**Analysis of algorithms**:

The theoretical study of computer-program performance and resource usage.

**Kinds of analyses**

1. **Worst-case:** (usually)

T(n) = maximum time of algorithm on any input of size n.

1. **Average-case:** (sometimes)

T(n) = expected time of algorithm over all inputs of size n.

• Need assumption of statistical distribution of inputs.

1. **Best-case:** (bogus)

• Cheat with a slow algorithm that works fast on some input.

**Asymptotic Notations:**

* A way to describe behavior of functions in the limit
* Describe the running time of an algorithm as n grows to limit
* (O) notion: Asymptotic ‘less than’: f(n) ≤ g(n)
* (Ω) notion: Asymptotic ‘Greater than’: f(n) ≥ g(n)
* (θ) notion: Asymptotic ‘equals’: f(n) = g(n)

**Analysis of Algorithms**

1. Methods for Solving non-recurrences

2. Methods for Solving Recurrences

* Iteration method
* Substitution method
* Recursion tree method
* Master method