

CS 130 Homework 1

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Practice Problems

You are not required to turn these in.

Gersting, 6e: Section 3.2, Exercises 1–13, 17–27, 71–73

Book of Proof: Section 3.1, Exercises 1–12

Turn-in Problems

- 1 We've seen that a truth table of v different variables will have $r = 2^v$ rows. For instance, a truth table of $v = 2$ variables will have $r = 2^2 = 4$ rows:

A	B	$A \text{ op } B$
F	F	?
F	T	?
T	F	?
T	T	?

How many distinct truth tables are possible with $v = 2$ variables?

- 2 If possible, systematically write out each distinct truth table with $v = 2$ variables (you needn't come up with the Boolean expression represented by each truth table; just say " $A \text{ op } B$ ").

If this is not possible, explain why.

- 3 How many distinct truth tables are possible with $v = 3$ variables?
- 4 How many distinct truth tables are possible with an arbitrary number of variables, v ?
- 5 An operator (Boolean or otherwise) is *binary* if its value is determined by the values of exactly two operands. Similarly, a *nullary* operator depends on zero operands, and a *unary* operator depends on one operand. In general, an operator's *arity* is the number of operands it depends on.

Does each possible truth table of $v = 2$ variables represent a binary operator? Explain.