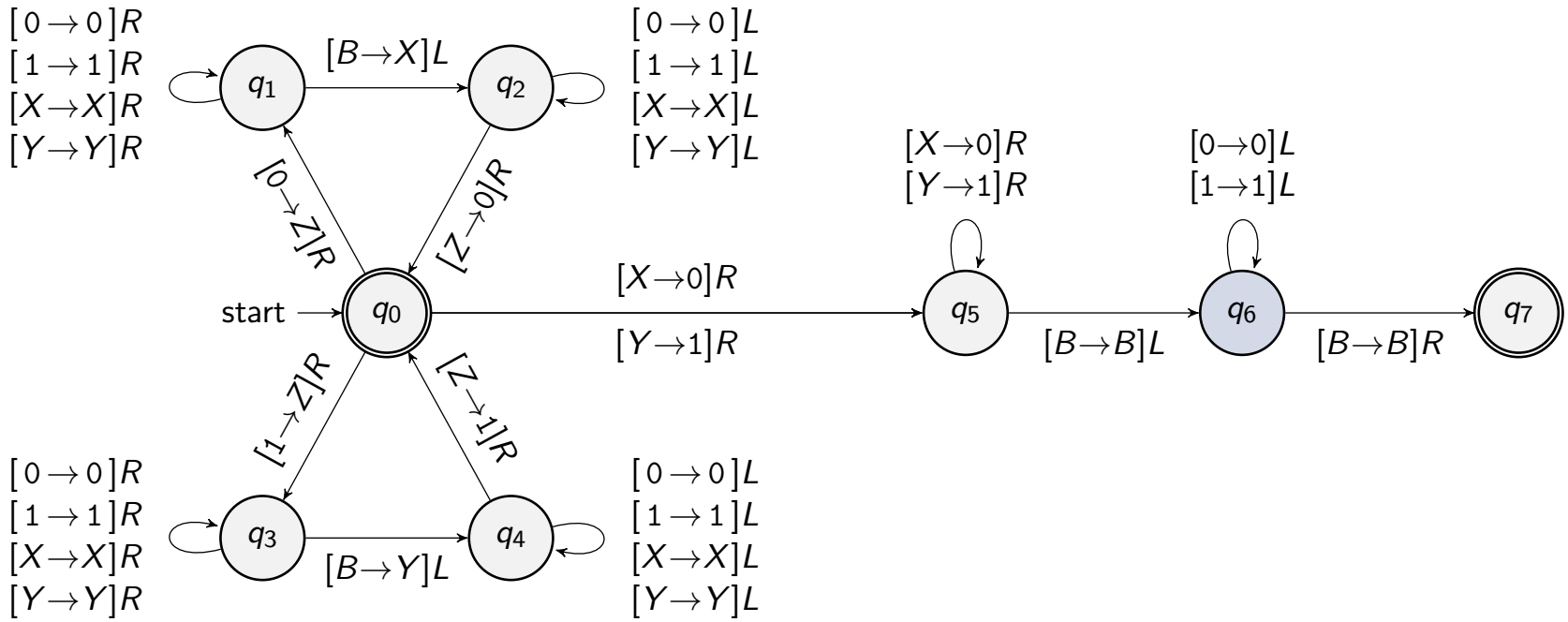

Go to the first input symbol.

