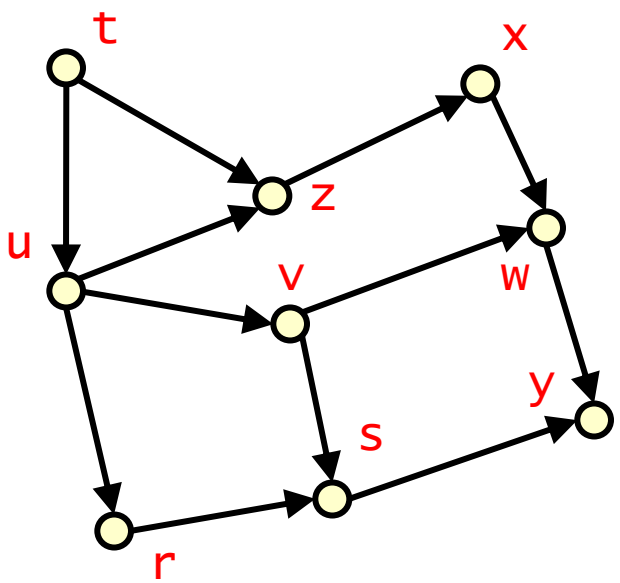
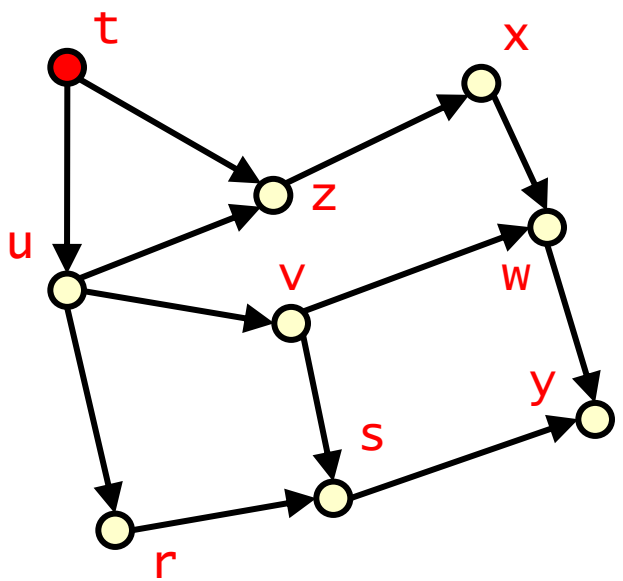
Topological ordering – Example

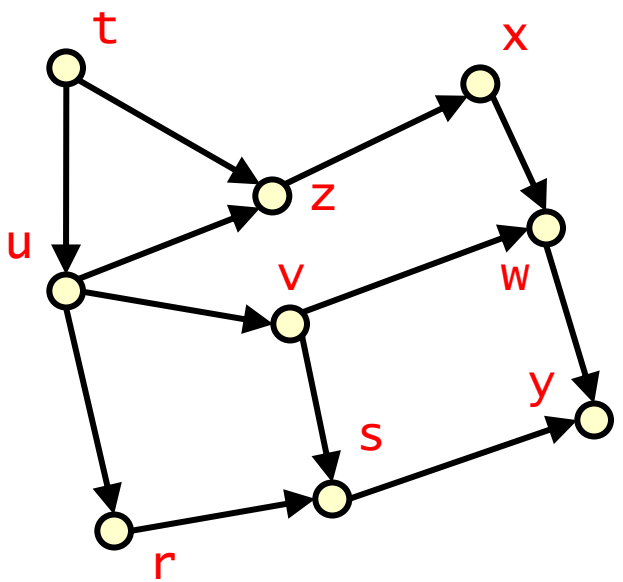
Directed acyclic graph D



Topological ordering – Example

Directed acyclic graph D



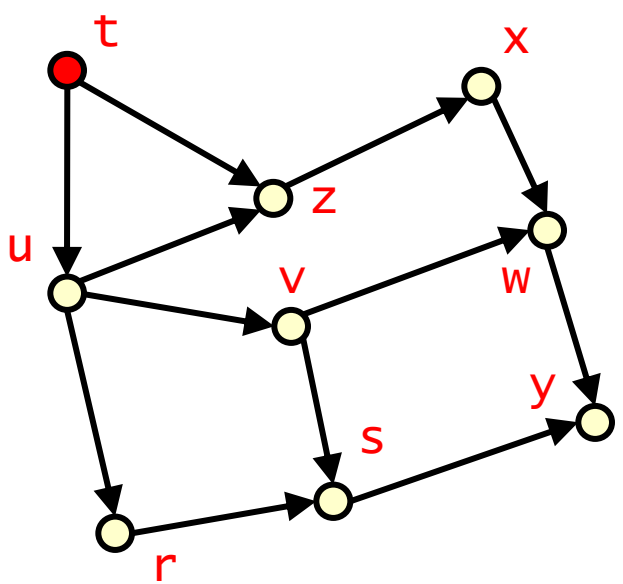


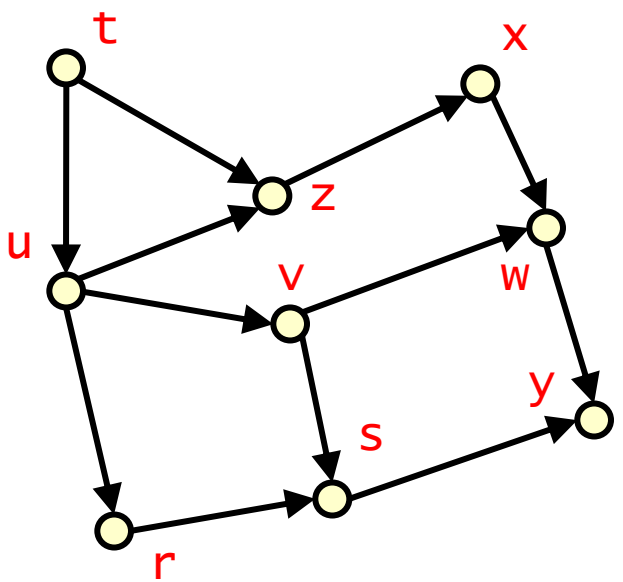
- labelled vertices
- queued vertices (count equals 0)
- vertices with count greater than 0

Topological ordering – Example

Directed acyclic graph D

source queue: ⟨t⟩





t is the only source vertex (only vertex with zero incoming edges)

