

CS 234

Module 10

November 29, 2018

Other directions for consideration

Types of directions:

- New criteria for assessment
- New data structures for common ADTs
- New ways of using ADTs together
- New ADTs and data structures for special kinds of data

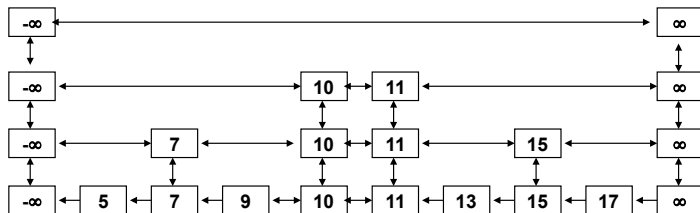
New criteria for assessment

- Amortized analysis (cost per operation over a sequence of operations)
- Use of space (e.g. succinct data structures)
- Support for change or multiple versions of data

New data structure for ADT Dictionary

Skip list

- Combines strong points of linked structures (easy to modify) and array (binary search)
- List of nodes of different “heights”, allows quick search between tall nodes.
- Uses randomization to keep nice distribution of heights even as changed by addition and deletion.



More problems solved using ADTs

Connectivity: Given a graph, determine the **connected components** (sets of vertices such that there is path between each pair of vertices in the set).

Single-source shortest paths: Given a weighted graph and a source vertex, determine the minimum costs of paths from the source to each other vertex. (Dijkstra's Algorithm)

Future directions

To use what you have learned:

- Planning - get practice solving problems from lots of application areas.
- Coding - write implementations of many variants discussed but not coded in class.

To learn more:

- CS 231 (Spring 2018 and on) on algorithms
- CS 338 on managing large amounts of data
- Courses in application areas of computer science