# Recursive Algorithm

Recursion is a programming technique where **a function calls itself** to solve smaller instances of the same problem. It breaks down complex problems into simpler, repetitive steps until reaching a base case

**Problem simplification**

1. **Mirrors Natural Thinking**
   * Many problems (e.g., tree traversals, Fibonacci sequences) are naturally recursive.
   * Example: Directory traversal (each folder contains subfolders).
2. **Reduces Code Complexity**
   * Avoids nested loops for hierarchical structures.
   * Example: QuickSort (recursively sorts subarrays).
3. **Elegance for Divide-and-Conquer**
   * Breaks problems into smaller identical subproblems

# When to use recursion

**Hierarchical data** (trees, graphs, file systems).  
 **Problems with recursive definitions** (factorials, Fibonacci).  
 **Backtracking algorithms** (solving puzzles like Sudoku).