

Topics that might be on the third examination on November 22 2022

Repeated topics from the second test study guide:

Asymptotic complexity classes.

A few time complexity and recurrence problems, since not everyone has mastered them.

Be able to write pseudocode:

1. Floyd Warshall algorithm.
2. Bellman Ford algorithm.

Be able to step through Dijkstra's algorithm for a small graph.

Johnson's algorithm.

Given a figure showing a weighted directed graph with some negative weights, update the weights on edges so that there are no negative weights.

What is the worst-case time complexity for each of those four algorithms?

Dynamic Programming, possibly with memoization.

Find components of an undirected graph using union/find.

Additional topics.

Simple True/False and fill in the blanks questions.

Classes of data structures (search structure, priority queue, etc.)

Implementation of data structures using linked lists and arrays.

Dynamic programming.

Finding strong components of a directed graph using DFS.

Cuckoo hashing.

All kinds of hashing.

Dynamic programming.

Graham scan and amortized analysis.

Median of medians algorithm for selection.

Compressing higher dimensional arrays (including arrays that are not rectangular) into one dimension in main memory.

Kruskal's algorithm using union/find.

A* algorithm.

Sparse structures.

What are the practical implications of a problem being NP-complete?