Construct a Turing machine that computes the function:

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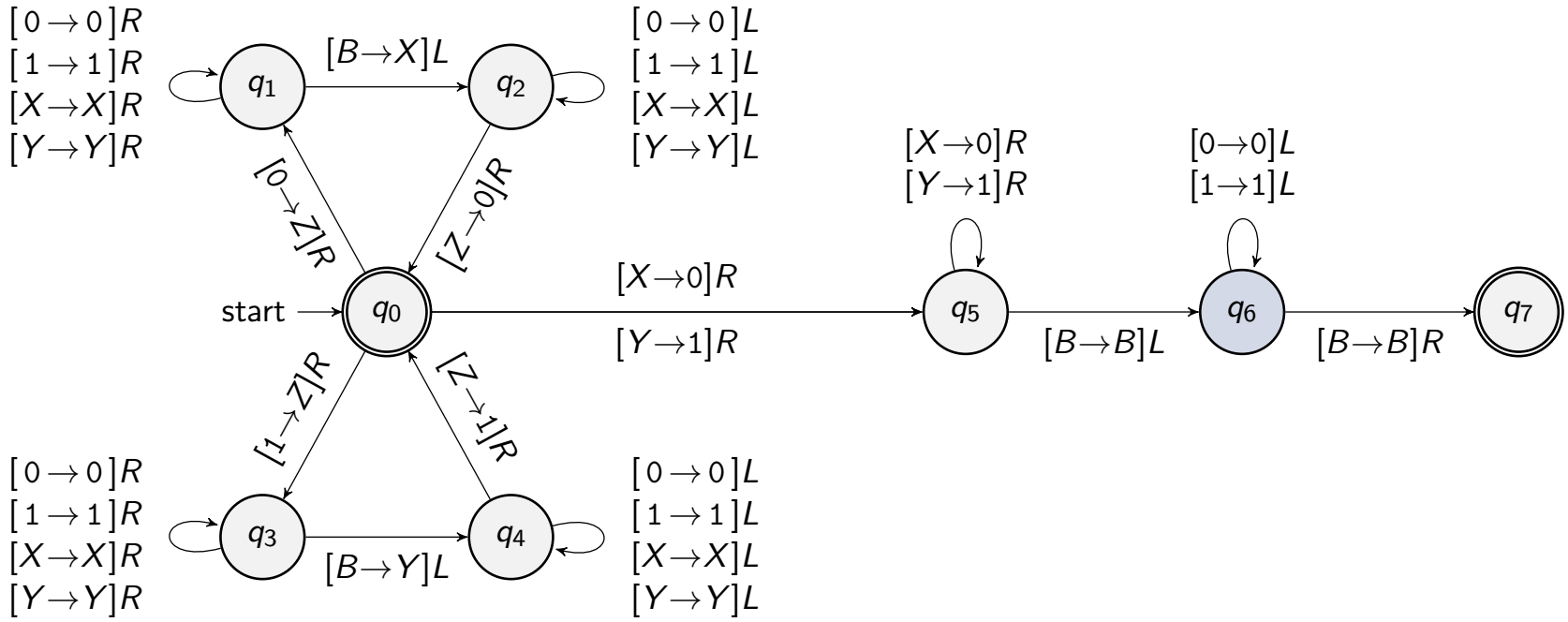

