Graphs, cont.

A university needs to schedule final exams for its large classes. There are 3 possible locations for exams and 10 possible timeslots. In addition some classes cannot have exams at the same time because they share students. How can the university perform the scheduling?

Suppose we want to program a GPS to find the shortest driving time from point A to point B.

In practice, one would use a specialized algorithm like Dijkstra's algorithm, rather than IP, to find the shortest path.

Fact: If you solve the above IP as an LP instead (and require vertex solutions), then you will always return an integer solution no matter what the t_{ij}'s are! This means the shortest path problem can be solved as a LP instead of an IP.