Stephane Secouard,
supervise by
Florent Madeleine

Graphs' decompositions and resolutions of combinatorial problems

ABSTRACT

A tree is a special graph but whose structure is easier to handle in many situations than a graph. For example, it is easy to browse through all its nodes without forgetting any ; Moreover, in a tree, the pre-order relationship is obvious.

Unfortunately, a graph is not in general isomorphic to a tree but may be represented by a tree where nodes are collections of nodes of the initial graph. This type of representation defines a measure to see how a given graph may "look like" a tree : the treewidth of the graph.

The first goal of this project is, starting from a graph whose tree representation is known, to implement a program to solve corresponding combinatorial problems. We may mention for example the 3-coloring problem, the max clique problem or the Hamilton path problem.

The second purpose is to implement a graph decomposition calculator.

Finally,it can be considered extensions by working on the efficiency of implementations on large-size structures, or improving the shape of displayed results.