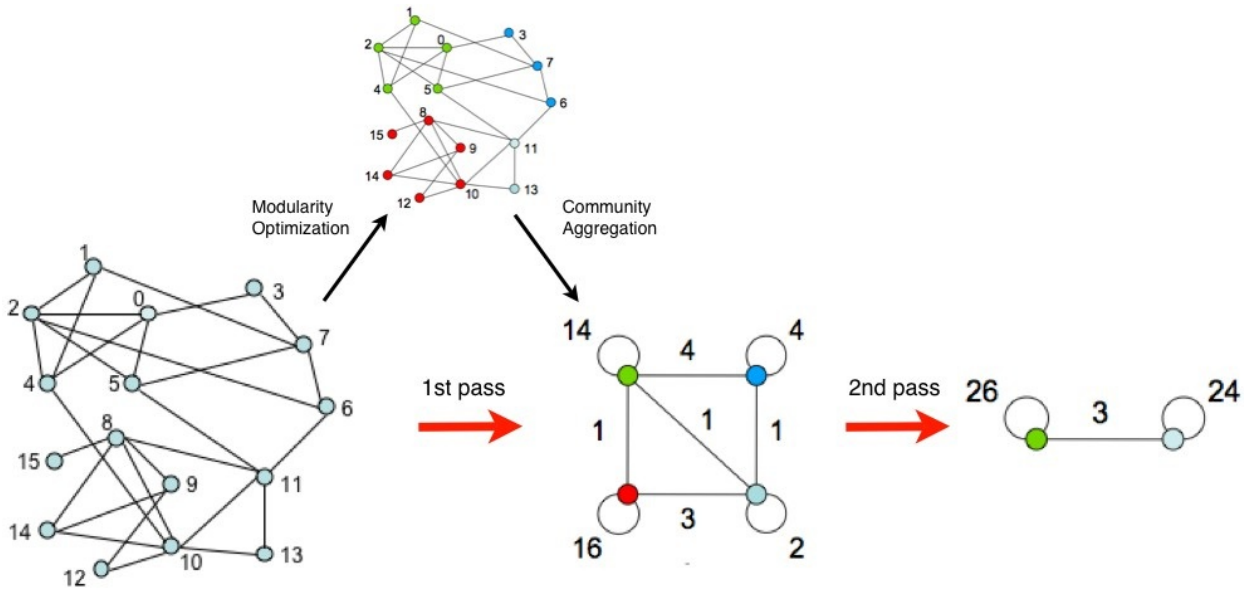
Advanced Human-Machine Interaction
Interaction Data Analysis
TD05: Social Network Analysis
INSA Rouen Normandie - Normandie University

Practical session : Community detection using Louvain/Blondel

1. Collect and analyze the Zachary's karate club dataset at `http://networkdata.ics.uci.edu/data/karate/` (NB : Wikipédia also propose a description of the dataset : `https://en.wikipedia.org/wiki/Zachary%27s_karate_club`). The network captures 34 members of a karate club, documenting 78 pairwise links between members who interacted outside the club.
2. Analyse the Louvain/Blondel algorithm, based on modularity optimization (e.g. `https://en.wikipedia.org/wiki/Louvain_Modularity`, `https://www.youtube.com/watch?v=dGa-TXpoPz8` or `https://www.youtube.com/watch?v=QfTxqAxJpOU`). The algorithm can be divided into two phases. 1) it extracts "small" communities by optimizing modularity. 2) it aggregates nodes of the same community and builds a new network whose nodes are the communities. These two steps are repeated iteratively until a maximum of modularity is obtained. (see example below).



3. Process the Zachary's karate club dataset using Louvain/Blondel algorithm implemented in Python (e.g. `https://networkx.org/documentation/stable/tutorial.html` or `https://github.com/taynaud/python-louvain` + NetworkX library at `https://networkx.github.io/`), C++ (e.g. `https://sourceforge.net/projects/louvain/`) or Java (e.g. `https://github.com/hwyywh/louvain-1` or `http://www.ludowaltman.nl/slm/`).