Introduction to CS - Terms

CHAPTER 3

- **Analysis of algorithms:** The process of determining the time and space efficiency of an algorithm, resulting in a function described with Θ notation.
- **Approximation algorithm:** A solution to a possibly intractable problem that is not guaranteed to give the best answer, but gives a good approximation of the best answer in a tractable amount of time.
- **Benchmarking:** The process of timing an algorithm on a particular machine and system in order to determine how it performs. This process is usually used to evaluate a machine and system, rather than a particular algorithm.
- **Best case:** For a particular size of input, the least work an algorithm could do based on the configuration of the input values.
- **Binary search algorithm:** An algorithm that searches for a particular value in a sorted list of values and runs in $\Theta(lg\ n)$ time in the worst case.
- **Bin-packing problem:** Given a list of objects and some bins, find the minimum number of bins required to contain the objects. A difficult, probably intractable problem.
- **Brute force algorithm:** An algorithm that tries all possible solutions in order to find the optimal solution.
- **Correctness:** An attribute of an algorithm that says that it solves the correct problem in the correct way.
- **Ease of understanding:** An attribute of an algorithm that describes how easy it is to understand and modify the algorithm.
- **Efficiency:** An attribute of an algorithm that captures the time and space requirements of the algorithm.
- **Elegance:** An attribute of an algorithm that captures the cleverness and sophistication of the algorithm.
- **Exponential algorithm:** An algorithm that runs in $\Theta(2^n)$ or worse.
- **Hamiltonian circuit:** Find a path through the graph that visits each node in the graph once and returns to the start node. A graph problem that is probably intractable.
- **Intractable:** A description of a problem or algorithm where the best-known performance is $\Theta(2^n)$.
- **Order of magnitude:** The general form of the curve that a particular function exhibits, for instance, linear, quadratic, polynomial, or exponential.
- **Polynomially bounded:** A problem that has a known polynomial time algorithm.
- **Program maintenance:** The task of maintaining and updating a piece of software once it has been created and released for public use.
- **Searching:** The problem of finding a particular value in a list of values.
- **Selection sort algorithm:** An algorithm for sorting a collection of values that repeatedly finds the largest values in the unsorted section of the list and moves them into the correct position.
- **Sorting:** The problem of ordering a collection of values into some specified order: alphabetic, numeric, and so on.
- **Worst case:** For a particular size of input, the most work an algorithm might have to do based on the configuration of the input values.