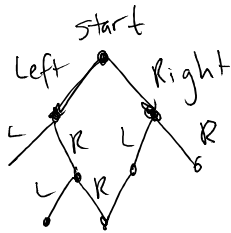
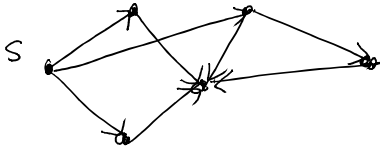


Graph Search

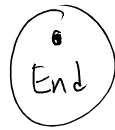
Wednesday, April 11, 2018 9:03 PM

Goals

- Describe applications of graph search
- Understand and answer problems related to generic graph search algorithm

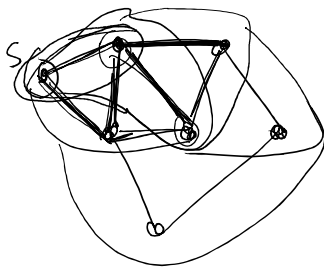


⋮



Desired Properties of Graph Search

1. Find all nodes reachable from the starting node
2. Efficient (doesn't explore same node over & over)



Input: $G = (V, E)$ starting node s

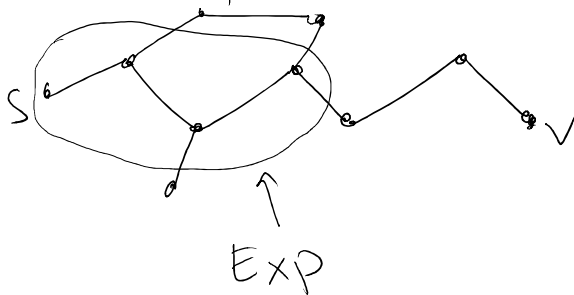
1. $Exp = \{s\}$ $Exp = \text{set of explored}$

2. While ($\exists \{u, v\} \in E : (u \in Exp \wedge v \notin Exp)$)
 Add v to Exp

Prove: Vertex v is explored iff there is a path from s to v

\Rightarrow If v is explored, we must have taken a sequence of edges from s to v , so there must be a path from s to v .

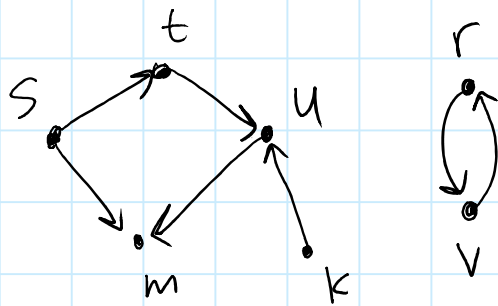
\Leftarrow Contradiction. Suppose there is a path from s to v , but v is not explored.



Alg must have terminated with part of the path unexplored. But this contradicts how the alg. works, because there is an edge from explored nodes to unexplored nodes, so the the alg. should not have terminated.

Multiple Choice

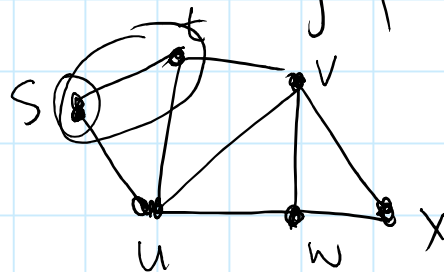
Wednesday, April 11, 2018 9:05 PM



Q: Which nodes are reachable from s?

- A) t, m
- B) t, m, u ←
- C) t, m, u, k
- D) all nodes.

Q: Consider the graph:



Which sequence of explored vertices is not possible?

A) s, t, u, w, x, v

B) s, u, v, x, w, t

C) s, u, v, t, x, w

D) s, t, w, x, u, v
↑