

Math 6d: Homework 6

HW#6 is due November 4th; submit to Google classroom 15 minutes before the class time.

Please, write clearly which problem you are solving and show all steps of your solution.

Logic variables are basic statements labeled with A, B, C, ..., that can be evaluated as T or F.

For example, $A = \text{"Bill is a knight"}$ and $C = \text{"Carl is a knight"}$ can be evaluated (answered) as True or False.

Logic operations AND, OR, NOT combine variables (statements) in more complicated statements. A **truth table** for a logic operation evaluates all possible combinations of two variables that are combined by the logic operation.

Examples: Operation AND: $A \text{ AND } B = \text{"Bill is a knight AND Carl is a knight"}$

Operation OR: $A \text{ OR } B = \text{"Bill is a knight OR Carl is a knight"}$,

Operations NOT: $\text{NOT } A = \text{" Bill is not a knight"}$.

Truth tables: be sure to use the truth tables for AND, OR, NOT , XOR, NOT

Homework questions

Instructions: questions 1 and 2 should be written on a separate sheet(s) of paper. Do not write on the printout.

For the Quiz preparation part (page 2 of the homework), write your answer on the printed page.

1. Verify the associative property of OR

Hint: create and fill out a truth table for the variables P , Q , and R , for the left and for the right side of the formula (equation). Then check if the left side is equal to the right side.

$$P \text{ OR } (Q \text{ OR } R) = (P \text{ OR } Q) \text{ OR } R:$$

(left side) ?= (right side)

(left side)

P	Q	R	$Q \text{ OR } R$	$P \text{ OR } (Q \text{ OR } R)$
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(right side)

P	Q	R	$P \text{ OR } Q$	$(P \text{ OR } Q) \text{ OR } R$
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How many rows do you have in a truth table for three logical variables?

2. In the same way as above, verify the associative property of XOR.

