



BA/SA:

## Online Graph Coloring

Graph coloring is a fundamental problem in Computer Science. An important application of graph coloring is assigning of frequency channels in mobile networks: Given a set of base stations, one needs to assign frequency channels such that the channels of adjacent base stations do not interfere. This example suggests that graph coloring isn't necessarily a global problem. Each base station could decide on its frequency channel given restricted information about the network.

This type of problems can be modeled by on-line algorithms. In this setting you are not given the whole graph as an input. Instead, each node can only see some part of the graph and has to use this information to decide on its color. Once a node decided for a color, it cannot change its decision anymore. Assuming that there is an adversary who decides which node will determine its color next, what is the best strategy that the nodes can apply in this case? Furthermore, how many colors will they require?

In this thesis, you will investigate different models for the online graph coloring problem. Some work has already been done by the group which can serve as a starting point for your work.



**Requirements:** Creativity and interest in theory of computer science. We will have weekly meetings where we will discuss problems and open questions.

**Interested? Please contact us for more details!**

### Contacts

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## Detailed Project Outline

We denote the following primary tasks mandatory (on the right side you find a rough estimate for the time that we allocate to the respective task):

- Requirement 1 (★)
- Requirement 2 (★★)
- Requirement 3 (★★★)
- Requirement 4 (★★★★)

## Extensions

Apart from these requirements, we can think of plenty of ways to extend *HikeDroid* with cool features. Of course, you may add your own ideas to this non-exhaustive enumeration:

- Extension 1
- Extension 2
- Extension 3