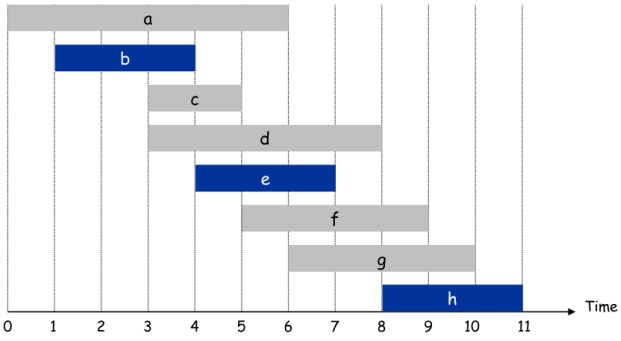
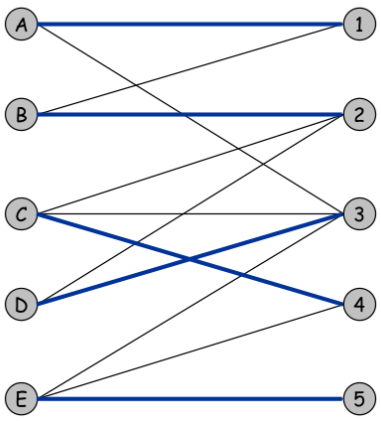
Interval Scheduling 区间调度

Input. Set of jobs with start times and finish times.
Goal. Find maximum cardinality subset of mutually compatible jobs.
↑ jobs don't overlap



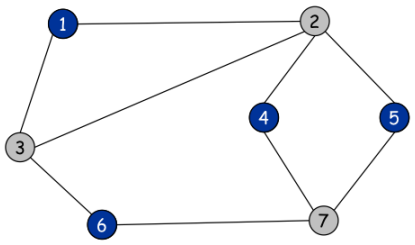
Bipartite Matching 二分匹配

Input. Bipartite graph.
Goal. Find maximum cardinality matching.



Independ Set 独立集

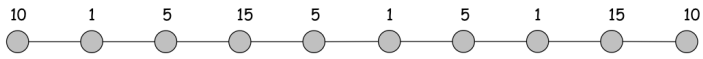
Input. Graph.
Goal. Find maximum cardinality independent set.
↑ subset of nodes such that no two joined by an edge



Competitive Facility Location 竞争设施位置

Input. Graph with weight on each node.
Game. Two competing players alternate in selecting nodes.
Not allowed to select a node if any of its neighbors have been selected.

Goal. Select a maximum weight subset of nodes.
↑ independent set



Second player can guarantee 20, but not 25.

Five Representative Problems

covered in this course

Interval scheduling: n log n greedy algorithm.
Weighted interval scheduling: n log n dynamic programming algorithm.
Bipartite matching: n^k max-flow based algorithm.
Independent set: NP-complete.
Competitive facility location: PSPACE-complete.