RUTGERS
UNIVERSITY | NEWARK

Math 237
Discrete Structures

Fall 2017

List of topics for Exam #2

Topics: The list of topics for Exam #2 includes all covered sections of Chapter 3 and Chapter 4.

Chapter 1: Sets and Logic; Chapter 2: Proofs

You should probably quickly review Chapter 1 and Chapter 2, at least go through the lecture notes carefully.

Chapter 3: Functions, Sequences and Relations

Review all covered sections of Chapter 3 in depth:

- **3.1** Definition of a relation. Diagram of a relation. Definition of a function. Notations and Terminology. Injective, Surjective and Bijective functions. Composition of functions. Graphs. Unary and Binary Operators.
- **3.2** Definition of a sequence of elements of any set. Finite sequences. Summation and Product symbols. Increasing, Decreasing, Nonincreasing and Nondecreasing Sequences. Strings and substrings. Concatenation of strings. Terminology.
- **3.3** Relations. Digraph of a relation on a set. Properties of relations: Functional, Reflexive, Symmetric, Antisymmetric, Transitive, Partial order, Equivalence relation.
- **3.4** Equivalence relations. Equivalence classes. Connection to Partitions. Classical examples of equivalence relations.

Chapter 4: Algorithms

Review all covered sections of Chapter 4 in depth:

- **4.1** Definition and characteristics of algorithms. Pseudocode. Example.
- **4.2** Classical algorithms. Insertion sort. Tracing an algorithm.
- **4.3** Analysis of algorithms. Complexity. Big O, Θ, and small o notation. Examples.

Review material:

> **Lecture notes** and supporting **textbook**.

> **Homework exercises:** refer to the online course schedule for the homework assignments corresponding to the topics in the list of topics.

> **Quizzes:** Quizzes 5, 6. Refer to the course schedule for the past quizzes and their solutions. Make sure you read all the solutions carefully.

General advice

- Your lecture notes from class should be your primary source of information. You are expected to know all the material in your lecture notes, and no other. Review your lecture notes regularly and thoroughly.
- Remember that all past quizzes, tests and homework exercises are available on the course web page. Make sure you go over all of them (or as many as you can).
- It is of the utmost importance that you work hard on your homework problems: do as many exercises as possible, and as seriously as possible. Just finding the correct answer is not sufficient: you need to understand why it is correct and you need to be able to write the proper justifications.
- I am happy to answer your questions, as long as: 1. They are mathematical questions, and 2. You have made a genuine effort to think about your question before contacting me.
- The best way to prepare for the exams is to work regularly: make sure you understand all the material as it is being taught, do many homework exercises, etc. Don't wait until the last moment to prepare. Don't try to guess what will be on the test, your time is best spent preparing for every possibility.
- Do not expect the test to be solely a direct application of the material you reviewed. It will require you to be capable of original thinking.
- Calculators will not be allowed, nor any other resources.