Construct a **Turing machine** that **computes** the function:
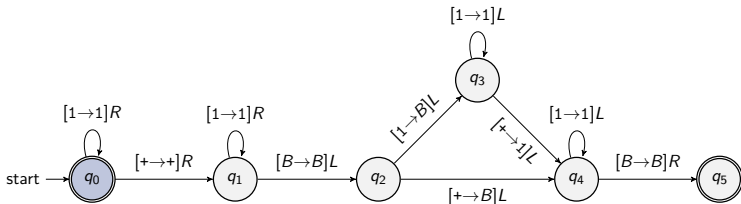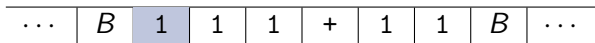
$$f(a, b) = a + b \qquad \text{where} \qquad a \text{ and } b \text{ are unary numbers}$$

$\cdots$	B	1	1	1	+	1	1	B	$\cdots$

1: Find + after 1's
2: Check if all remaining symbols are 1
3: **if** the last symbol is 1 **then**
4:    Find and Remove the last 1
5:    Find and Replace the + with 1
6: **else**
7:    Remove the +
8: Go to the first input symbol

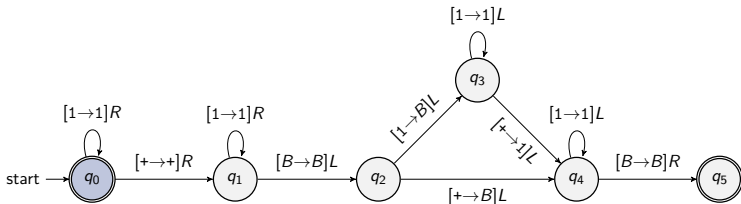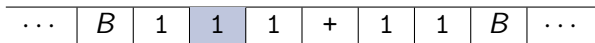Construct a **Turing machine** that **computes** the function:

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Find + after 1's.

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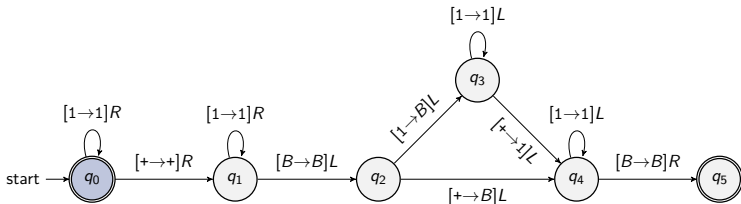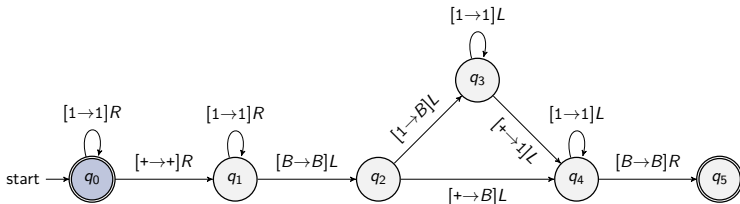| $\cdots$	B	1	1	1	+	1	1	B	$\cdots$

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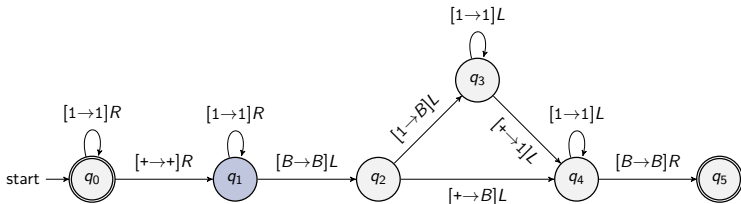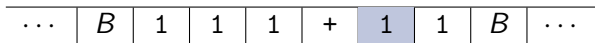| $\cdots$	B	1	1	1	+	1	1	B	$\cdots$

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$[1 \to 1]L$

q_3

$[1 \to 1]R$ $[1 \to 1]R$ $[1 \to B]L$ $[+ \to 1]L$ $[1 \to 1]L$

start $\to$ q_0 $[+ \to +]R$ q_1 $[B \to B]L$ q_2 q_4 $[B \to B]R$ q_5

$[+ \to B]L$
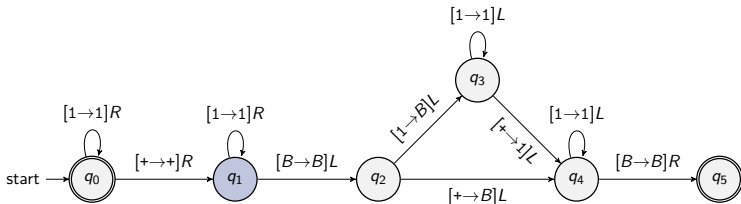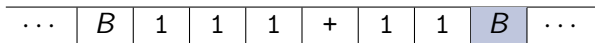
Check if all remaining symbols are 1.

