## Algorithmie Avancée TP/TD Marche et Graphe biparti

## A. Document Algo\_TDParE\_Birmele.pdf

Vous traiterez les exercices 1.6 et 1.7

## B. L'intérêt pratique des graphes bipartites. L'exemple des recettes de cuisine : Tripartite Network <a href="http://networksciencebook.com/chapter/2#bipartite-networks">http://networksciencebook.com/chapter/2#bipartite-networks</a>

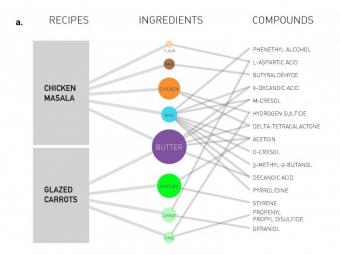
a.The construction of the tripartite recipe-ingredient- compound network, in which one set of

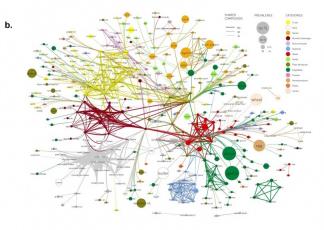
nodes are recipes, like Chicken Marsala; the second set corresponds to the ingredients each recipe has (like flour, sage, chicken, wine, and butter for Chicken Marsala); the third set captures the flavor compounds, or chemicals that contribute to the taste of each ingredient.

b.The ingredient or the flavor network represents a projection of the tripartite network. Each node denotes an ingredient; the node color indicating the food category and node size indicates the ingredient's prevalence in recipes. Two ingredients are connected if they share a significant number of flavor compounds. Link thickness represents the number of shared compounds.

Quel est le nombre chromatique d'un graphe tri-partite ?

Vous étudierez le paragraphe Bipartite Network Section 2.7 du livre en ligne de Albert Barabasi. Puis vous étudierez l'article [1] en montrant l'actualité de ce sujet non encore complètement résolu. Vous pourrez aussi essayer de faire tourner le module R proposé\*. L'article [2] est un





article encore plus récent qui vous montre l'actualité de la problématique.

[1] BMOTIF: A package for motif analyses of bipartite networks

https://besjournals.onlinelibrary.wiley.com/doi/full/10.1111/2041-210X.13149

[2] Biclique: an R package for maximal biclique enumeration in bipartite graphs <a href="https://bmcresnotes.biomedcentral.com/articles/10.1186/s13104-020-04955-0">https://bmcresnotes.biomedcentral.com/articles/10.1186/s13104-020-04955-0</a>

\*https://github.com/SimmonsBI/bmotif

<sup>\*\*</sup>https://cran.r-project.org/web/packages/bmotif/index.html