Exercise for usage of networks in gene function prediction

1. Assume that the nodes in a given graph are assigned colours, and that a fraction of nodes are colourless. Implement a function that assigns colours to colourless nodes based on the following algorithm: (1) cluster the network based on modularity clustering, (2) identify the majority colour in each cluster and assign it to the colourless nodes in the cluster. Is there an initial colour assignment for which the algorithm does not assign colour to all nodes?

2. Assume that the nodes in a given graph are assigned colours, and that a fraction of nodes are colourless. Implement a function that assigns colours to colourless nodes based on majority voting in the first neighbourhood of a node. Is there an initial colour assignment for which the algorithm does not assign colour to all nodes?

Homework

3. Use the line graph transformation introduced in exercise 8 to write a function that implements fuzzy QT clustering. Label the nodes with letters indicating the cluster(s) they belong to.