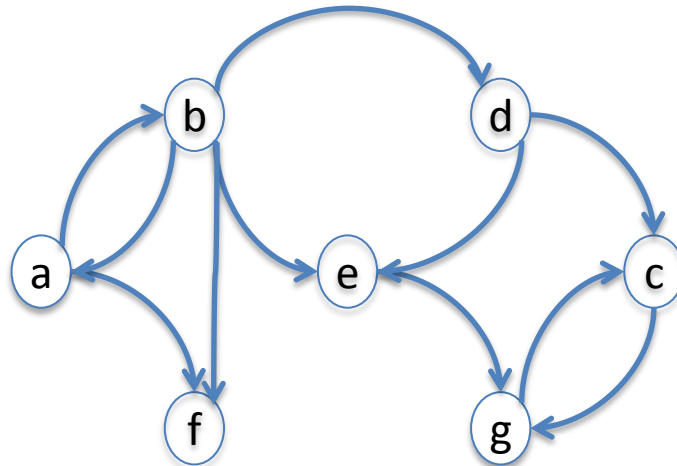


# Graph Analytics: Some Structural Tasks

- Diameter
  - Longest of all shortest paths

What is the diameter of this graph?



# Graph Analytics: Some Structural Tasks

- Connectivity Coefficient
  - Minimum number of vertices you need to remove that will disconnect the graph

What is the connectivity coefficient of this graph?

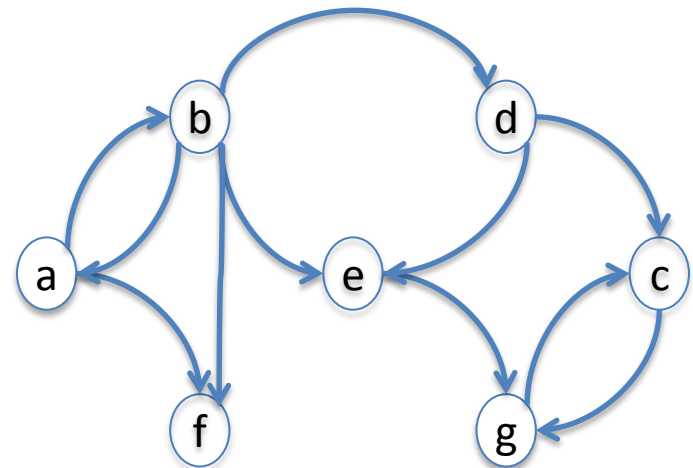
*May depend on what is meant by “connectivity”*

*x and y are **strongly connected** if*

*x is reachable from y **and** y is reachable from x*

*x and y are **connected** if*

*x is reachable from y **or** y is reachable from x*

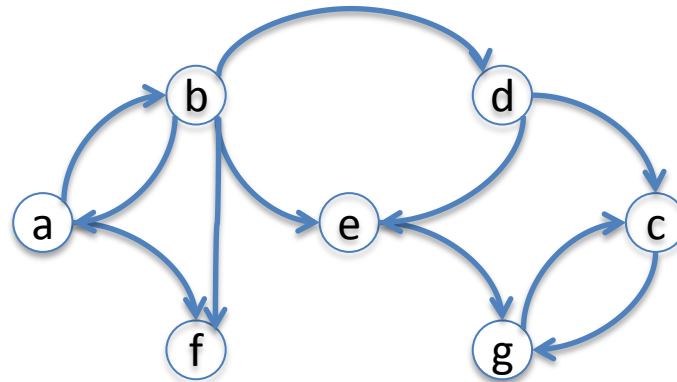


Why might you want to compute the connectivity coefficient?

# Graph Analytics: Some Structural Tasks

- We may want to understand the “importance” of a vertex
- Various notions of *Centrality*
  - Closeness Centrality of a vertex:
    - Average length of all its shortest paths
  - Betweenness Centrality of a vertex  $v$ :
    - the fraction of all shortest paths that pass through  $v$

What is the betweenness centrality of vertex  $e$ ?



Why might you want to compute betweenness centrality?