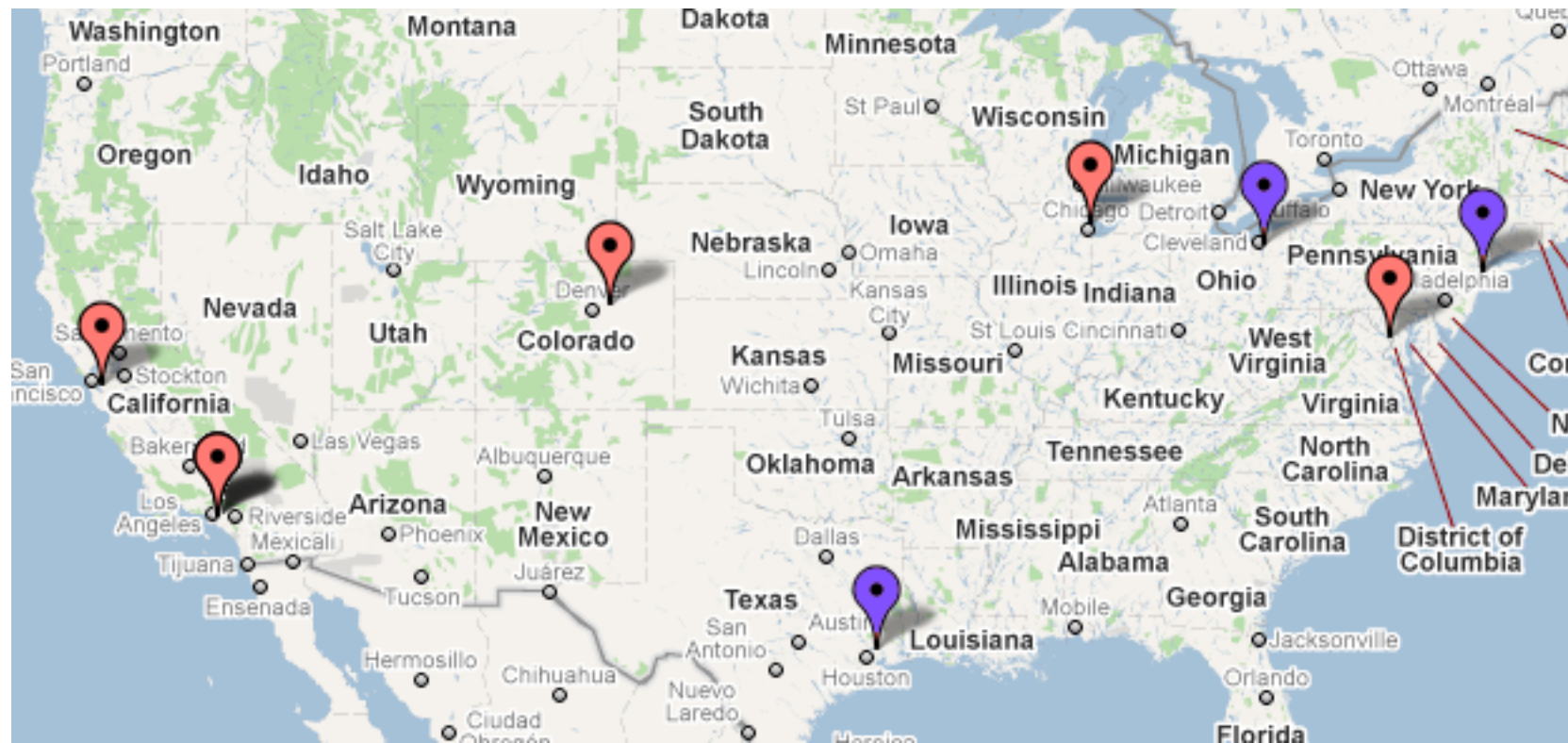


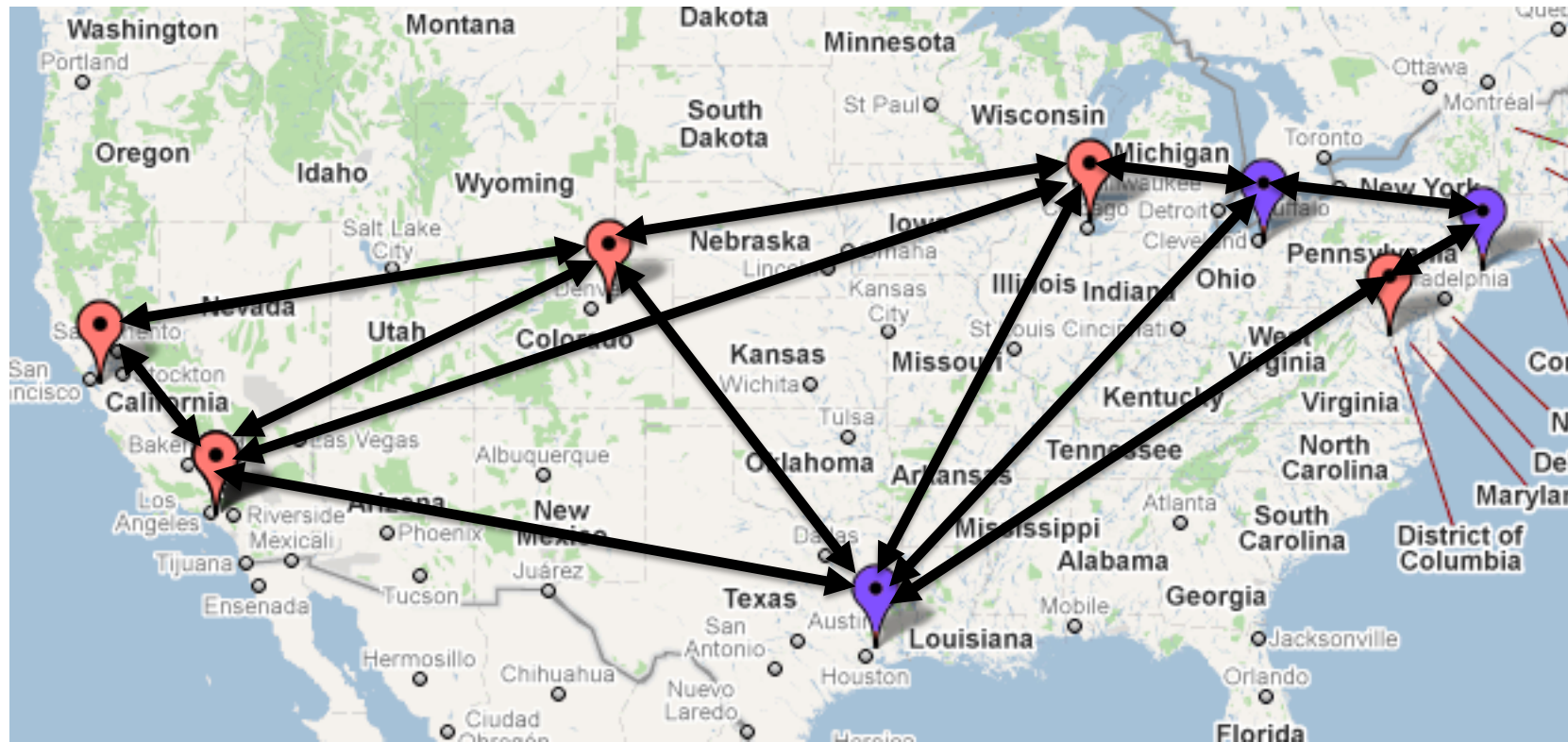
Graphs and Search

- Suppose you had data on flights between cities in the US, with prices
 - And you assume that for all cities, A, B and C, the cost of flying from A to C by way of B is the same as the cost of flying from A to B plus the cost from B to C
- You might like to know
 - Fewest stops between two cities
 - Least expensive airfare between two cities
 - Least expensive airfare between two cities, with no more than two stops

