CS367 Announcements
Thu, Aug 1st, 2013

- H7 due Mon Aug, 5th 6:00pm
- Final next Thurs in class

Last Time

- Graphs

Today

- Graphs (cont.)

Recall Depth-First Search (DFS)

Questions it is used to answer:

Recursive definition:

As a Stack:

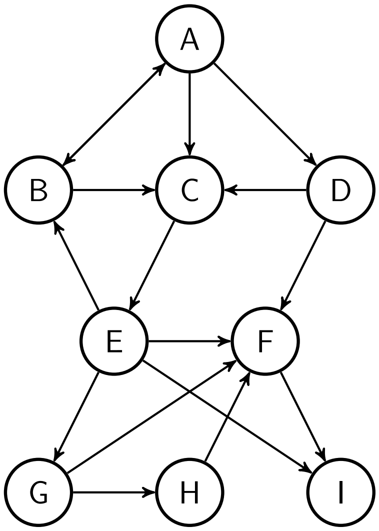
Breadth-First Search (DFS)

Questions it is used to answer:

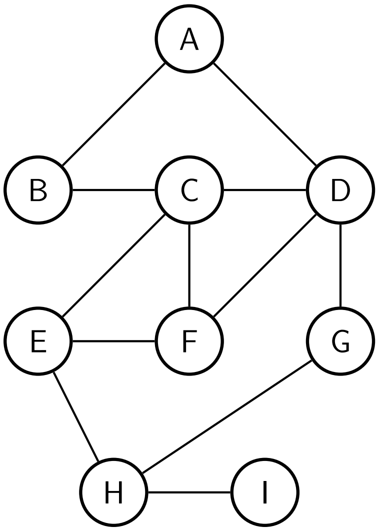
As a Queue:

Examples:

Graph 1



Graph 2



Give the order that nodes are visited in breadth-first search (BFS) starting at A

Graph 1:

Graph 2:

Give the BFS spanning tree starting at A

Graph 1:

Graph 2:

Dijkstra's Algorithm

A graph search algorithm used to find:

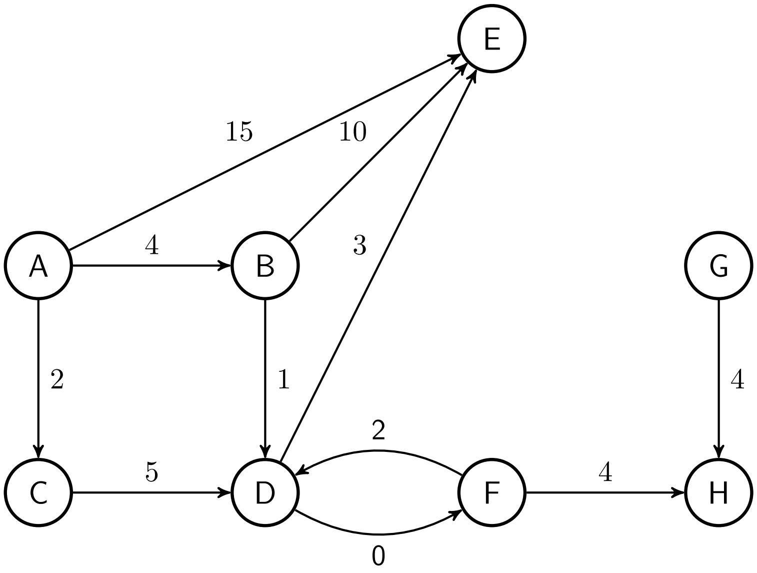
Works on graphs of type:

Produces a:

Pseudocode:

```
choose a start node S

foreach node N that is reachable from S
  initialize N's total weight to infinity
  initialize N's predecessor to null

create new priority queue pq
pq.add((0,S))

while !pq.isEmpty()

  (totalWgt,N) = pq.removeMin()

  foreach neighbor M of N

    if M's totalWgt can be reduced
    // if current cost [S->...->M] isGreaterThan [S->...->N->M]

      update M's newTotalWgt = (N's totalWgt) + (N -> M)
      // this is the path cost to get to N, then from N to M

      update M's predecessor to N

      put (newTotalWgt,M) on pq
      // if M is already on pq, just update M's totalWgt in pq
```

Example of Dijkstra's Algorithm

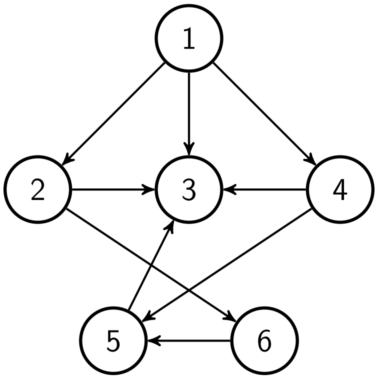


Node	TotalWgt	Predecessor
A		
B		
C		
D		
E		
F		
H		

Iteration	Priority Queue	Node Visited
0		
1		
2		
3		
4		
5		
6		
7		

Topological Ordering

Example



```
1       1
4       2
2       6        . . .
6       4
5       5
3       3
```