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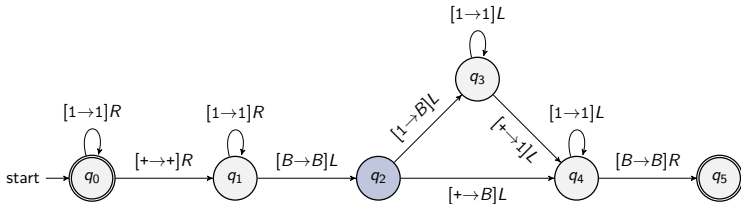|	B	1	1	1	+	1	1	B	$\cdots$
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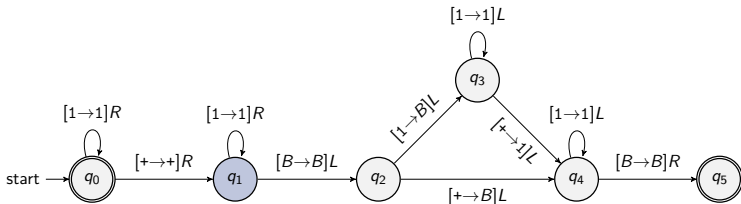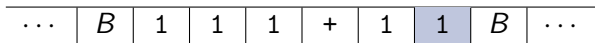
Since the last symbol is 1, find and remove the last 1.

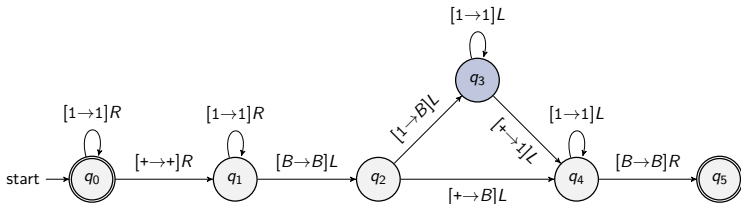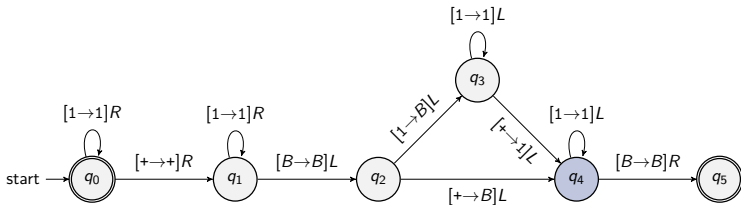Construct a **Turing machine** that **computes** the function:

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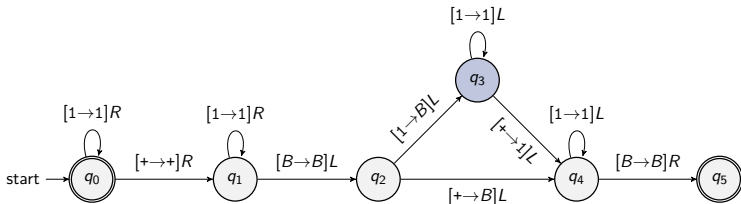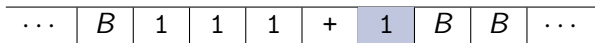
Find and Replace the + with 1.

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| · · · | B | 1 | 1 | 1 | 1 | 1 | B | B | · · · |

Go to the first input symbol.

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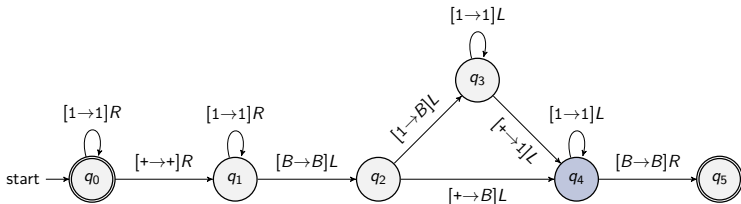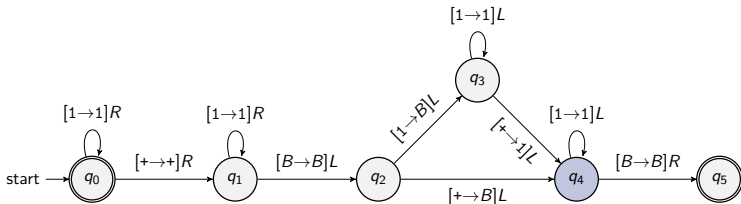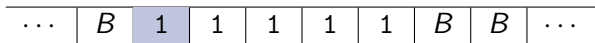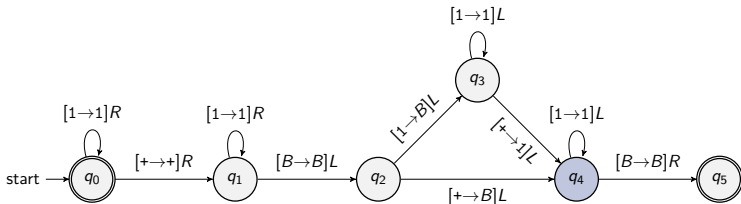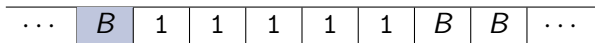Construct a **Turing machine** that **computes** the function:

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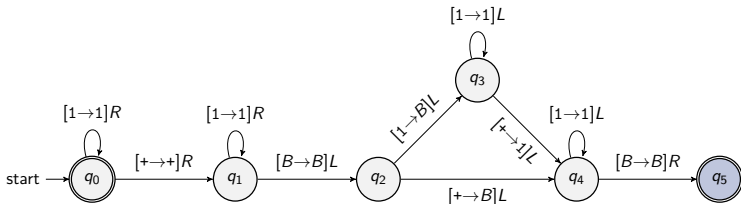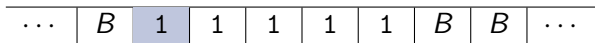| $\cdots$	B	1	1	1	1	1	B	B	$\cdots$

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Computed! $f(111+11) = 11111$