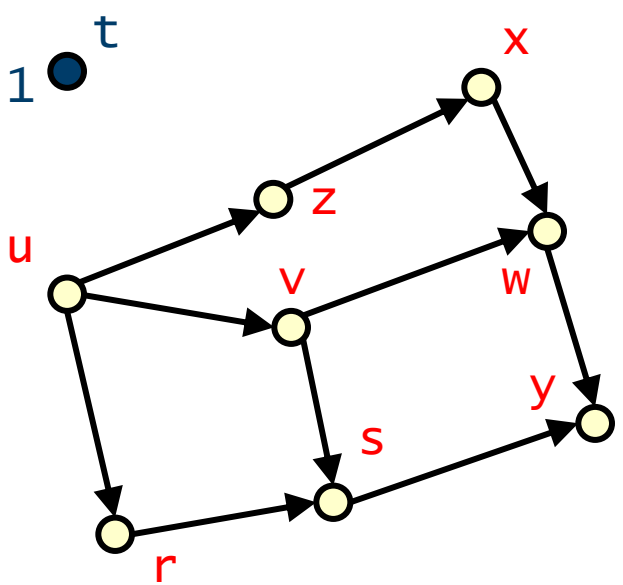
add t to the source queue

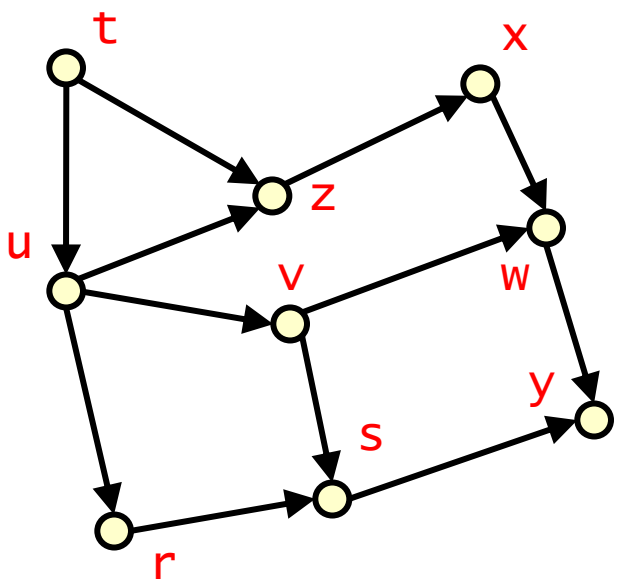
- labelled vertices
- queued vertices (count equals 0)
- vertices with count greater than 0

Topological ordering – Example

Directed acyclic graph D

source queue: ⟨⟩





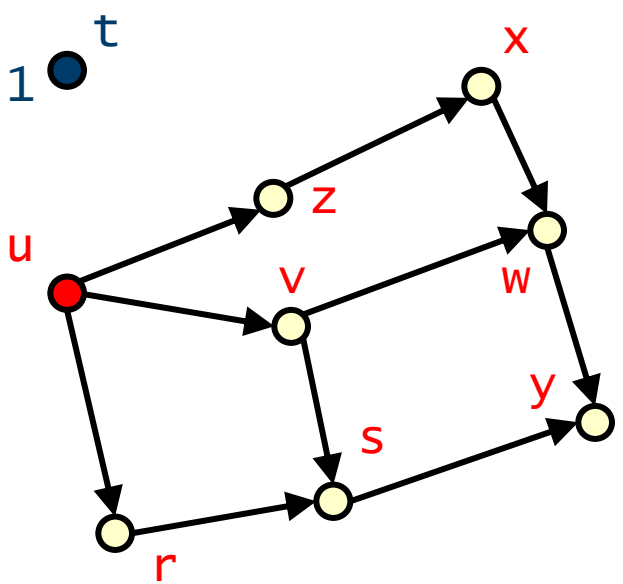
label and remove t from the graph and source queue

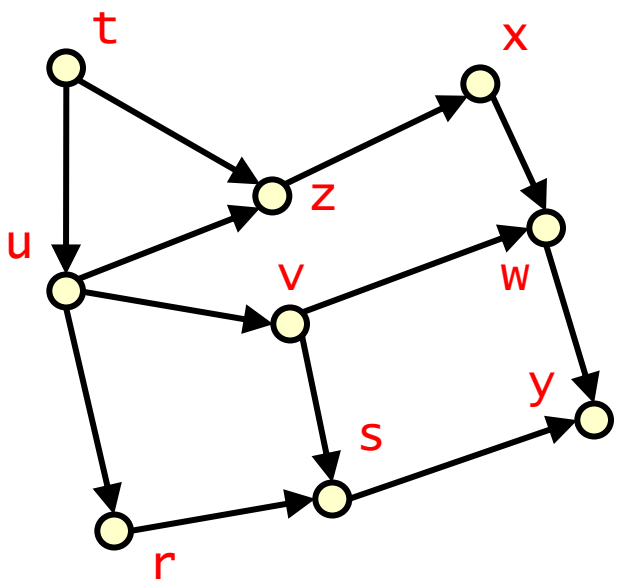
labelled vertices
queued vertices (count equals 0)
vertices with count greater than 0

Topological ordering – Example

Directed acyclic graph D

source queue: ⟨u⟩





u now has no incoming edges

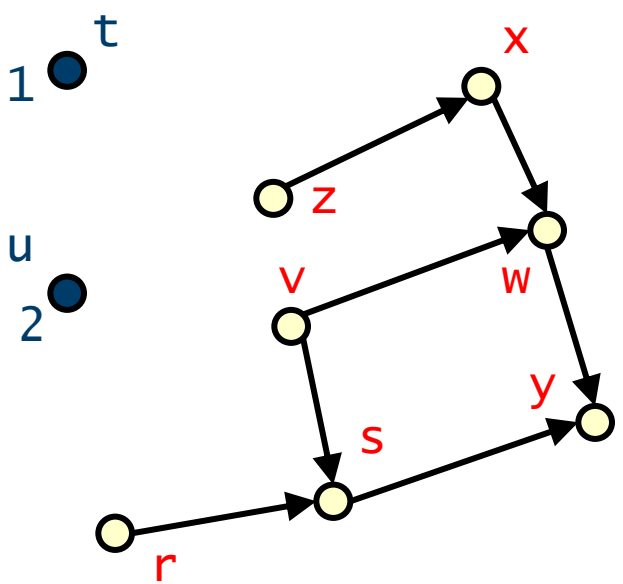
add u to the source queue

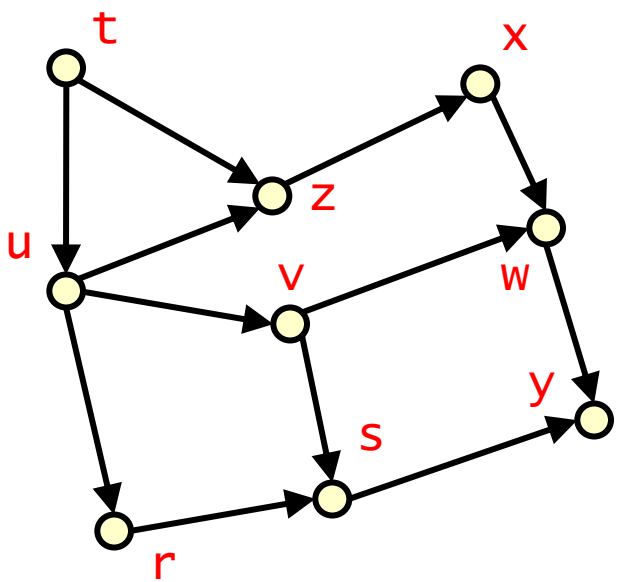
- labelled vertices
- queued vertices (count equals 0)
- vertices with count greater than 0

