

Math 118 G1

Exam #1 Review

This is NOT necessarily a complete list of topics that you should know. Consult your class notes to see what we have covered, and meet with me to discuss any material that you do not understand.

Chapter 1

1. Determine if a graph is connected.
2. Construct the graph of a given street network.
3. Determine the valence of each vertex of a graph.
4. Define an Euler circuit.
5. List two conditions for an Euler circuit to exist (Euler's Theorem).
6. If a graph contains an Euler circuit, find one such circuit.
7. If a graph does not contain an Euler circuit, "eulerize" the graph to find a best possible circuit.
8. Identify some problems that use Euler circuits in their solutions.

Chapter 2

1. Give the definition of a Hamiltonian circuit.
2. Explain the difference between an Euler circuit and a Hamiltonian circuit.
3. Know which problems are solved with Euler circuits and which are solved with Hamiltonian circuits.
4. Know how to compute $n!$ for small values of n (i.e., $n = 2, 3, 4$).
5. Determine the number of distinct Hamiltonian circuits on a complete graph with n vertices.
6. Give an advantage and a disadvantage of a heuristic algorithm.
7. Explain why the method of trees ("brute force") algorithm is not a reasonable solution to finding minimum-cost Hamiltonian circuits.
8. Know the nearest-neighbor and sorted edges algorithms, and how to apply them.
9. Know what trees and spanning trees are.
10. Know Kruskal's algorithm and how to use it to find minimum-cost spanning trees.

11. Find the critical path and earliest completion time of a set of tasks using an order requirements digraph.

Chapter 3

1. Describe the list-processing algorithm, and apply it to find schedules for a set of tasks.
2. Know how to determine if a schedule is optimal using two different methods.
3. Use the critical path scheduling method to determine a priority list.

General concepts

1. Know the different algorithms and what the input and output of each algorithm is.
2. Know what algorithms can be used to solve what problems, with examples.