MTH 225: Discrete Structures for Computer Science 1

Daily Preparation, Module 3A: Statements and logical connectives

Due by: 11:59pm ET, Sunday, September 20

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 3, we shift from looking at *numbers* to looking at the *logic* behind mathematics and computer science. Logic is what makes computers and programs work, and in this module we will learn how logic works! Part A of Module 3 focuses on distinguishing *logical statements* from non-statements, five important kinds of basic logical statements and the conditions under which they are true, and a special focus on *conditional statements* and different ways of stating them.

What you will learn

Learning Targets addressed in this module:

- **L.1:** I can use propositional variables and logical connectives to represent statements; and interpret symbolic logical statements in plain language.
- **L.2 (Core):** I can write the negation, converse, and contrapositive of a conditional statement and use DeMorgan's Laws to simplify symbolic logical expressions.

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

- Differentiate between a statement and a non-statement.
- Determine whether a statement is atomic or molecular; if molecular, identify the atomic statements that make it up.
- State the conditions under which a conjunction, disjunction, conditional, biconditional, and negation are true.
- Identify the hypothesis and conclusion of a conditional statement.

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

- Use propositional variables and logical connectives to represent statements; and interpret symbolic logical statements in plain language
- Determine whether a conditional statement is true.
- State the converse and contrapositive of a conditional statement.

Resources for Learning

Text: We will use the main textbook for the course for the first time in this module. Read the following from *Discrete Mathematics: An Open Introduction*:

- Section 0.2, up to (but not including) the box titled "Direct Proofs of Implications".
- Section 3.1, up to (but not including) the section "Logical Equivalence". (We'll start there in Module 3B.)

Video: The textbook should be all you need, but in case you want more (or don't like reading?), here are some supplementary videos you can watch. These were made by me for MTH 210 (Communicating in Mathematics) but they work for MTH 225 as well.

- Statements and Non-Statements (5:38) https://www.youtube.com/watch?v=UuETUEJo0r
- How do we know if a statement is true? (6:53) https://www.youtube.com/watch?v=z-TPb8hI58k
- Conditional statements (5:32) https://www.youtube.com/watch?v=1f2l2t4MAwk
- When are conditional statements true? (5:34) https://www.youtube.com/watch?v=9rz_iC2t0iE
- Truth tables for conditional statements (4:56) https://www.youtube.com/watch?v=iT1FgtoeFx4

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 `A7Z 3LH`.

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.