Topological ordering – Example

Directed acyclic graph D

source queue: ⟨⟩





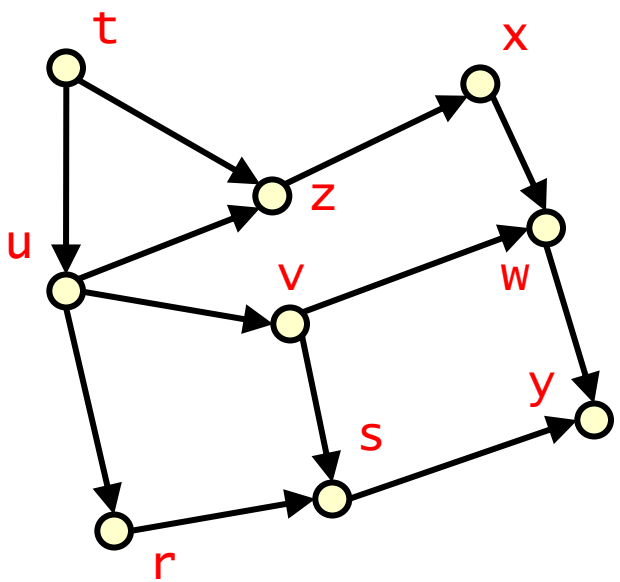
label and remove u from the graph and source queue

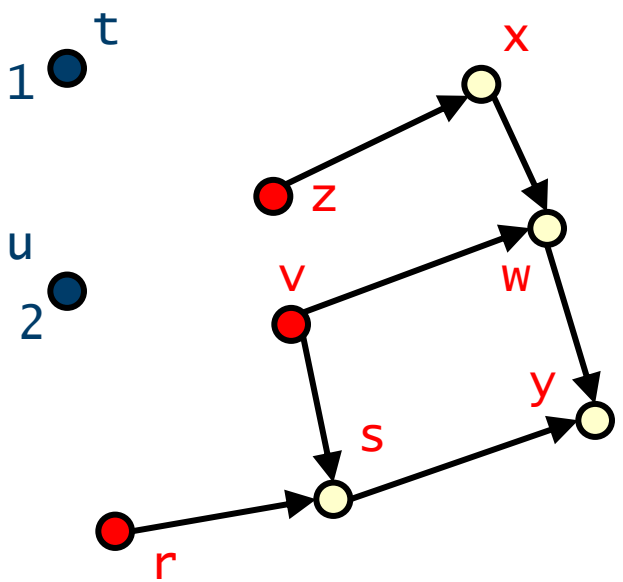
labelled vertices
queued vertices (count equals 0)
vertices with count greater than 0

Topological ordering – Example

Directed acyclic graph D

source queue: ⟨v,r,z⟩





v, r and z become queued vertices (no incoming edges)

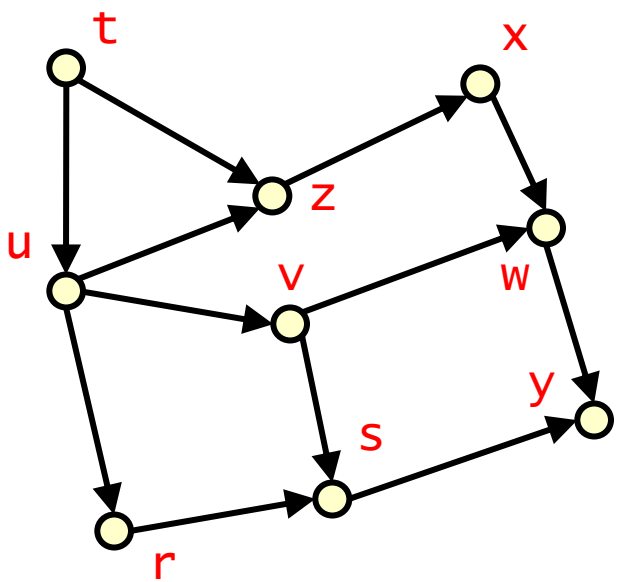
labelled vertices

queued vertices (count equals 0)

