Depth First Search
Depth-First Search (from CLRS text)

DFS(G)
1  for each vertex u in V
2     u.color = WHITE
3     u.prev = nil
4  time = 0
5  for each vertex u in V
6     if u.color = WHITE
7         DFS-Visit(G,u)

DFS-VISIT(G,u)
1  time = time + 1
2  u.disc = time
3  u.color = GRAY
4  for each v in adjacency list of u
5      if v.color = WHITE
6          v.prev = u
7          DFS-Visit(G,v)
8  u.color = BLACK
9  time = time +1
10 u.finish = time

white - not seen yet
gray - in process
black - done
edge classification

- tree edges - used in a DFS tree
- back edges - to an ancestor in DFS tree
- forward edges - to a descendent
- cross edges - all other edges
topological sort

- DAG = directed acyclic graph
- no back edges
- reverse finish time
dag with many paths

with $V=2k$, this graph has $2^{k-1}$ paths from 1 to 2k (that is, exponentially many paths)
dag with many paths (2)

here $V = 2k + 1$, and there are $2^k$ paths from 0 to $2k$