COT 3100

Applications of Discrete Structures

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Abstract

These notes are intended as a resource for myself; past, present, or future students of this course, and anyone interested in the material. The goal is to provide an end-to-end resource that covers all material discussed in the course displayed in an organized manner. If you spot any errors or would like to contribute, please contact me directly.

1 Foundations of Logic: Overview

- Propositional Logic
  - Basic Definitions
  - Equivalence Rules & Derivations
- Predicate Logic
  - Predicates
  - Quantified Predicate Expressions
  - Equivalences & Derivations

1.1 Propositional Logic

Definition 1.1 (Propositional Logic)**.** The logic of compound statements built from simpler statements using *Boolean Connectives*

Basic Definitions

Definition 1.2 (Propositional Logic)**.** A ***proposition (p, q, r, ...)*** is simply a *statement i.e. a declarative sentence) with a definite meaning*, having a *truth value* that's either *true* or *false* (never both, neither, or somewhere in between)

Equivalence Rules & Derivations

1.2 Predicate Logic

Predicates

Quantified Predicate Expressions

Equivalences & Derivations