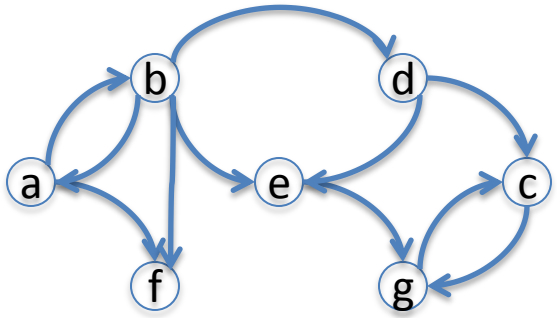
What is a Graph?

G = (V, E)

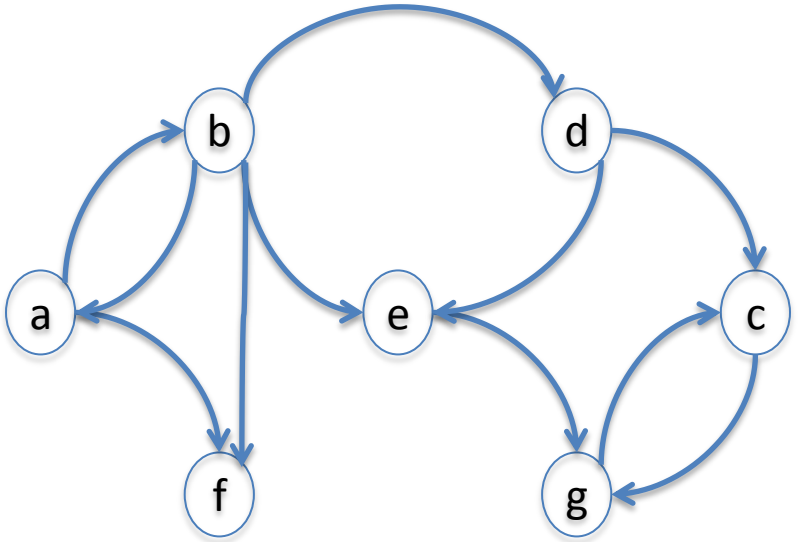


- V is a set of vertices (synonym: nodes)
- E is a set of edges.
  - Each edge is a pair (v_{source},v_{target})
  - Edges may be considered directed or undirected

Graphs in the wild

- The Web
- The Internet
- Social networks
- Communication logs
  - Ex: PRISM
- many more – ubiquitous!

  (why?)



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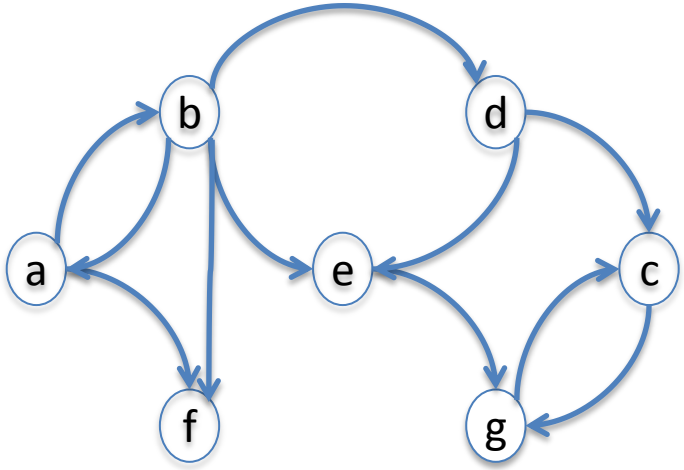
Graph Analytics

- Structural Algorithms
- Traversal Algorithms
- Pattern-Matching Algorithms



Graph Analytics: Some Structural Tasks

- Basic Metrics
  - |V|, |E|
  - |E| is more interesting than |V|
  - in-degree(v), out-degree(v)

"I have a big graph"

"How many edges, and what is the highest in or out degree?"