COMP110: Principles of Computing

4: Logic and memory

Learning outcomes

- **Distinguish** the basic types of logic gate
- **Use** logic gates to build simple circuits
- **Explain** how computer memory works

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Logic gates

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- One boolean value = one **bit** of information
- Programmers use boolean logic for conditions in `if` and `while` statements

Not

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NOT *A* is TRUE
if and only if
A is FALSE

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A	NOT *A*
FALSE	TRUE
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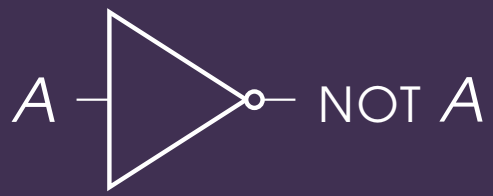

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Socrative FALCOMPED

What is the value of

$$A \text{ AND } (B \text{ OR } C)$$

when

$$A = \text{TRUE}$$
$$B = \text{FALSE}$$
$$C = \text{TRUE}$$

?

Socrative FALCOMPED

What is the value of

$$(\text{NOT } A) \text{ AND } (B \text{ OR } C)$$

when

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$$C = \text{TRUE}$$

?

Socrative FALCOMPED

For what values of A, B, C, D is

$$A \text{ AND NOT } B \text{ AND NOT } (C \text{ OR } D) = \text{TRUE}$$

?

Socrative FALCOMPED

What is the value of

A OR NOT *A*

?

Socrative FALCOMPED

What is the value of

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Socrative FALCOMPED

What is the value of

$$A \text{ OR } A$$

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Socrative FALCOMPED

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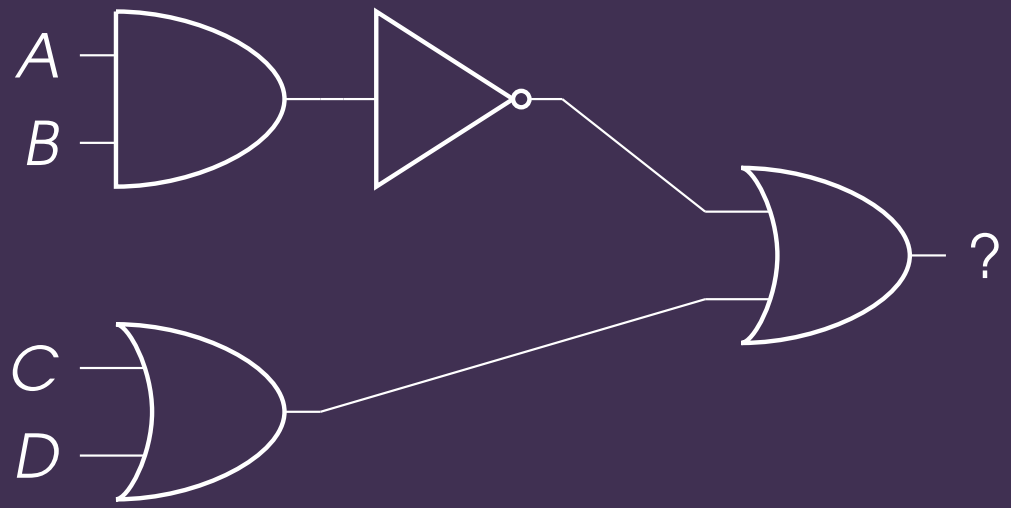
Socrative FALCOMPED

What expression is equivalent to this circuit?



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Other operators can be expressed by combining these

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Socrative FALCOMPED

How can *A* XOR *B* be written using the operations AND , OR , NOT ?

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