CSE 191
Introduction to Discrete Structures

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Announcements

- Midterm is Wednesday 3/8/23 during class
  - 50 minutes to complete
  - Equivalence laws and inference rules will be provided
  - You may bring your own cheatsheet – One 8.5x11 sheet, front and back
  - Covers up to basic set operations (cartesian product/powerset excluded)
Topics Covered

1. Propositional Logic
2. Logical Equivalence
3. Predicates and Quantifiers
4. Logical Reasoning and Proofs
5. Sets
Propositional Logic

- **Subtopics:** Propositions, Logical Operators, Truth Tables
- **What you should know/be able to do:**
  - Understand what is and is not a proposition
  - Be able to determine the truth value of a proposition
  - Be able to construct truth tables for compound propositions
  - Be able to translate from symbolic representation to English
  - Be able to translate from English to symbolic representation
Logical Equivalence

- **Subtopics:** Laws of Equivalence, Proofs of Logical Equivalence
- **What you should know/be able to do:**
  - Understand what it means to be a tautology/contradiction
  - Understand what it means to be logically equivalent
  - Be able to show logical equivalence with truth tables
  - Understand how to apply logical equivalence laws to a proposition
  - Understand how to prove logical equivalence of two propositions
Predicates and Quantifiers

- **Subtopics**: Predicate Logic, Quantifiers
- **What you should know/be able to do**:  
  - Understand what a predicate is  
  - Understand when a predicate is also a proposition  
  - Understand what quantifiers are  
  - Be able to translate from symbolic form to English and vice versa  
  - Understand how variable binding works  
  - Understand quantifier negation
Logical Reasoning and Proofs

- **Subtopics:** Arguments, Inference Rules, Proof Methods
- **What you should know/be able to do:**
  - Understand what an argument is
  - Know what it means for an argument to be valid/invalid
  - Be able to construct logical reasoning proofs to show argument validity
  - Understand the basic mathematical proof methods discussed in class
  - Be able to construct a proof of a given statement using a specific method
Sets

- **Subtopics:** None
- **What you should know/be able to do:**
  - Understand the basics of what a set is
  - Be able to describe a set using roster notation and set builder notation
  - Understand what it means to be an element of a set
  - Understand what it means to be a subset of a set
  - Understand what it means for sets to be equal (and how to show it)
  - Understand the different set operations and be able to apply them