MEM291 Design and Analysis of Algorithms

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Preparing for the final exam

The final exam is scheduled for **Thursday, 11 January 2024, 12:00–14:00**. It will be a closed-book exam. You will be required to answer questions on the topics listed below and be able to apply, say, a sorting algorithm to some number sequence, determing the running time of some algorithm, solve a recurrence realtion, or show the steps of a graph traversal method.

The exam will cover the following topics:

1. Insertion sort. The characterization of running times. Asymptotic notation. The O-notation, the Θ-notation and the Ω-notation.
2. Divide and conquer. The merge sort algorithm.
3. The substitution method for solving recurrences. Recursion trees. The master theorem for solving recurrences.
4. The heap sort algorithm. Heaps and priority queues.
5. The quicksort algorithm and its analysis. Lower bounds for sorting.
6. Dynamic programming principles. Matrix-chain multiplication. The longest common subsequence problem.
7. Greedy algorithms. Elements of the greedy strategy.
8. Graph concepts and representations of graphs. The BFS and DFS traversals and their applications.