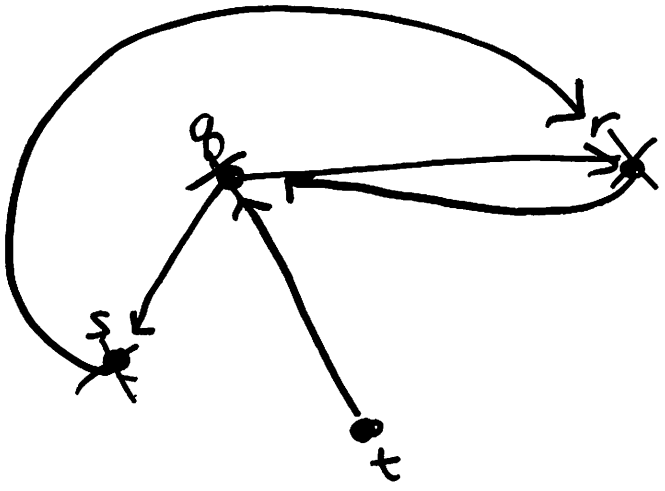
G :



Problem: Is there a path from s to t?

1. $A = \{ \langle G, s, t \rangle \mid$ G is a D.G. that has a path from s to t $\}$

2. M = "
   1. Place mark on node s
   2. Repeat until there are no nodes that can be marked
   3. → Scan all edges of G. If edge (a, b) exists where a is marked and b is not, mark b.
   4. If t is marked, accept.
      If t is not marked, reject.

3. Argue that M computes in polynomial time.

   n = number of nodes e = number of edges

   - Step 1 is one operation
   - Step 4 is one operation
   - Steps 2+3 n×e

   1+1 + n×e

$n = |\langle G, s, t \rangle|$

m = number of nodes e = num edges

n is impacted by m and e

$$\frac{1 + 1 + m \times e}{} = O(2 + n^2) = O(n^2)$$

Size of input