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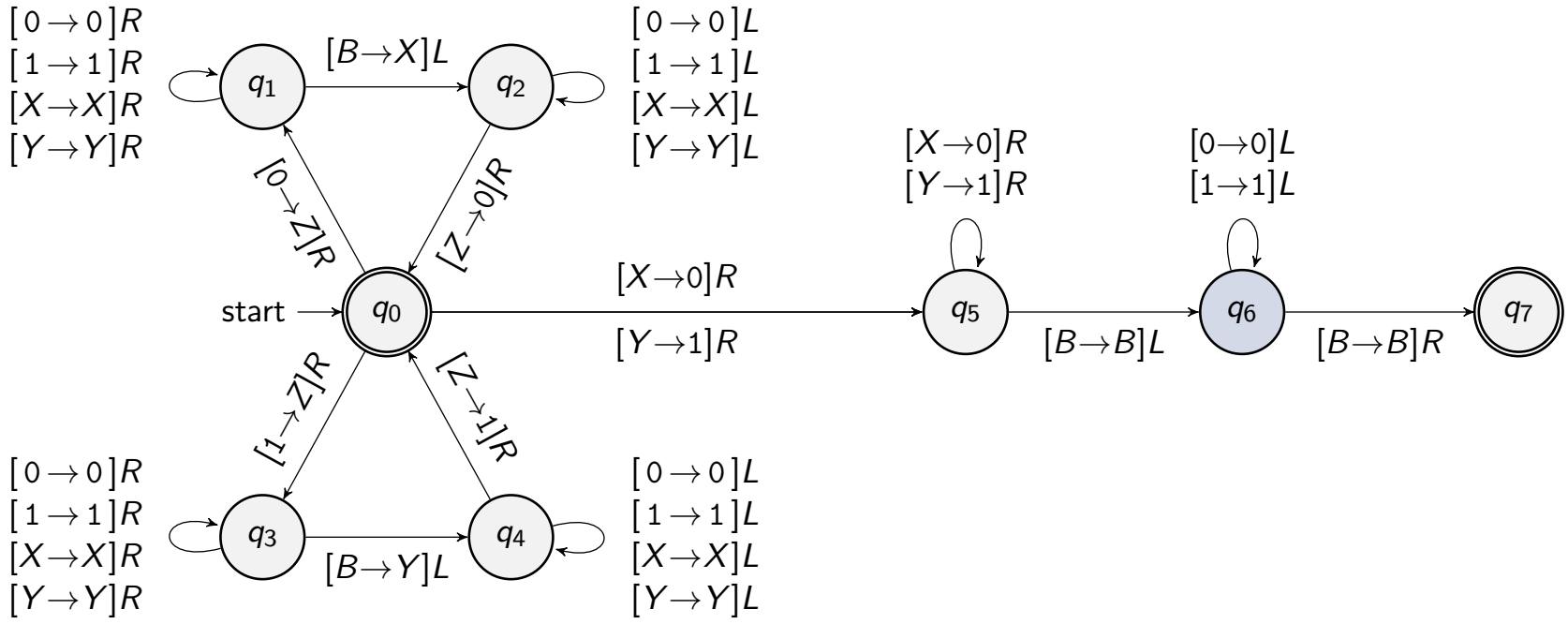

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