Maximum cliques

- For some problems, finding subgraphs of a graph that are complete can be important
- Complete means that for every node in the graph, it is connected to every other node
- Examples:
  - Finding sets of people in a social network that all know each other
  - Finding subjects in an infected population that all have had contact with one another

Clique example

- Given a set of users on a social network
  - For a given user, want to find the set of all other users that know this person, and know everyone else in the group
  - Want to find the largest set of users who all know each other
  - Want to separate the network into collections of cliques

Use of cliques

- Analyzing communication networks
- Designing circuits
- Analyzing gene expression data
- Analyzing social networks
- Analyzing disease networks among infected populations

Max clique

- While more efficient algorithms exist, the brute force method can solve small sized problems
  - Find all subgraphs of a graph
  - Test each one to see if complete
  - Keep track of the largest
- Can extend to recursively find other large cliques by removing nodes of largest clique and repeating