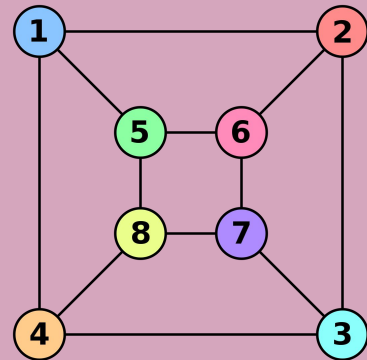


PROVE IT!

EECS 203 Discussion 1

Introduction to 203, Introduction to Proofs



Assignment Information:

Forms:

- There are a few forms due at the start of the semester, be sure to check Canvas.

Homework:

- Homework gets released late night on Thursdays or early Friday mornings and is due the next **Thursday at 10 pm on Gradescope** (you can submit up until 11:59 pm without penalty)
 - You **MUST match your pages to the problems** as different graders grade different problems and will ONLY see the pages you've link to their problem
 - Please note as soon as you press submit you've successfully submitted by the deadline, you can still match the pages with no rush, that doesn't add to your submission time.
- **Assignment 0** is released and will be graded

Weekly Check-Ins:

- Weekly check-ins were created to have a quick material check in order to encourage attendance. The idea is that the check-ins directly correlate with/follow the discussion.
- Same timeline as homework (on corresponding material)

Exams:

- Essentially three midterms, they are *not explicitly cumulative* as in the focus will be on the current material but old concepts can still apply and be used in later sections. For instance, if we teach sets on one exam and probability on a later exam, it would be fair game to have a probability question involving sets on the probability exam.
- Dates: **Oct 4, Nov 8, Dec 14 (all 7–9pm)**

Student Resources:

Piazza:

- The go-to place to ask questions about course content or logistics
- Please use your resources and search Piazza before posting. Getting duplicate questions is frustrating for staff as well as a questions like: what does a mod b mean? when it's defined in lecture/discussion. So FIRST look through your resources, THEN resort to Piazza. And search keywords in case your question has already been asked. :)

Office Hours:

- Meet with profs and IAs to ask questions about homework assignments, exam review, general concepts (in-person and virtual options available) and meet/work with peers!
- OH calendar linked on Canvas home page

Admin Form:

- Let course admin know about exam accommodations, time conflicts, extended illness, etc
- Do not send questions about material or homework here.
- Linked on the Canvas homepage

Regrade Requests on Gradescope:

- Read the posted solutions first, then submit your request with a detailed explanation.

Practice Problems (Coming Soon):

- We will be posting practice problems from the Rosen textbook with each section for additional practice

EVERYONE ON STAFF IS ROOTING FOR YOU AND HERE TO HELP. :) PLEASE REACH OUT TO ANY OF US AT ANY TIME WITH QUESTIONS OR CONCERNS ABOUT THE COURSE.

Discussion Resources:

Winter 2023

EECS 203 WN 2023 > Files > Discussion Materials

Home

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Assignments

Files

Quizzes

Syllabus

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EECS 203 WN 2023

- Admin & Logistics
- course_image
- Discussion Materials**
- 1. Discussion Worksheets
- 2. Discussion Solutions
- 3. Discussion Slides
- Lecture slides and Handouts
- Uploaded Media

Name ▲	Date Created	Date Modified	Modified By	Size
1. Discussion Worksheets	1:54pm			*Uploaded before discussion
2. Discussion Solutions	1:54pm			*Uploaded sometime Monday
3. Discussion Slides	1:55pm			*Uploaded sometime Monday

Recordings

- Lecture Recordings
 - Use the navigation bar on the left to access lecture recordings
- [Discussion Recordings](#)  ***Discussion times & links to discussion slides, and recording links**
 - recordings of discussions and review sessions

1. Meet your Classmates!

Say hello to your classmates. Your peers are an amazing resource, so this exercise is to help you meet some of them. In a group of 3 or more:

- a) Introduce yourself
- b) Write down each others' names and usernames
- c) Find one thing you all have in common



Getting into the 203 Mindset

Propositions & Negations

- **Propositions:** A proposition is a declarative statement (a sentence that declares a fact) that is either true or false, but not both.
 - a. It is raining.
 - b. $1 < 2$
 - c. I like cats and dogs.
- **Negation:** The negation of a proposition is a statement that always has the opposite truth value.
 - a. It is NOT raining
 - b. $1 \geq 2$
 - c. I don't like cats or I don't like dogs.

Proofs

- A **proof** shows that a **proposition** is true by a step-by-step explanation
- Each step should be easy enough to follow, even if the overall statement is not obvious
 - a. **Complete**
 - b. **Clear**
 - c. **Each step follows the previous**

Problem:

2. Propositions

Which of these are propositions? What are the truth values of those that are propositions?