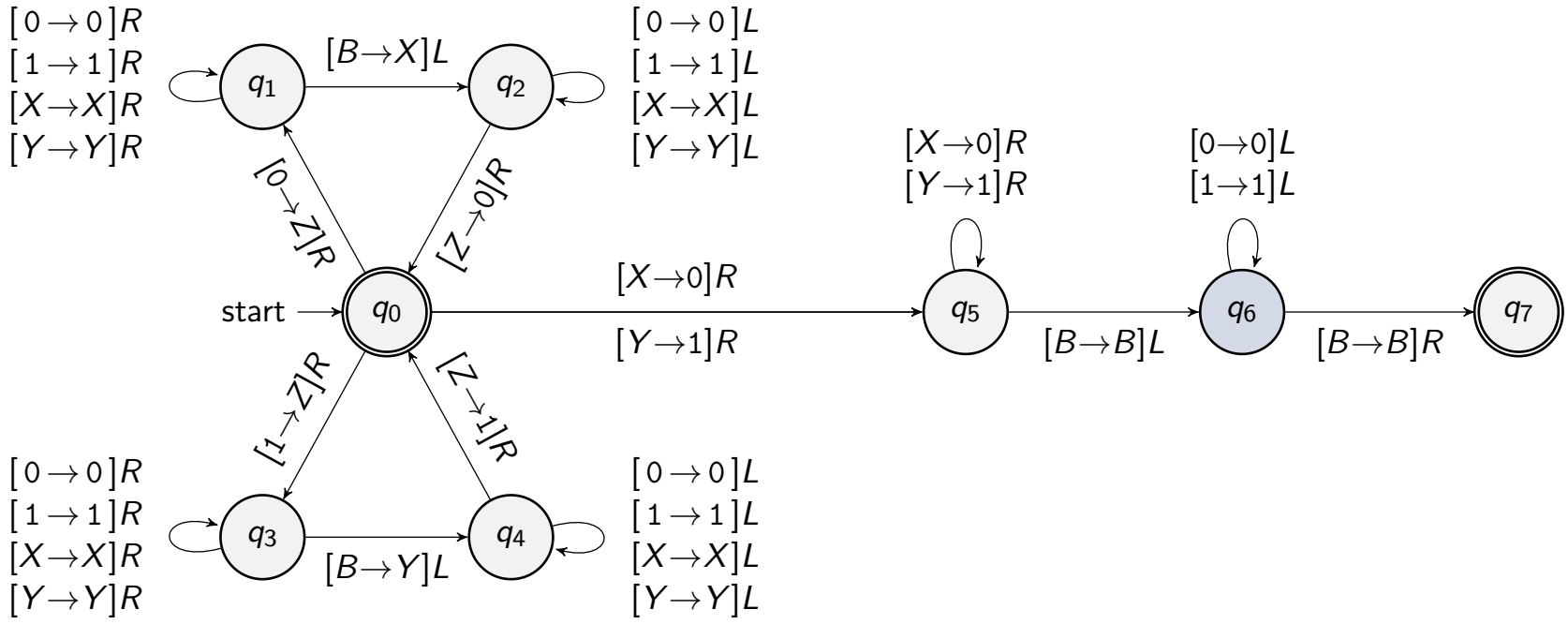

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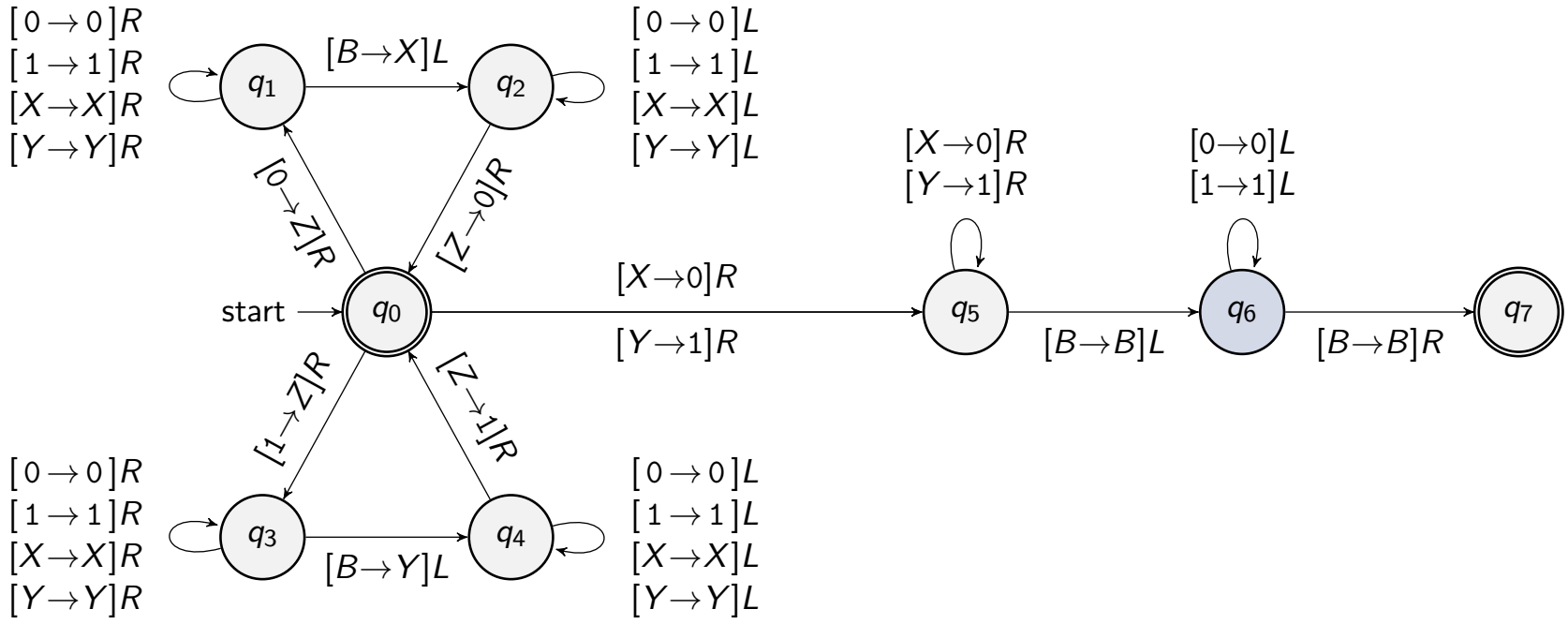

