Program 5 assigned Monday?

Homework h9 available tomorrow

Last Time
ADTs/Data Structures
Graphs
• terminology
• implementation
• edge representations (A-M and AL)

Today
Graphs
• Traversal Algorithms
  o DFS
  o BFS
• Topological ordering
• Applications of BFS/DFS

Next Time
Read: finish Graphs, start Hashing
Graphs
• more terminology
• Dijkstra’s algorithm
Hashing
• terminology
Searches and Traversals

Search

Traversal

Which connected component in the graph above can produce the longest path?

CS367 Convention: Pick next unvisited vertex in increasing numerical or alphabetical order
Depth-First Search (DFS)

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Algorithm
Breadth-First Search (BFS)

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Algorithm
Topological Ordering

IDEA:

Example

Iterative Algorithm (see readings for recursive algorithm)
→ Give the order that vertexes are visited for depth-first search (DFS) starting at A.

Graph 1:

Graph 2:

→ Give the DFS spanning tree starting at A.

Graph 1:

Graph 2:
→ Give the order that vertexes are visited for breadth-first search (BFS) starting at A.

Graph 1:

Graph 2:

Give the BFS spanning tree starting at A.

Graph 1:  

Graph 2:
Topological Ordering Practice

1. Draw the edges indicating which steps must come before which other steps.
2. Simplify the graph.
3. Find set (unique) of possible topological orderings.

1. get bread
2. get jelly
3. get peanut butter
4. get butter knife
5. open jelly
6. open peanut butter
7. take bread slice 1
8. take bread slice 2
9. use knife to spread jelly on bread slice
10. use knife to spread peanut butter on bread slice
11. put slices together with spreaded sides facing each other

Full Graph

Simplified Graph

Topological Orderings
Applications of DFS/BFS

Path Detection

Cycle Detection
More Graph Terminology