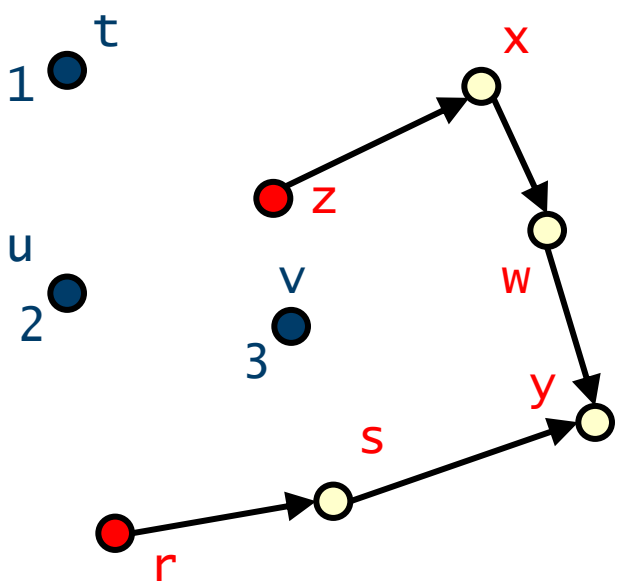
vertices with count greater than 0

Topological ordering – Example

Directed acyclic graph D



source queue: ⟨r,z⟩

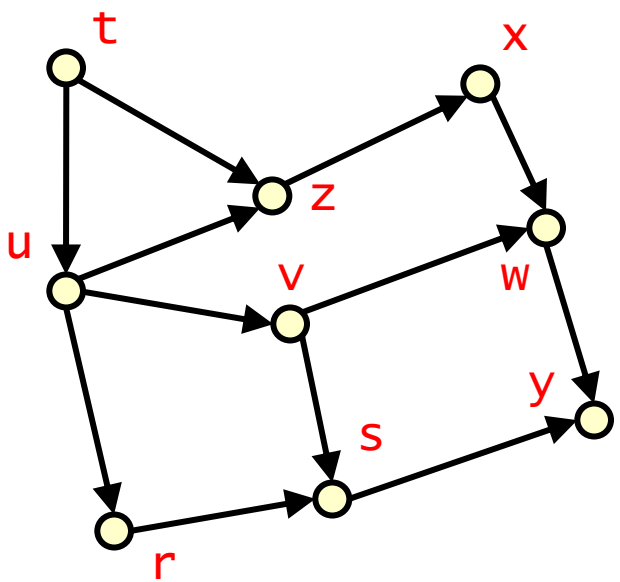


label and remove v from the graph and source queue

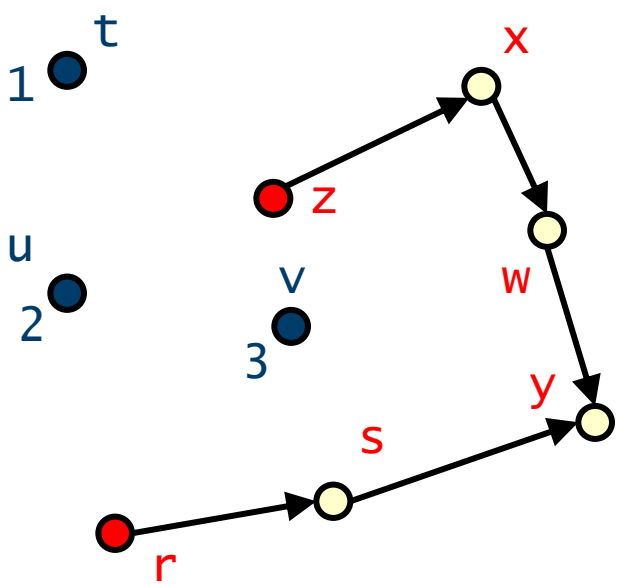
- labelled vertices
- queued vertices (count equals 0)
- vertices with count greater than 0

Topological ordering – Example

Directed acyclic graph D



source queue: ⟨r,z⟩



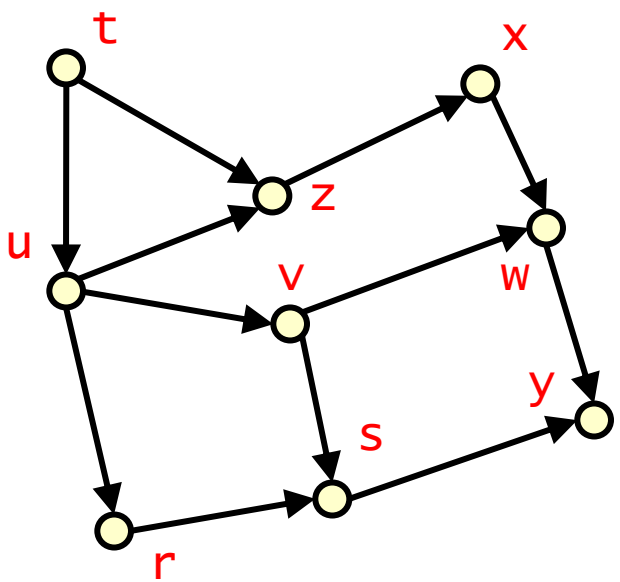
no new vertices have zero incoming edges so source queue remains unchanged

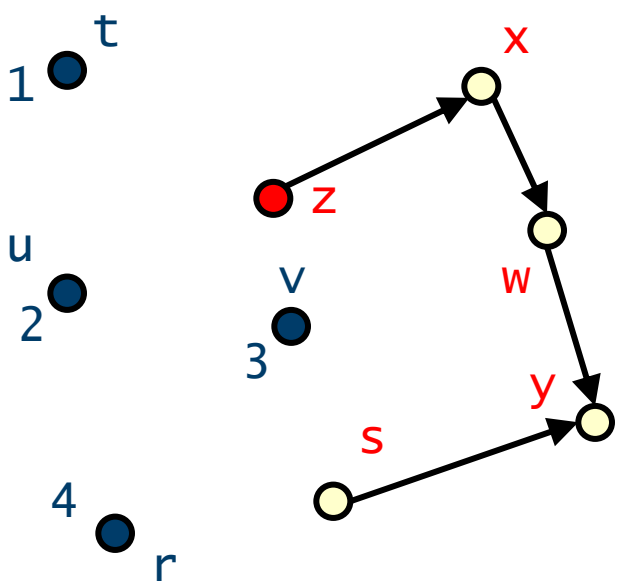
- labelled vertices
- queued vertices (count equals 0)
- vertices with count greater than 0

Topological ordering – Example

Directed acyclic graph D

source queue: ⟨z⟩



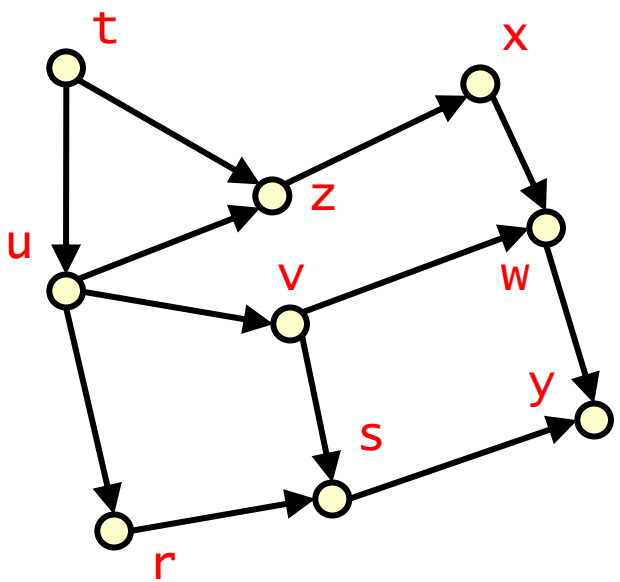


label and remove r from the graph and source queue

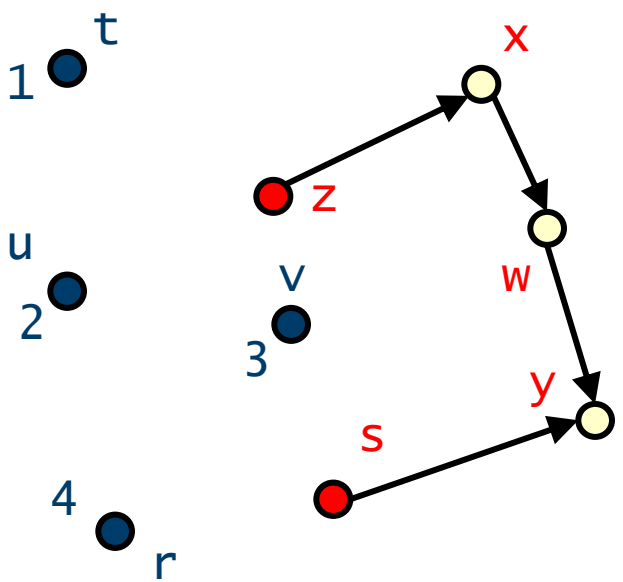
labelled vertices
queued vertices (count equals 0)
vertices with count greater than 0