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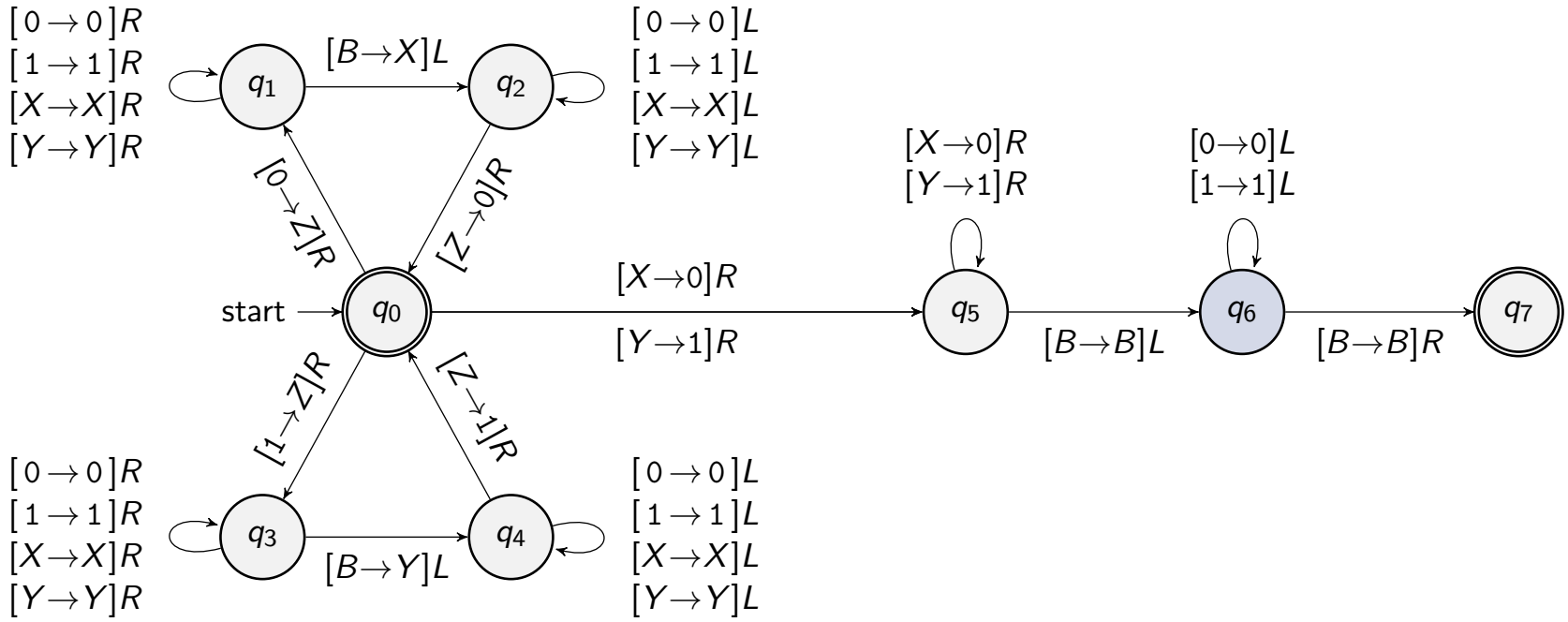

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