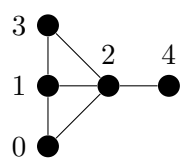
	M2-RIT Recherche Opérationnelle **Graphes et Réseaux**	Année 2014 - 2015 Semestre 1

TD 3: Coloring

1 Coloring

Exercice 1 Show that for each minimal coloring of a graph G (*i.e.*, coloring with a minimal number of colors) and for each maximal independent set U of G, there is a mininmal coloring that assigns the same color to U.

Exercice 2 Apply the algorithm *maxCliques* to the following graph:



Which result do you obtain when removing / not removing non-maximal cliques?

Exercice 3 *Application of Euler formula:*

1. Show: If G is planar and bipartite, then $m \leq 2n - 4$.
2. Conclude that $K_{3,3}$ is not planar.

Exercice 4 Show that the inequality $\chi(G) \leq \Delta(G) + 1$ can give a very inaccurate estimate of $\chi(G)$, by constructing, for each $n \in Nat$, a graph G_n, such that $\Delta(G_n) - \chi(G_n) = n$.