**Recursion and Efficiency**

**Recursion Advantages:**

* Recursion often produces short and clean solutions to complex problems.
* Recursive solutions can be easier to understand and to describe than iterative solutions.

**Recursion Disadvantages:**

* Recursion can often be inefficient compared to iterative solutions.

**Two factors contribute to the inefficiency of some recursive solutions:**

1. The overhead associated with function calls
2. The inherent inefficiency of some recursive algorithms

* The first of these factors does not pertain specifically to recursive functions but is true of functions in general.
* In most implementations of C++ and other high-level programming languages, a function call incurs a certain amount of bookkeeping overhead.
* Each function call produces an activation record, which is analogous to a box in a box trace.
* Recursive functions magnify this overhead because a single initial call to the function can generate a large number of recursive calls. For example, the call factorial(n) generates n recursive calls. On the other hand, the use of recursion, as is true of modularity in general, can greatly clarify complex programs. This clari- fication frequently more than compensates for the additional overhead.