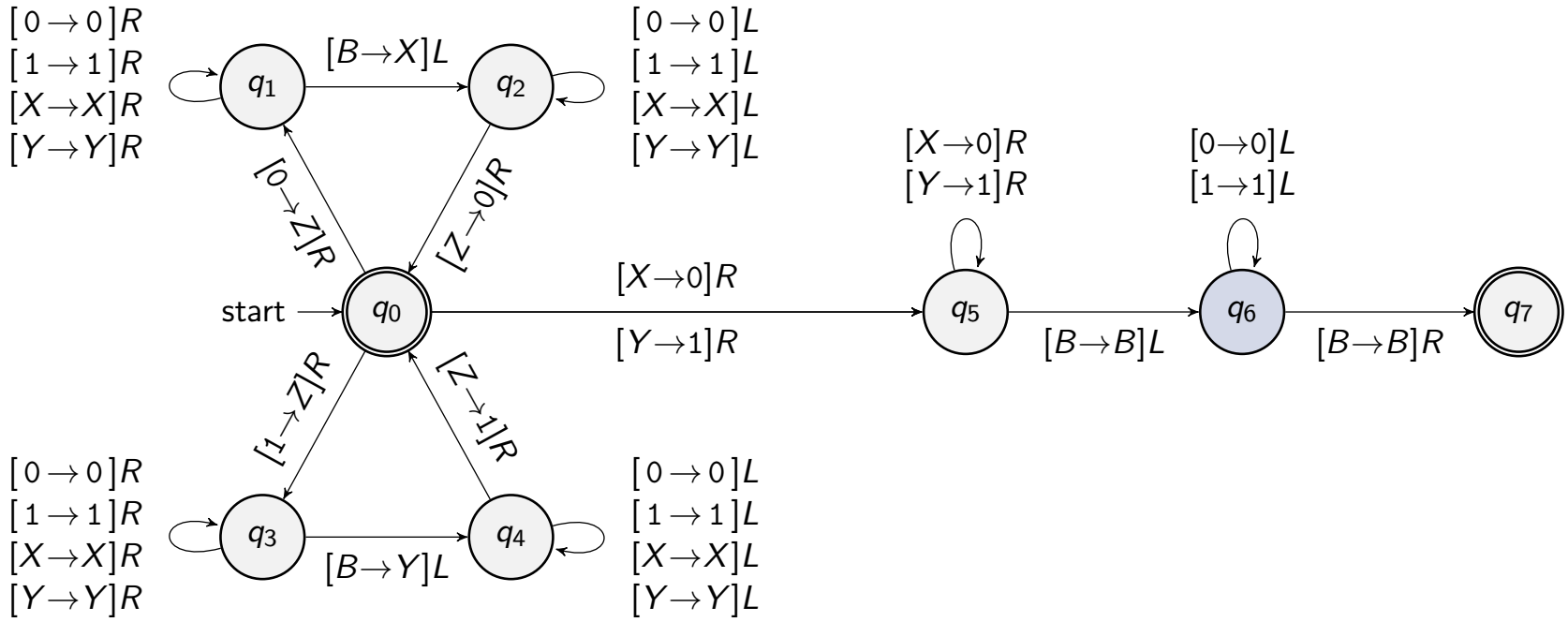

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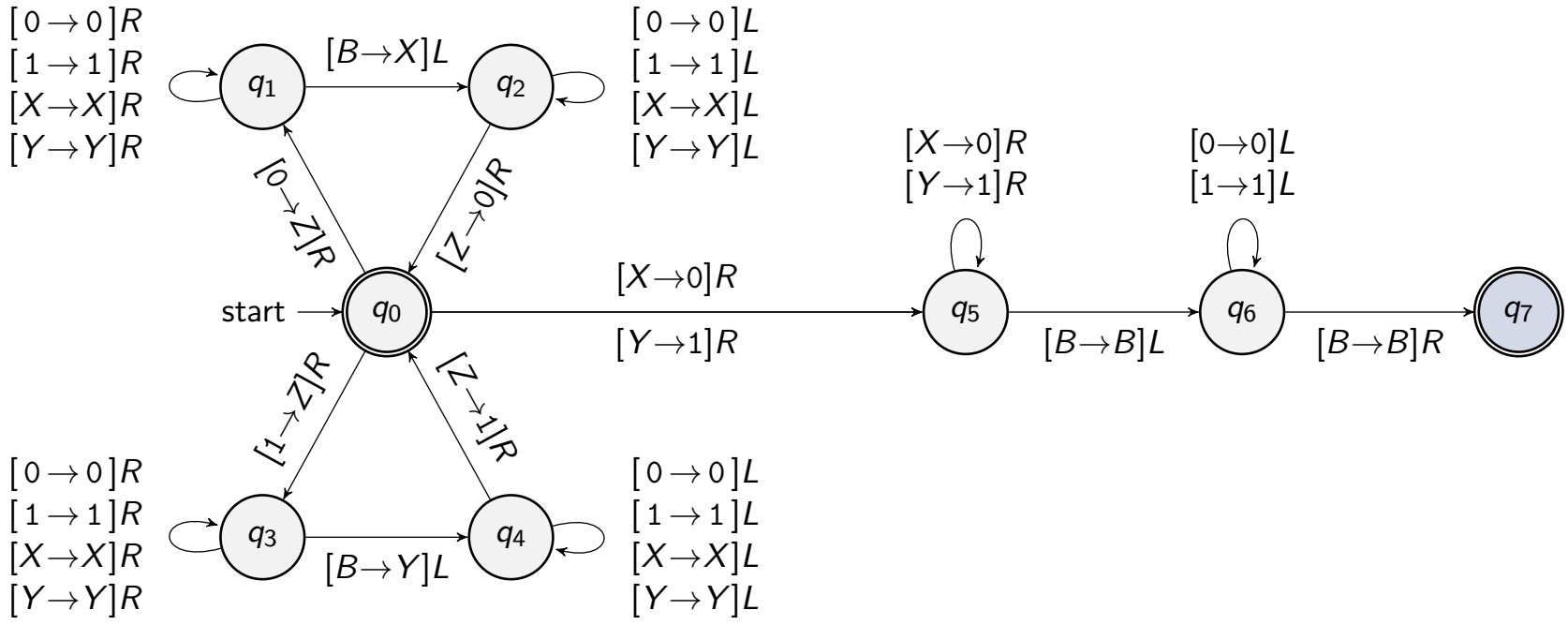

Computed! $f(011) = 011011$