List of data structures

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This is a list of data structures. For a wider list of terms, see list of terms relating to algorithms and data structures. For a comparison of running time of subset of this list see comparison of data structures.

Data types [edit]

Primitive types [edit]

- Boolean, true or false
- Character
- Floating-point, single-precision real number values
- Double, a wider floating-point size
- Integer, integral or fixed-precision values
- Enumerated type, a small set of uniquely named values

Composite types [edit]

(Sometimes also referred to as Plain old data structures.)

- Array
- Record (also called tuple or struct or class)
- Union
- Tagged union (also called a variant, variant record, discriminated union, or disjoint union)

Abstract data types [edit]

- Array
- Container
- Map/Associative array/Dictionary
- Multimap
- List
- Set
- Multiset/Bag
- Priority queue

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Main page
Contents
Featured content
Current events
Random article
Donate to Wikipedia
Wikipedia store

Interaction
Help
About Wikipedia
Community portal
Recent changes
Contact page

Tools
What links here
Related changes
Upload file
Special pages
Permanent link
Page information
Wikidata item
Cite this page

Print/export
Create a book
Download as PDF
Printable version

Languages
हिन्दी
Italiano
Magyar
Русский
ไทย
Türkçe
Українська
Tiếng Việt
中文
Edit links

- Queue
- Double-ended queue
- Stack
- String
- Tree
- Graph

Some properties of abstract data types:

Structure	Stable	Unique	Cells per Node
Bag (multiset)	no	no	1
Set	no	yes	1
List	yes	no	1
Map	no	yes	2

"Stable" means that input order is retained.

Other structures such as "linked list" and "stack" cannot easily be defined this way because there are specific operations associated with them.

Linear data structures [edit]

A data is said to be linear if its elements form a sequence.

Arrays [edit]

- Array
- Bit array
- Bit field
- Bitboard
- Bitmap
- Circular buffer
- Control table
- Image
- Dynamic array
- Gap buffer
- Hashed array tree
- Heightmap
- Lookup table
- Matrix
- Parallel array
- Sorted array
- Sparse array
- Sparse matrix
- Iliffe vector
- Variable-length array

Lists [edit]

- Doubly linked list
- Array list
- Linked list
- Self-organizing list
- Skip list
- Unrolled linked list
- VList
- Xor linked list
- Zipper
- Doubly connected edge list
- Difference list
- Free list

Trees [edit]

Main article: Tree (data structure)

Binary trees [edit]

- AA tree
- AVL tree
- Binary search tree
- Binary tree
- Cartesian tree
- Order statistic tree
- Pagoda
- Randomized binary search tree
- Red-black tree
- Rope
- Scapegoat tree
- Self-balancing binary search tree
- Splay tree
- T-tree
- Tango tree
- Threaded binary tree
- Top tree
- Treap
- Weight-balanced tree
- Binary data structure

B-trees [edit]

- B-tree
- B+ tree
- B*-tree
- B sharp tree
- Dancing tree
- 2-3 tree
- 2-3-4 tree
- Queap
- Fusion tree
- Bx-tree
- AList

Heaps [edit]

- Heap
- Binary heap
- Weak heap
- Binomial heap
- Fibonacci heap
  - AF-heap
- Leonardo Heap
- 2-3 heap
- Soft heap
- Pairing heap
- Leftist heap
- Treap
- Beap
- Skew heap
- Ternary heap
- D-ary heap
- Brodal queue

Trees [edit]

In these data structures each tree node compares a bit slice of key values.

- Trie
- Radix tree
- Suffix tree
- Suffix array
- Compressed suffix array
- FM-index
- Generalised suffix tree
- B-trie
- Judy array
- X-fast trie
- Y-fast trie
- Ctrie

Multiway trees [edit]

- Ternary tree
- K-ary tree
- And–or tree
- (a,b)-tree
- Link/cut tree
- SPQR-tree
- Spaghetti stack
- Disjoint-set data structure
- Fusion tree
- Enfilade
- Exponential tree
- Fenwick tree
- Van Emde Boas tree
- Rose tree

Space-partitioning trees [edit]

These are data structures used for space partitioning or binary space partitioning.

- Segment tree
- Interval tree
- Range tree
- Bin
- Kd-tree
- Implicit kd-tree
- Min/max kd-tree
- Adaptive k-d tree
- Quadtree
- Octree
- Linear octree
- Z-order
- UB-tree
- R-tree
- R+ tree
- R* tree
- Hilbert R-tree
- X-tree
- Metric tree
- Cover tree
- M-tree
- VP-tree
- BK-tree

- Bounding interval hierarchy
- BSP tree
- Rapidly exploring random tree

Application-specific trees [edit]

- Abstract syntax tree
- Parse tree
- Decision tree
- Alternating decision tree
- Minimax tree
- Expectiminimax tree
- Finger tree
- Expression tree
- Log-structured merge-tree

Hashes [edit]

- Bloom filter
- Count-Min sketch
- Distributed hash table
- Double Hashing
- Dynamic perfect hash table
- Hash array mapped trie
- Hash list
- Hash table
- Hash tree
- Hash trie
- Koorde
- Prefix hash tree
- Rolling hash
- MinHash
- Quotient filter
- Ctrie

Graphs [edit]

- Graph
- Adjacency list
- Adjacency matrix
- Graph-structured stack
- Scene graph
- Binary decision diagram
- Zero-suppressed decision diagram
- And-inverter graph
- Directed graph
- Directed acyclic graph
- Propositional directed acyclic graph
- Multigraph
- Hypergraph

Other [edit]

- Lightmap
- Winged edge
- Doubly connected edge list
- Quad-edge
- Routing table
- Symbol table

v · t · e	Data structures	[hide]
Types	Collection · Container	
Abstract	Associative array · Double-ended priority queue · Double-ended queue · List · Map · Multimap · Priority queue · Queue · Set (multiset) · Disjoint Sets · Stack	
Arrays	Bit array · Circular buffer · Dynamic array · Hash table · Hashed array tree · Sparse array	
Linked	Association list · Linked list · Skip list · Unrolled linked list · XOR linked list	
Trees	B-tree · Binary search tree (AA · AVL · red-black · self-balancing · splay) · Heap (binary · binomial · Fibonacci) · R-tree (R* · R+ · Hilbert) · Trie (Hash tree)	
Graphs	Binary decision diagram · Directed acyclic graph · Directed acyclic word graph	
List of data structures		

External links [edit]

- Tommy Benchmarks Comparison of several data structures.

Categories: Data structures | Computing-related lists