CS 3233 Final Review
Practice Problems

Chapter 1

Key Terms and Results (pp. 111–113): all Logic terms except for "free variable", all Methods of Proof term except "constructiv existence proof" through "uniqueness proof", all Set terms except for "membership table", all Function terms except "$f \circ g$ (composition of f and g).

Review Questions (pp. 113–114): 1a, 2a, 4a, 4c with truth tables, 6–9, 11, 14, 15, 17a, 18, 20, 22.

Supplementary Exercises (pp. 114–116): 2, 3, 5, 11, 14–17, 16, 34–46. 47ab, 50–52.

Chapter 2

Key Terms and Results (pp. 206–207): the terms from "algorithm" to "sorting", "$O(g(x))$", "time complexity" to "composite", "gcd(a,b)", "a mod b", "base b representation" to "octal representation", "matrix" to "matrix multiplication", "zero-one matrix", and "Boolean product". For results, see algorithms in class notes.

Review Questions (pp. 208–209): 1–4, 6–8, 12acd, 14 (convert decimal to binary), 21, 22.

Supplementary Exercises (pp. 209–210): 1–5, 8, 13, 14, 16, 23–25, 35, 42.

Chapter 3

Key Terms and Results (pp. 290–291): Term from "sequence" to $\sum_{i=1}^{n}$, from "mathematical induction" to "recursive definition of a function", "recursive algorithm", and "iteration". First two results.

Review Questions (pp. 291–292): 4, 5, 9–11, 14, 15.

Supplementary Exercises (pp. 292-297): 10–22, 28, 29, 31, 33, 41 (write a recursive algorithm), 43, 53

Chapter 4

Key Terms and Results (p. 349): All terms and results up to and including "Binomial Theorem".

Review Questions (pp. 349–350): 1-9, 12ac.

Supplementary Exercises (pp. 350–353): 1abc, 2abc, 3, 4, 6-12, 14, 15, 18, 20, 22–24, 27–29, 34–36, 39–42.

Chapter 5

Key Terms and Results (p. 394): from "probability of an event" to "random variable", "Bernoulli trial", and "probabilistic algorithm".

Review Questions (p. 395): 1–5, 8.

Supplementary Exercises (pp. 395–398): 1, 2, 11ab, 15–18, 21, 22.

Chapter 6

Key Terms and Results (p. 465): "recurrence relation" and "initial conditions for a recurrence relation".

Review Questions (p. 466): 1, 4.

Supplementary Exercises (pp. 466–468): 1-5.

Chapter 7

Key Terms and Results (pp. 530–531): "binary relation" to "relational data model", from "projection" to "circuit", "equivalence relation", and "partial ordering". The closure results and Warshall's algorithm.

Review Questions (p. 532): 1-10, 14.

Supplementary Exercises (pp. 533–535): 1-3, 7-9, 14a, 16ab, 20.

Chapter 8

Key Terms and Results (pp. 622–623): the terms from "undirected edge" to "simple graph"; "directed graph"; "adjacent"; "incident"; the terms "degree", "in-degree", and "out-degree", but not the notation; "underlying directed graph"; "adjacency matrix"; from "path ..." items to "connected graph"; "strongly connected directed graph"; "weighted graph"; "shortest-path problem"; and Dijkstra's algorithm.

Review Questions (pp. 623–624): 1-3, 5, 9 (ignore incidence matrix), 11a, 12ac, 15, 16.

Other Chapter 8 Exercises: [The Supplementary Exercises are generally weird, so I am providing a selection of other exercises.] 8.1.1-10, 8.2.1, 8.2.7, 8.2.26-29, 8.3.1-8, 8.3.10-12, 8.4.1-5, 8.4.18-19, 8.6.1-13, 8.6.17.

Chapter 9

Key Terms and Results (pp. 694–695): All terms up to "ordered tree", and "tree traversal" to "minimal spanning tree". First six results (for $m = 2$, i.e., binary trees), and depth-first search to Kruskal's algorithm.

Review Questions (pp. 696): 1-7, 10, 11, 15, 16, 18, 19.

Other Chapter 9 Exercises: 9.1.1-10, 9.1.17-20, 9.3.7-19, 9.3.22-24, 9.5.1-6, 9.5.13-16, 9.6.1-8.

Chapter 11

Key Terms and Results (pp. 783): the terms from "alphabet" to "Backus-Naur form" (except "type 1 grammar" and "type 3 grammar"), and "Turing machine".

Review Questions (pp. 784): 1, 2, 14.

Supplementary Exercises (pp. 784–786): 3, 5, 6.

Other Chapter 11 Exercises: 11.1.1-2, 11.1.5, 11.1.7, 11.1.16-18, 11.5.1-2, 11.5.5-6, 11.5.9-10, 11.5.16-17.