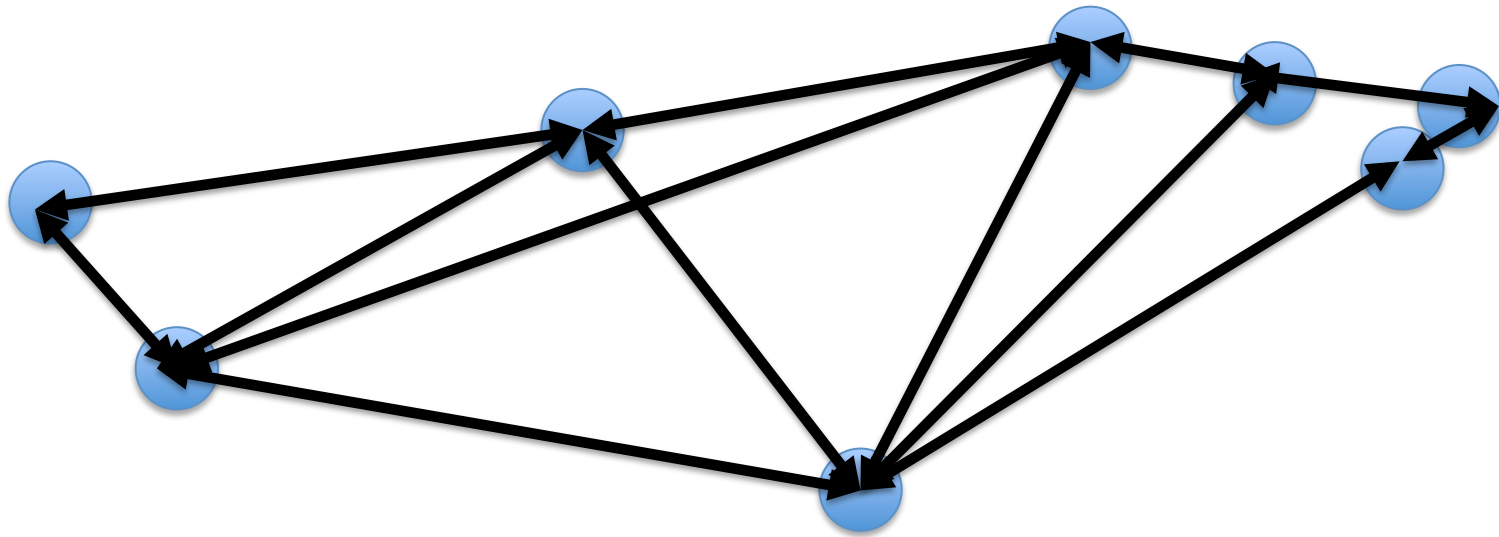
An example






An example



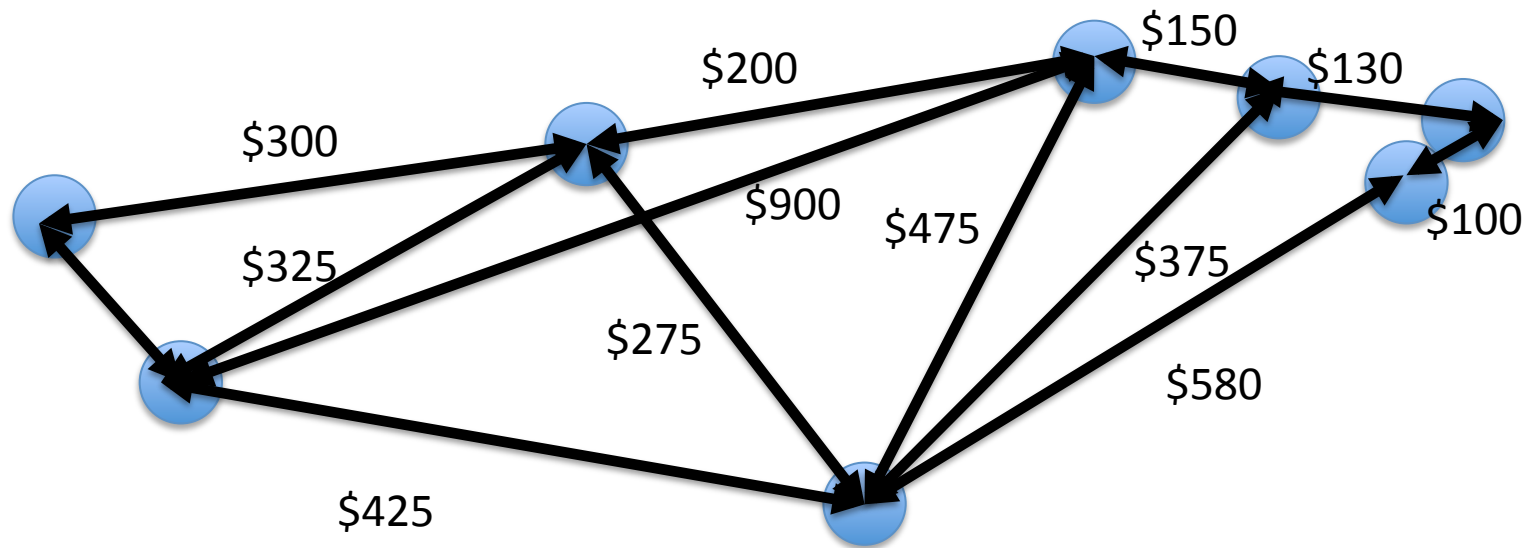
Graph abstraction



What is a graph

- Set of **nodes (or vertices)** 
 - connected by a set of **edges (or arcs)** 
- If edges are unidirectional, the graph is a **directed graph (or digraph)** 
- If we add a weight (or cost) to each edge, then the graph is a **weighted graph**

Weighted graph abstraction



Why are graphs interesting?

- Represent situations with interesting relationships among parts
- Naturally lead to questions that can be answered by search problems
- Can capture a wide range of problems
 - World Wide Web traffic (nodes are pages, edges are links, weights are how often links used)
 - Epidemiology (nodes are people with information about a disease, edges indicate interactions between people, weights indicate level of interaction)