Topological ordering – Example

Directed acyclic graph D



source queue: ⟨z,s⟩



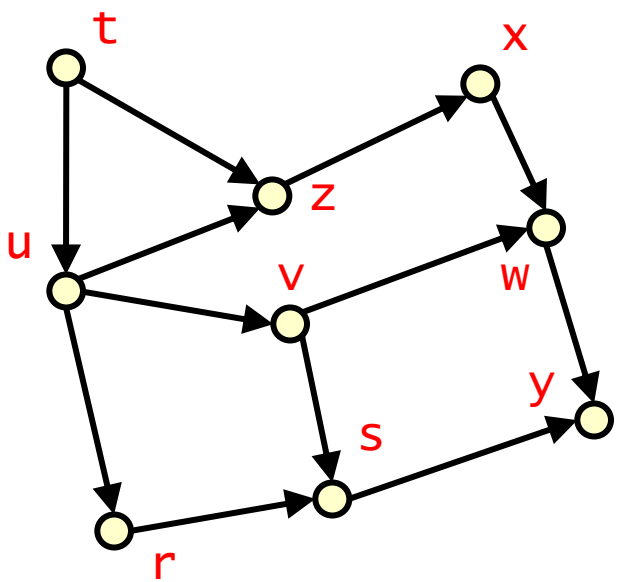
label and remove r from the graph and source queue

s now has no incoming edges so add to the queue

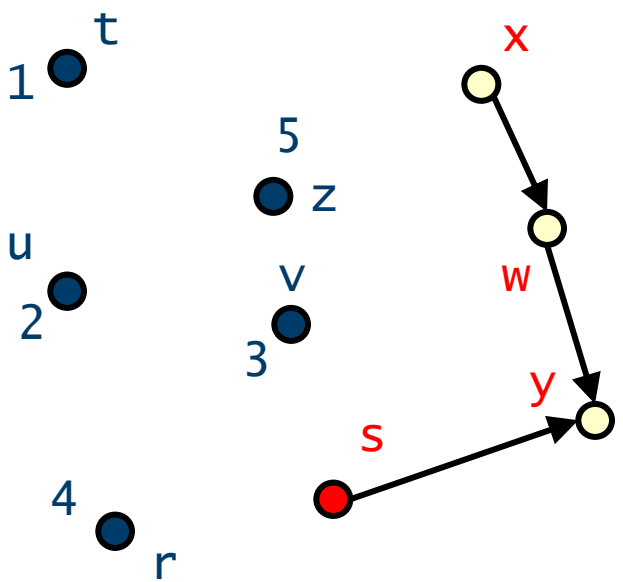
- labelled vertices
- queued vertices (count equals 0)
- vertices with count greater than 0

Topological ordering – Example

Directed acyclic graph D



source queue: ⟨s⟩

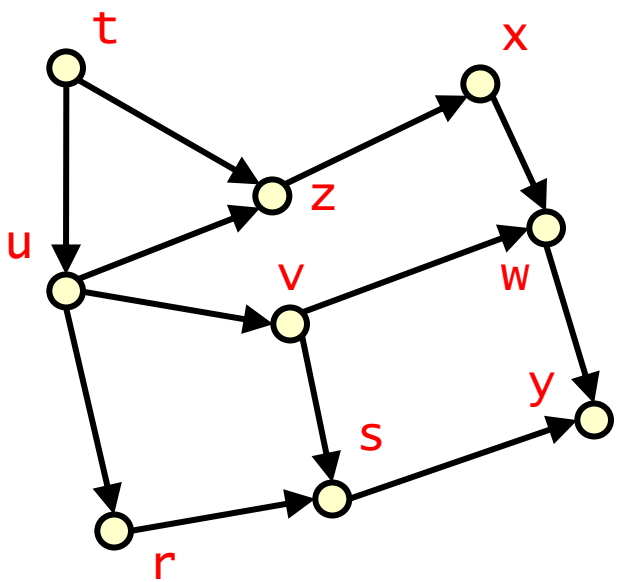


label and remove z from the graph and source queue

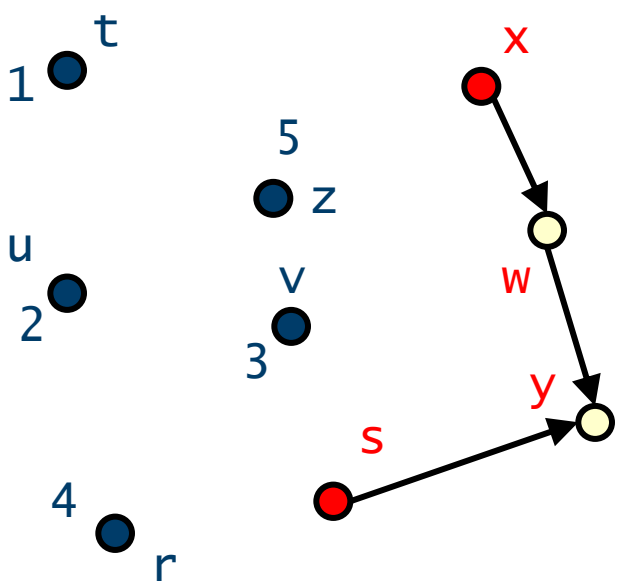
- labelled vertices
- queued vertices (count equals 0)
- vertices with count greater than 0

Topological ordering – Example

Directed acyclic graph D



source queue: ⟨s,x⟩



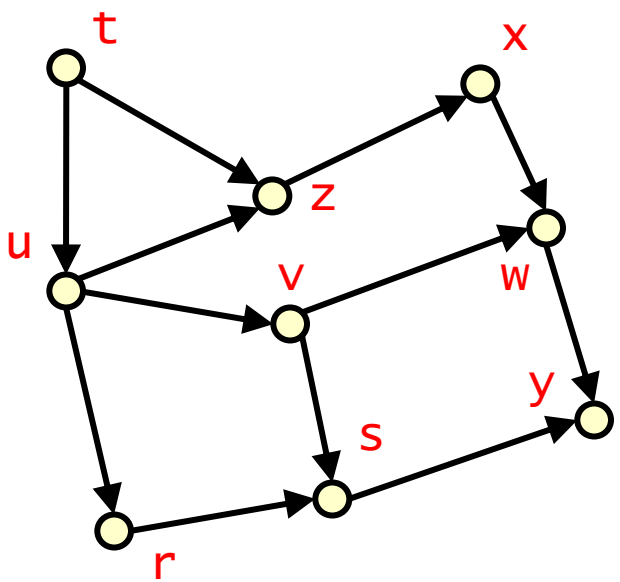
label and remove z from the graph and source queue

