CSCE 629-601 Analysis of Algorithms

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Course Prerequisites

Undergraduate data structures and algorithms, and discrete mathematics. I will be assuming that you are familiar with the topics listed below. Discussion on these materials can be found in our textbook. Some of the materials here may be quickly reviewed in class.

- pseudo-code for describing algorithms
- big-Oh notation and complexity analysis (e.g., is $O(n) = O(n^2)$?)
- related (discrete) mathematics foundations (e.g., proof by induction, proof by contradiction)
- data structures such as lists, stacks, queues, and binary trees
- sorting: insertion sort, selection sort, mergesort, quicksort, heapsort, radix sort
- basic graph concepts and representations
- depth-first search and breadth-first search
- algorithms based on DFS and BFS (e.g., connectivity, no-cycle, bi-connectivity)
- Dijkstra's algorithm, Kruskal's algorithm
- Strassen's matrix multiplication algorithm
- general idea of P, NP, and NP-completeness
- basic probability theory (e.g., what is the probability to win a lottery?)
- basic combinatorics (e.g., $\sum_{r=1}^{n} r^2 = ?$)
- experience in programming using a popular language (e.g., C++, Java)