California State University, Sacramento
College of Engineering and Computer Science

Computer Science 28: Discrete Mathematics

Spring 2017 – Assignment #1 – Basic Logic

About

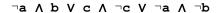Homework will be due in <u>one</u> week. It should be ready to turn-in at the beginning of lecture.

If you cannot turn-in your work in class, then you may submit your homework at Riverside Hall 3018 instead, but you must time-stamp and write "Cook CSc 28" across the top of your submission.

Boolean Algebra

1. Show that the following is a tautology or contradiction. Use a truth table.

    $(p \land q) \rightarrow (p \lor q)$

2. Simply the following. Use Boolean algebra. Label <u>all</u> the laws you apply.

    $\neg a \land b \lor c \land \neg c \lor \neg a \land \neg b$

Arguments

3. Write out and prove (or disprove) the following statement:

    "If I'm sleepy, then I'll drink coffee or tea. I'll never drink tea. <u>Therefore</u>, if I'm sleepy, then I'll drink coffee"

    Convert the English sentence to an argument (short notation). Then use any method you like to prove or disprove it:

4. The following argument from the movie *Monty Python and the Holy Grail*.

    "If it's made of wood then it floats. If it's a duck then it floats. Therefore, a duck is wood."

    Is it valid? Answer by converting the argument to its logical form and then validating the argument with a truth table. Show why.