

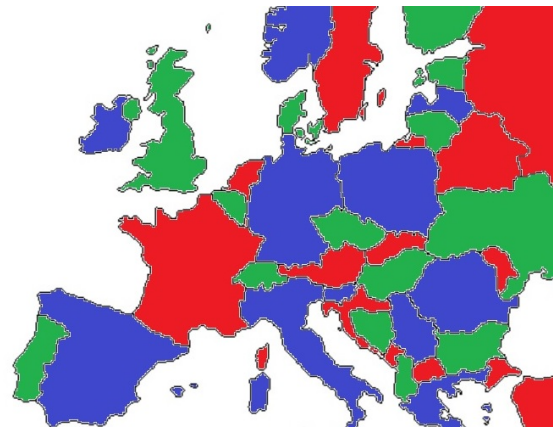


BA/MA/SA:

Heuristics for Graph Coloring

Graph Coloring is one of the most fundamental problems of Computer Science, with an incredibly wide variety of theoretical results on the topic. However, coloring is not only important from a theory point of view; the problem also has various real-life applications, e.g. in frequency assignment, register allocation or scheduling problems.

Therefore, besides the theoretical analysis, it is also important to be able to solve actual problem instances in practice. Since graph coloring is NP-hard, this often means settling for algorithms that may find suboptimal solutions, but are able to do this relatively quickly. Developing such methods is often a challenging task which requires intuition about the key aspects of the coloring problem. In addition, for different kinds of input graphs, it may be better to use different kinds of algorithms, which further complicates the picture.



In this project, you will design, develop and compare graph coloring algorithms that aim to solve the problem efficiently in practice. With this approach, the thesis lies somewhere between theory and practice. Your solutions algorithms will have to be implemented, and then compared and evaluated empirically, on a range of actual input graphs. However, the ideas behind the algorithms should come from insights and observations about the underlying theoretical problem, so a theoretical analysis of graph coloring is also essential.

Requirements: Interest in theoretical computer science, creativity in designing algorithms, and basic programming skills in a programming language of your choice. We will have weekly meetings to discuss questions and new ideas.

Interested? Please contact us for more details!

Contacts

- Pál András Papp: apapp@ethz.ch, ETZ G60.1
- Roland Schmid: roschmi@ethz.ch, ETZ G94