

MTH 225: Discrete Structures for Computer Science

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Daily Preparation, Module 3B: Truth tables and logic gates

Due by: 11:59pm ET, Tuesday, September 22

Estimated time requirement: About 45-60 minutes for the whole assignment. *If you have worked on this assignment for 30 minutes and you're not at least halfway done, DON'T work any further — instead, stop and ask for help* on the `#dailyprep` channel on CampusWire. Remember these are graded just on completeness and effort — try to be right and understand everything, but don't get bogged down if you get stuck. Just give a good effort and move on, and ask a question.

Overview

In Module 3A we learned some of the basic language of logic — what a *proposition* or *statement* is, how to break complex statements down into their atomic parts, and how to identify the parts of a conditional statement. What makes a proposition what it is, is the idea that it is either **True** or **False**. The truth value of a complex proposition depends on the truth values of its atomic parts. In Module 3B, we'll look at how we can determine the conditions under which such propositions are true, by using a **truth table**.

What you will learn

Learning Targets addressed in this module:

- **L.4 (Core):** I can write the truth table for a logical statement.

BEFORE your class meeting, use the Resources for Learning (below) to learn how to do the following:

- Write a truth table for a basic conjunction, disjunction, conditional, biconditional, and negation.
- Define the term *tautology*

DURING AND AFTER your class meeting, you will learn how to do the following:

- Write a truth table for a molecular statement containing 1, 2, or 3 variables.
- Determine using a truth table whether a statement is a tautology or not.

Resources for Learning

Text: Read the following from *Discrete Mathematics: An Open Introduction*:

- [Section 3.1](#), up to (but not including) the section “Logical Equivalence”. (We’ll start there in Module 4.)

Video: These were made by me for MTH 210 (Communicating in Mathematics) but they work for MTH 225 as well. **I recommend watching at least the three of these.** Also “**Truth Tables Part 4**” deals with **statements with 3 variables rather than 2.**

- Truth tables for conditional statements (4:56) <https://www.youtube.com/watch?v=iT1FgtoeFx4>
- Truth tables, Part 1 (6:07) <https://www.youtube.com/watch?v=d2yKsDk4h6s>
- Truth tables, Part 2 (5:51) <https://www.youtube.com/watch?v=GKRryCRG4Tk>
- Truth tables, Part 3 (6:16) <https://www.youtube.com/watch?v=0j0DsAWbP7E>
- Truth tables, Part 4 (7:03) <https://www.youtube.com/watch?v=GD25pbPTFs>

You are free to search for and use other resources in addition to, or instead of the above, as long as you can work the exercises below.

Exercises

The exercises for this assignment are found at Classkick. Go to <http://app.classkick.com> and sign in (as a “Portfolio” student). If prompted, use the code `0M0 U8S`.

Submission, grading, and getting help

Submitting your work: Your work is to be done on Classkick using the link/code above. Classkick saves your work as you go, so there’s nothing to submit – just do the work and you’re good.

How this is graded: Daily Prep assignments are graded on the basis of *completeness and effort*: If your submission has **all parts completed** (no blank entries, even if left blank accidentally) and **a good-faith effort to provide a correct solution or explanation is given** (no responses of “I don’t know” or “I didn’t understand”) and **the work is submitted on time**, it gets a “check”. Otherwise it gets an “x”. If you are stuck on an item, you’re expected to ask questions and give your best effort.

Getting help on this assignment: *You may work with others on this assignment, but you may not copy each others’ answers.* Evidence of copying will be treated as academic dishonesty. You may also ask questions on the #dailyprep channel on CampusWire, but you may not ask simply to be given the answers; giving and receiving answers on CampusWire will be treated as academic dishonesty.

