

Construct a **Turing machine** that **computes** the function:

$$f(w \in \{0, 1\}^*) = (\text{the flip of each bit in } w)$$

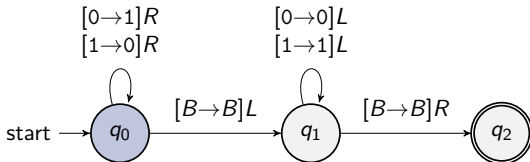
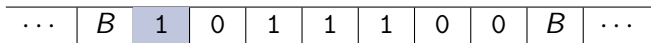
$$w = \begin{array}{|c|c|c|c|c|c|c|c|c|c|c|} \hline \dots & B & 1 & 0 & 1 & 1 & 1 & 0 & 0 & B & \dots \\ \hline \end{array}$$

$$f(w) = \begin{array}{|c|c|c|c|c|c|c|c|c|c|c|} \hline \dots & B & 0 & 1 & 0 & 0 & 0 & 1 & 1 & B & \dots \\ \hline \end{array}$$

- 1: Flip each bit of the input:  $1 \rightarrow 0$  and  $0 \rightarrow 1$
- 2: Go to the first input symbol

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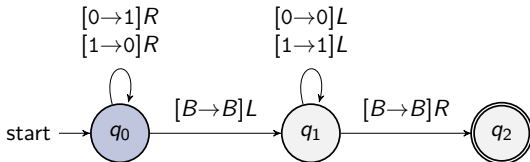
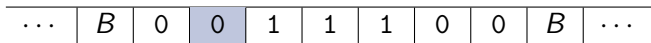
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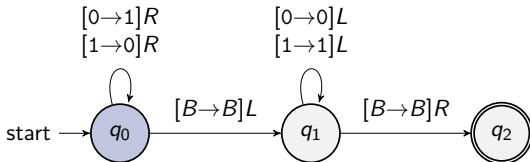
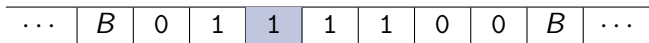
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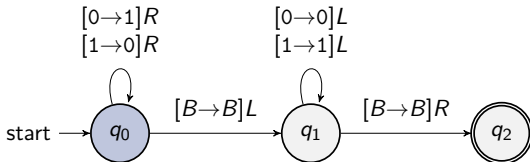
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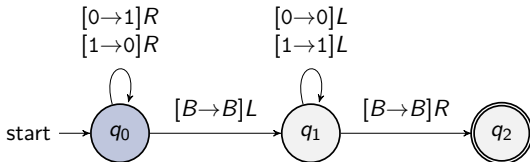
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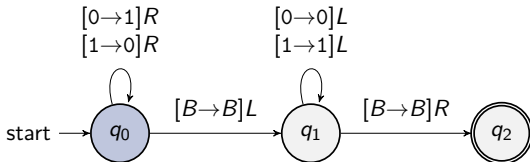
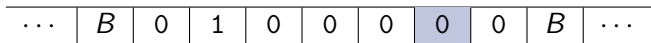
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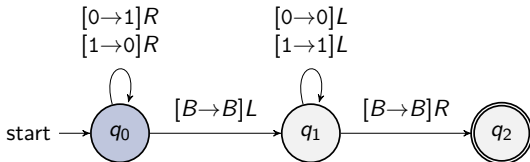
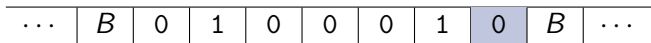
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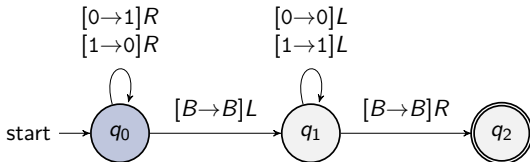
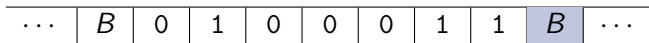
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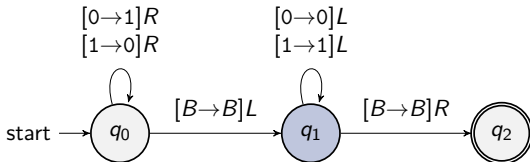
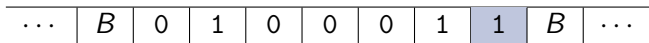
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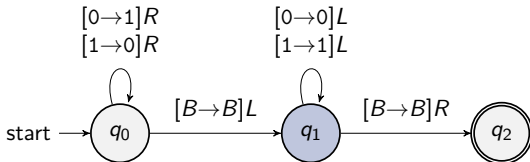
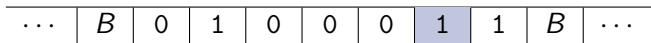
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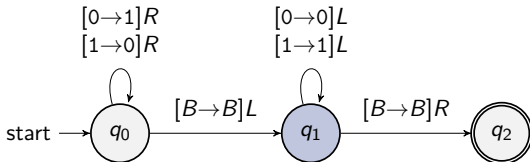
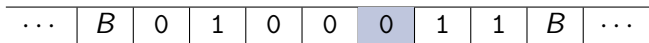
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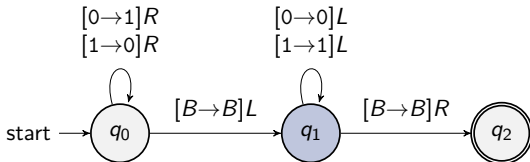
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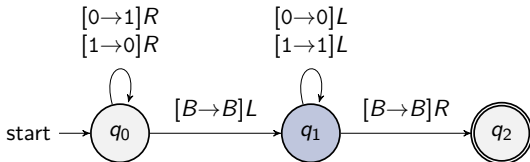
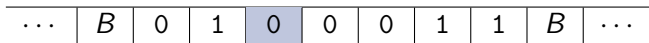
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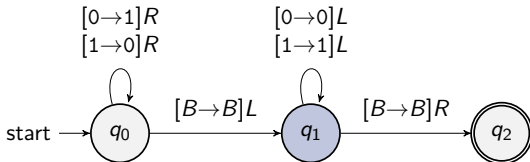
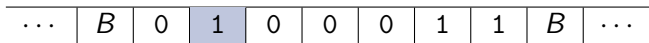
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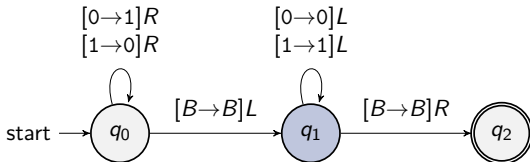
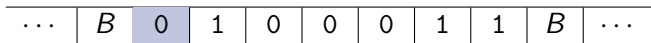
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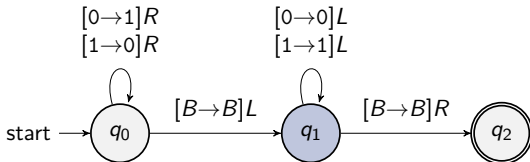
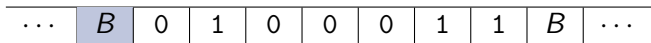
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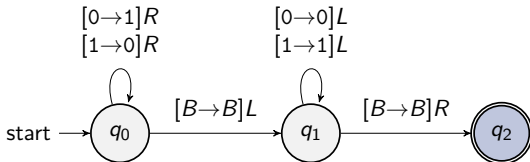
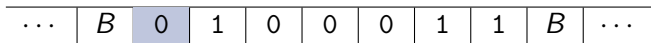
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Computed!  $f(1011100) = 0100011$