

CS112 Lab 11, April 15, 2010

http://cs-people.bu.edu/deht/cs112_spring11/lab11/

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Graphs

- You can't throw a rock in Computer Science without hitting a graph
- Vertexes: the things in the graph
- Edges: the relationships/connectivity between things.
- $G = (V,E)$ (Graph = (Vertexes, Edges))

Graph Implementations

- Adjacency lists
 - Each node has a list of other nodes it is connected to.
- (alternatives)
 - Adjacency matrix
 - Edge List

Constructing a Graph (Implementation)

- (Go through code on p. 432 for reading in a graph from a file.)
- <http://algs4.cs.princeton.edu/41undirected/Graph.java.html>

Traversals

- Most of the interesting things about graphs are tied up in how the nodes are connected to each other
- Techniques for walking through graphs:
 - Depth-first traversal
 - Breadth-first traversal

Depth-First Traversal

- (p. 437)
- Stack-based (recursive)
- (Example)
- <http://algs4.cs.princeton.edu/41undirected/DepthFirstSearch.java.html>

Breadth-First Traversal

- (p. 446)
- Queue-based
- (Example)
- <http://algs4.cs.princeton.edu/41undirected/BreadthFirstPaths.java.html>