The Design and Analysis of Algorithms

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1. Define various algorithms and data structures used in the design and analysis of algorithms.
2. Apply asymptotic notations to analyze the efficiency of algorithms.
3. Develop non-recursive and recursive algorithms for solving computational problems.
4. Evaluate algorithms using the brute force method and assess their efficiency.
5. Implement and analyze sorting algorithms such as selection sort, bubble sort, insertion sort, merge sort, and quick sort.
6. Understand and apply divide and conquer techniques in algorithm design.
7. Implement graph algorithms such as Depth First Search (DFS) and Prim's algorithm for solving graph-related problems.
8. Analyze algorithms using lower-bound arguments to determine best-case efficiency.
9. Develop and analyze backtracking algorithms for solving optimization problems.
10. Apply algorithms to solve the Hamiltonian circuit problem and the traveling salesperson problem.