

# CSE 2321 Foundations I

## Spring 2024 Dr. Estill

### Topic Guide for Midterm I

The broad (bulleted, first-level) topics are complete, but the dashed, second-level topics may be just a sample.

- Propositional Logic (*check out the "Further Notes" in the "Extra Resources" Module in Carmen*)
  - Use a truth table to see whether an argument is valid or not.
  - Use a truth table to see whether a compound proposition is a tautology, a contradiction, or a contingency.
  - Know the disjunctive normal form, especially as used in the proof of universality of  $\{\wedge, \neg, \vee\}$ .
- Set theory (*check CLRS<sup>1</sup> appendix B.1*)
  - Power sets
- Predicate logic (*check out the (other) "Further Notes" on Carmen*)
  - Order of quantifiers
  - Negating quantifiers
- Proof by Induction
- Asymptotic analysis (*read CLRS chapter 2 for the basic idea and chapter 3 for the asymptotic sets*)
  - Know the basic definitions of the asymptotic growth sets,
    - \* how to guess an appropriate comparison function,
    - \* how to use these definitions and inequalities to show that a given function is in an asymptotic growth set of a given comparison function, and
    - \* how to use limits to prove the same thing; and
  - how to turn **FOR** loops (and possibly **WHILE** loops) into summation formulas (*read CLRS Appendix A for a basic review of sums*).

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<sup>1</sup>Our textbook *Introduction to Algorithms* by Cormen, Lieserson, Rivest, & Stein.