x now has no incoming edges so add to the source queue

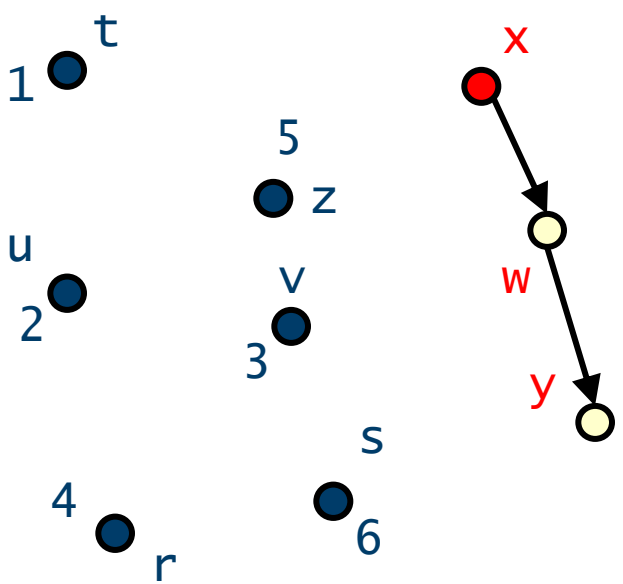
- labelled vertices
- queued vertices (count equals 0)
- vertices with count greater than 0

Topological ordering – Example

Directed acyclic graph D



source queue: ⟨x⟩

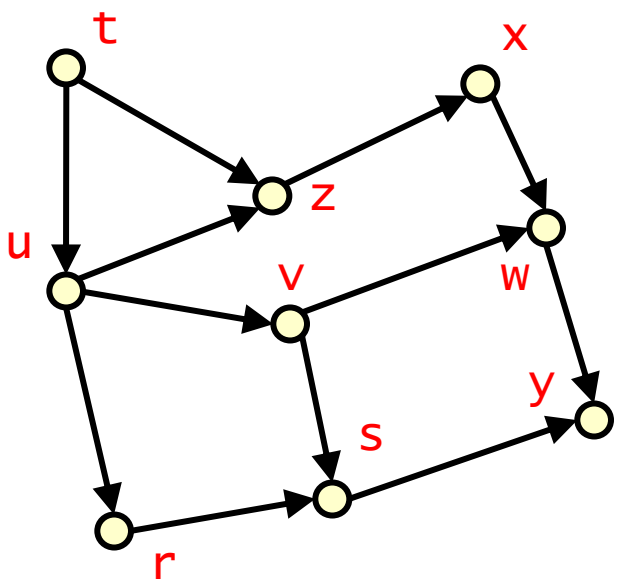


label and remove s from the graph and source queue

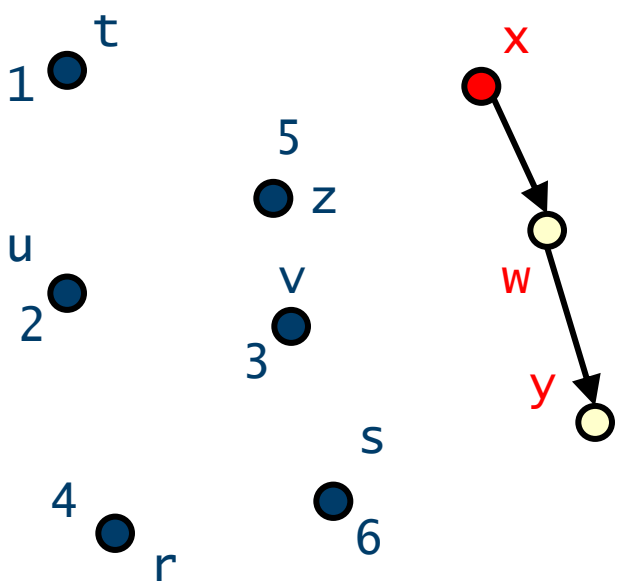
labelled vertices
queued vertices (count equals 0)
vertices with count greater than 0

Topological ordering – Example

Directed acyclic graph D



source queue: ⟨x⟩

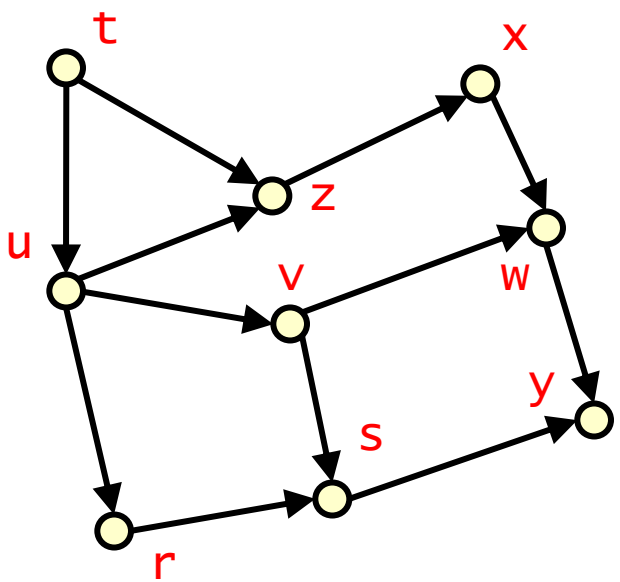


no new vertices has zero incoming edges so source queue remains unchanged

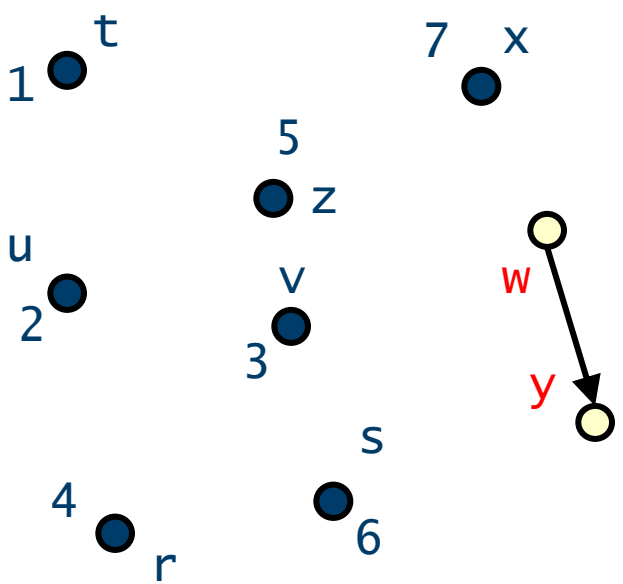
labelled vertices
queued vertices (count equals 0)
vertices with count greater than 0

