Politecnico di Torino

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# Operations Research: theory and applications to networking

## Graph coloring revisited

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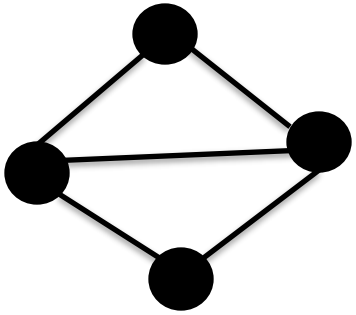
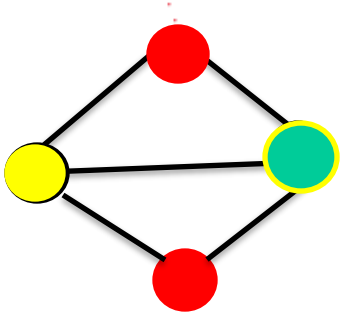
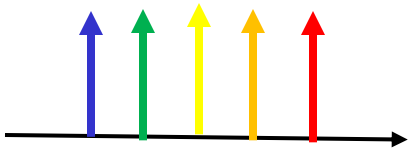
**ICT4SS-CE**

# Frequency allocation problem

Given an undirected graph, in which nodes correspond to Tx-Rx pairs in a wireless environment, and edges correspond to potential conflicts between transmissions, assign a frequency $f_i \in \{f_1, \ldots, f_k\}$ (frequencies are assumed equally spaced) to every node by ensuring that adjacent nodes do not use neither the same frequency nor contiguous frequencies. The goal is to minimize the width of the used spectrum







Formulate the problem!

# Graph coloring II

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.

For p= 0.2, 0.4 generate three/four instances and solve the GC problem on them.