- a) Do not pass go.
- b) What time is it?
- c) There are no black flies in Maine.
- d) The moon is made of green cheese.
- e) $2^n \geq 100$
- f) Your discussion leader's favorite number is 2
- g) $4 + x = 5$



Solution:

2. Propositions

Which of these are propositions? What are the truth values of those that are propositions?

- a) Do not pass go.
- b) What time is it?
- c) There are no black flies in Maine.
- d) The moon is made of green cheese.
- e) $2^n \geq 100$
- f) Your discussion leader's favorite number is 2
- g) $4 + x = 5$

Solution:

- a) This is **not** a proposition; it's a command and does not have a truth value.
- b) This is **not** a proposition; it's a question.
- c) This **is** a proposition that is false, as anyone who has been to Maine knows.
- d) This **is** a proposition that is false.
- e) This is **not** a proposition; its truth value depends on the value of n . This is a predicate, which you will hear more of later.
- f) This **is** a proposition, even if you don't know whether it is true or false.
- g) This is **not** a proposition; its truth value depends on the value of x . This is also a predicate.



Problem:

3. Beginning to Think Logically ★

Find the negations of each of the following statements. Discuss with a neighbor what that negation means and if there are any other ways to express that statement. (*We will formally define some rules for logic later on.*)

- a) I am a student.
- b) My sister and my mom like ice cream.
- c) I will wear a dress or skirt today.
- d) We all have phones.
- e) Nobody knows everything.
- f) Someone in this class is a math major.



Solution:

3. Beginning to Think Logically ★

Find the negations of each of the following statements. Discuss with a neighbor what that negation means and if there are any other ways to express that statement. (*We will formally define some rules for logic later on.*)

- | | |
|---|---|
| a) I am a student. | d) We all have phones. |
| b) My sister and my mom like ice cream. | e) Nobody knows everything. |
| c) I will wear a dress or skirt today. | f) Someone in this class is a math major. |

Solution:

- a) I am not a student.
- b) My sister does not like ice cream or my mom does not like ice cream.
- c) I will not wear a dress nor a skirt today.
Equivalently, I will not wear a dress and I will not wear a skirt today.
- d) We don't all have phones.
In other words, at least one of us does not have a phone.
- e) Somebody knows everything
- f) No one in this class is a math major.



Logic

Logical And

$p \wedge q$

- Means if p is true and q is true, then the preposition $p \wedge q$ is true
- Otherwise the preposition is false

P	Q	$P \wedge Q$
T	T	T
T	F	F
F	T	F
F	F	F

Logical Or

$p \vee q$

- Means if p is true or q is true (or both are true), then the preposition $p \vee q$ is true
- Otherwise the preposition is false

P	Q	$P \vee Q$
T	T	T
T	F	T
F	T	T
F	F	F

Logical Not

$\neg p$

- Negation

P	$\neg P$
T	F
F	T

Logical Implication

$$p \rightarrow q$$

- “ p implies q ” or “if p , then q ”

P	Q	$P \rightarrow Q$
T	T	T
T	F	F
F	T	T
F	F	T

Problem:

4. Truth Tables

Fill in the following truth table.

***Reminder:** \wedge denotes “and”, \vee denotes “or”, and \rightarrow denotes “implies” / “if... then”.

p	q	r	$p \rightarrow q$	$q \rightarrow r$	$(p \rightarrow q) \wedge (q \rightarrow r)$	$p \vee r$	$[(p \rightarrow q) \wedge (q \rightarrow r)] \rightarrow (p \vee r)$
T	T	T					
T	T	F					
T	F	T					
T	F	F					
F	T	T					
F	T	F					
F	F	T					
F	F	F					

Solution:

p	q	r	$p \rightarrow q$	$q \rightarrow r$	$(p \rightarrow q) \wedge (q \rightarrow r)$	$p \vee r$	$[(p \rightarrow q) \wedge (q \rightarrow r)] \rightarrow (p \vee r)$
T	T	T	T	T	T	T	T
T	T	F	T	F	F	T	T
T	F	T	F	T	F	T	T
T	F	F	F	T	F	T	T
F	T	T	T	T	T	T	T
F	T	F	T	F	F	F	T
F	F	T	T	T	T	T	T
F	F	F	T	T	T	F	F

Problem:

5. Logic Puzzle

Knights always tell the truth and Knaves always lie. Figure out what A and B are in each scenario!

- a) A says, "Either I am a Knave, or B is a Knight."
- b) A says, "I am a Knave, but B isn't."

Solution:

5. Logic Puzzle

Knights always tell the truth and Knaves always lie. Figure out what A and B are in each scenario!

- a) A says, "Either I am a Knave, or B is a Knight."
- b) A says, "I am a Knave, but B isn't."

Solution:

- a) A is a Knight and B is a Knight. A cannot be a Knave, because then their claim would be a truth. Because A must be a Knight and can only tell the truth, B must be a Knight.
- b) A is a Knave and B is a Knave. If A were a Knight, A would not be able to claim to be a Knave. In order to make A's statement a lie, B must be a Knave.