Topological ordering – Example

Directed acyclic graph D



source queue: ⟨⟩



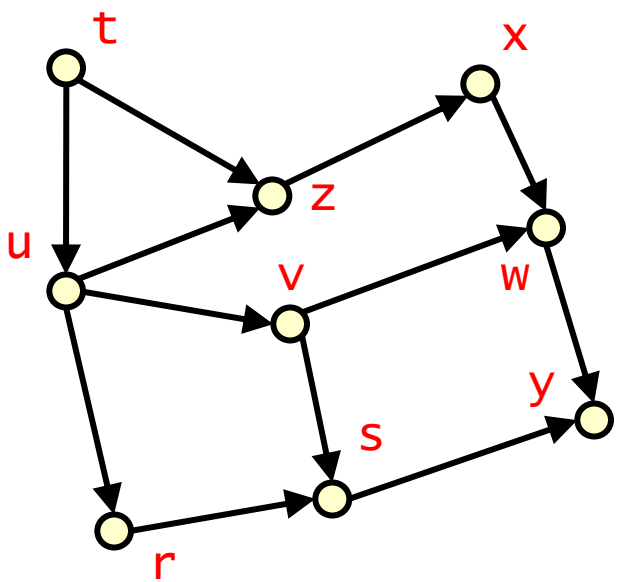
label and remove x from the graph and source queue

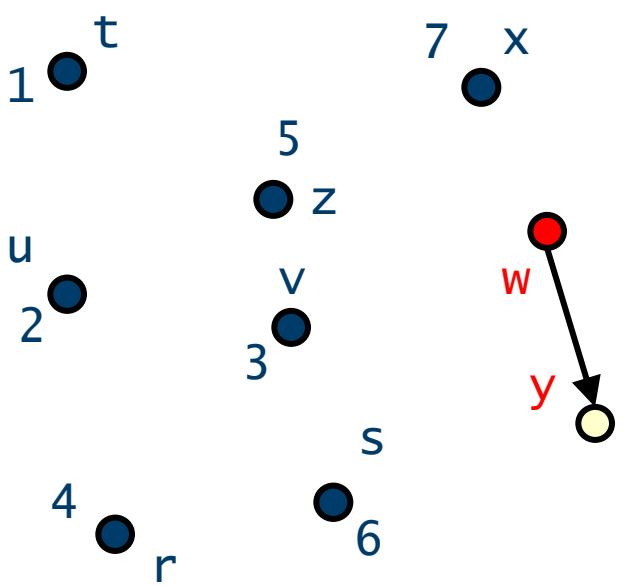
labelled vertices
queued vertices (count equals 0)
vertices with count greater than 0

Topological ordering – Example

Directed acyclic graph D

source queue: ⟨w⟩



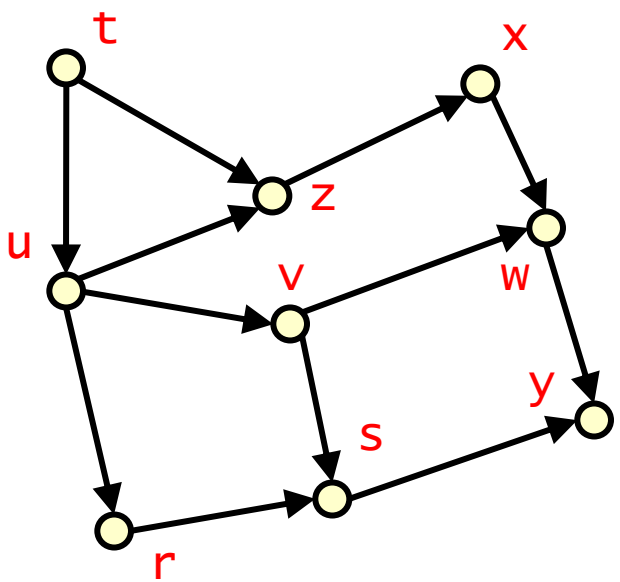


w now has no incoming edges so added to the queue

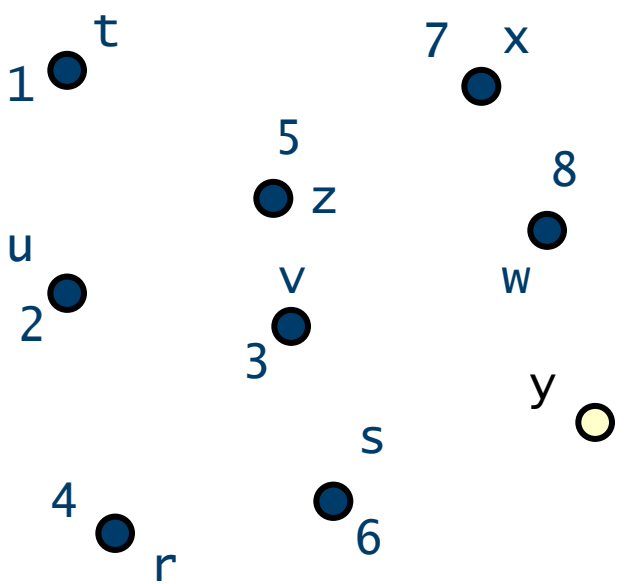
labelled vertices
queued vertices (count equals 0)
vertices with count greater than 0

