

The background features a large, semi-transparent watermark of the NPTEL logo. It consists of a circular emblem with a stylized flower or sunburst in the center, surrounded by a ring of rectangular blocks. Below the emblem, the word "NPTEL" is written in large, bold, sans-serif capital letters.

NPTEL MOOC, JAN-FEB 2015
Week 2, Module 1

DESIGN AND ANALYSIS OF ALGORITHMS

Arrays and lists

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Sequences of values

- * Two basic ways of storing a sequence of values
 - * Arrays
 - * Lists
- * What's the difference?

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Arrays

- * Single block of memory
 - * Typically fixed size
- * Indexing is fast
 - * Access $A[i]$ in constant time for any i
- * Inserting an element between $A[i]$ and $A[i+1]$ is expensive
- * Contraction is expensive

Lists

- * Values scattered in memory
 - * Each element points to the next—“linked” list
 - * Flexible size
- * Follow i links to access $A[i]$
 - * Cost proportional to i
- * Inserting or deleting an element is easy
 - * “Plumbing”

Operations

- * Exchange $A[i]$ and $A[j]$
 - * Constant time in array, linear time in lists
- * Delete $A[i]$ or Insert v after $A[i]$
 - * Constant time in lists (if we are already at $A[i]$)
 - * Linear time in array
- * Algorithms on one data structure may not transfer to another
 - * Example: Binary search