

# CISC 1400

## Discrete Structures

Review Topics  
Midterm Exam

Arthur G. Werschulz

Fordham University Department of Computer and Information Sciences  
Copyright © Arthur G. Werschulz, 2019. All rights reserved.

Summer, 2019

## General info

- ▶ Date: Monday 10 June 2019
- ▶ 110 points' worth of questions on Chapters 1–4
- ▶ Graded on a 100-point basis
- ▶ Questions based on exercises on text (either assigned or unassigned)
- ▶ One double-sided  $8\frac{1}{2} \times 11$ -inch sheet of notes

1/6

2/6

## Chapter 1: Sets

- ▶ Operations ( $\in, \subset, \subseteq, \cap, \cup, -, \times, \mathcal{P}, ', |\cdot|$ )
- ▶ Venn diagrams
- ▶ Principle of inclusion/exclusion

3/6

## Chapter 2: Sequences

- ▶ Sequences
  - ▶ What is the next term in a sequence?
  - ▶ Determine recursive formula for a sequence
  - ▶ Determine closed formula for a sequence
- ▶ Summation notation
- ▶ Proof by induction

4/6

## Chapter 3: Logic

- ▶ English into propositions (and vice versa)
- ▶ Operations  $'$ ,  $\wedge$ ,  $\vee$ ,  $\oplus$ ,  $\Leftrightarrow$ ,  $\Rightarrow$
- ▶ Propositional equivalence
- ▶ Truth tables
  - ▶ Definition of operations
  - ▶ Proving and disproving propositional equivalences and implications
- ▶ Parse trees
- ▶ Duality
- ▶ Predicates

5/6

## Chapter 4: Relations

- ▶ Relation from  $X$  to  $Y$ : set of ordered pairs from  $X \times Y$ .
- ▶ Relation on  $X$ : relation from  $X$  to  $X$
- ▶ Terminology
  - ▶ domain
  - ▶ codomain
  - ▶ rule or description
- ▶ Understand descriptions of relations:
  - ▶ a set of pairs
    - ▶ explicit listing
    - ▶ a rule:  $\{(x,y) \in X \times Y : p(x,y)\}$  for some predicate  $p: X \times Y \rightarrow \{\text{True}, \text{False}\}$
  - ▶ a graph
- ▶ Know whether a relation on some set satisfies the five properties:
  - ▶ reflexive
  - ▶ irreflexive
  - ▶ symmetric
  - ▶ antisymmetric
  - ▶ transitive

6/6