Topological ordering – Example

Directed acyclic graph D



source queue: ⟨⟩

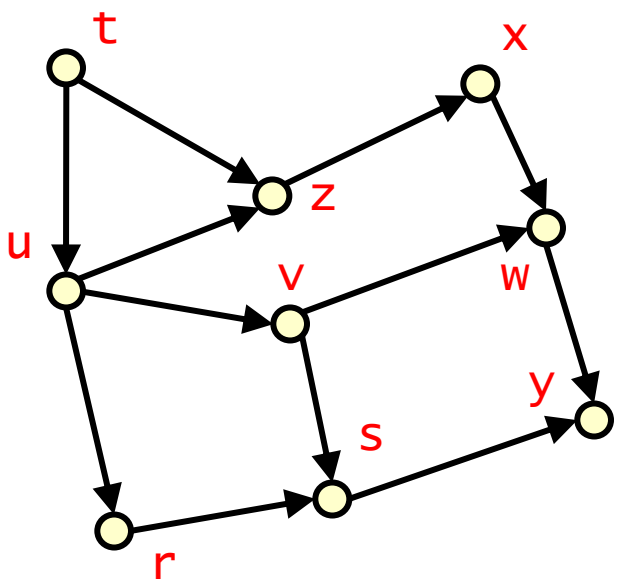


label and remove w from the graph and source queue

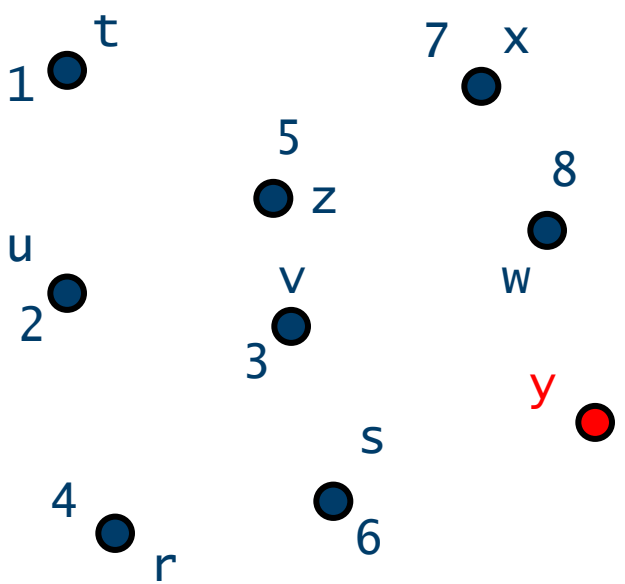
labelled vertices
queued vertices (count equals 0)
vertices with count greater than 0

Topological ordering – Example

Directed acyclic graph D



source queue: ⟨y⟩

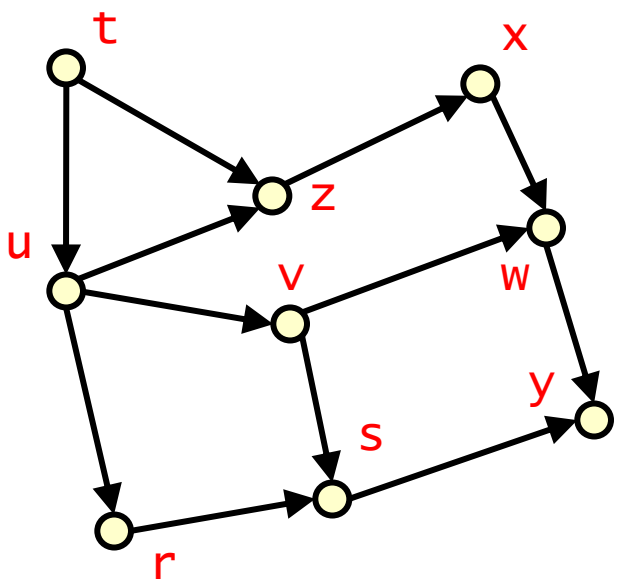


y now has no incoming edges so added to the queue

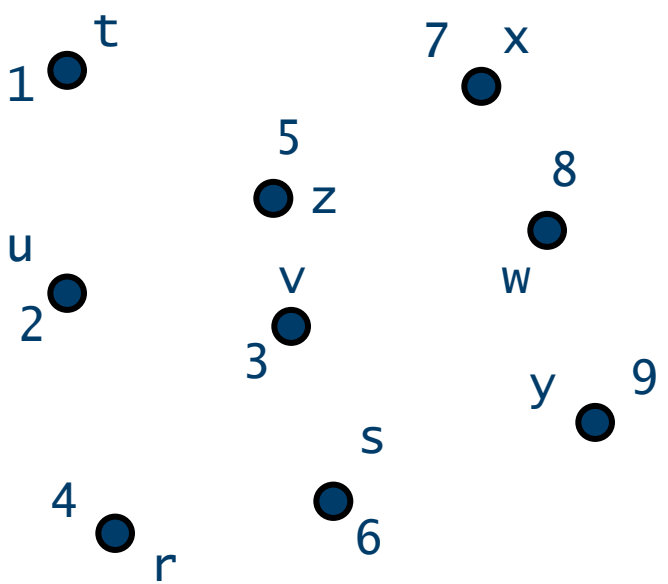
labelled vertices
queued vertices (count equals 0)
vertices with count greater than 0

Topological ordering – Example

Directed acyclic graph D



source queue: ⟨⟩



after labelling and removing y, the topological ordering is complete

labelled vertices

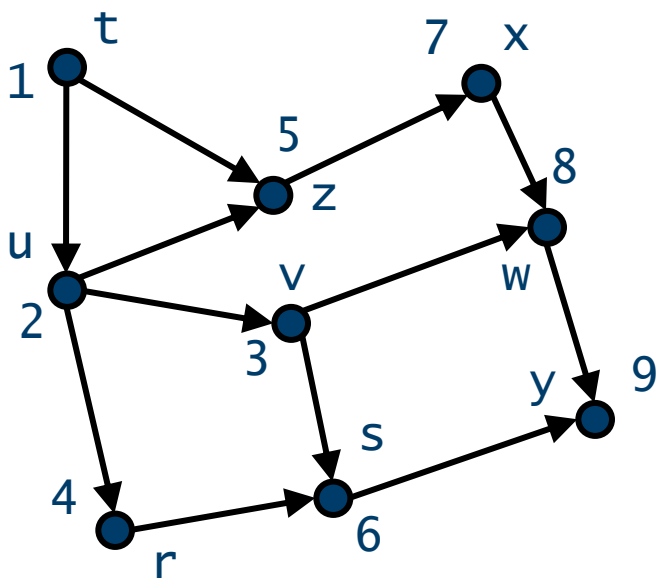
queued vertices (count equals 0)

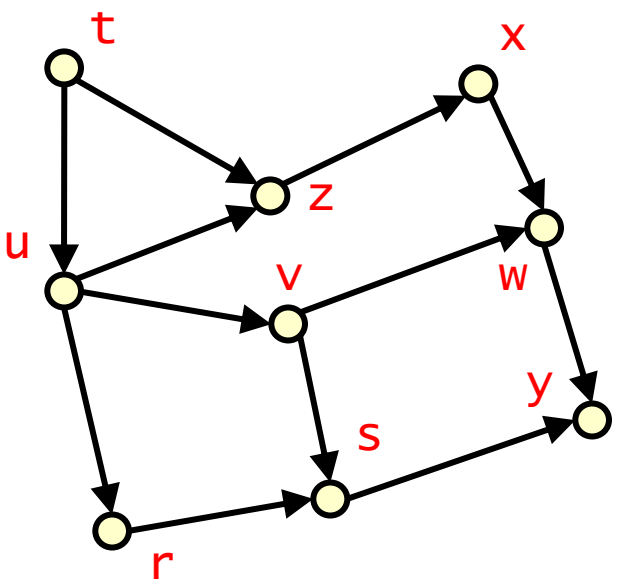
vertices with count greater than 0

Topolgocal ordering – Example

Directed acyclic graph D

source queue: ⟨⟩





a topological ordering on D