Politecnico di Torino

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Operations Research: theory and applications to networking

Maximum Independent Set

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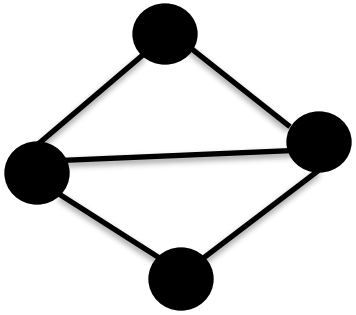
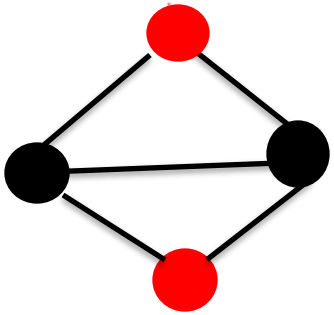
CC+ICT4SS

Independent set

Given an undirected graph, an independent set *I* is a subset of nodes V which does not contain adjacent nodes.





Formulate the problem!

Maximum Independent set

Given an undirected weighed graph (weights are associated to nodes), find the maximum weighted independent set *I** (i.e. *I** *is such that for any other independent set I, we have w(I)<= w(I*)).*

Note that given a set of nodes S, w(S) is the sum of weights associated to nodes in S.

Is there any relationship with the graph coloring problem

Independent set

As for graph coloring, consider graphs with N = 20, 40, 60, in which
for every pair of nodes (i,j), an undirected edge (i,j) is added to the graph with probability p, independently from other edges. Weights are either i.i.d. uniformly distributed in [0,1] or deterministically equal to 1.

For p= 0.1, 0.2 and 0.4 generate three instances and solve the maximum-independent set problem on them.