ETH
Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zurich

Distributed Computing

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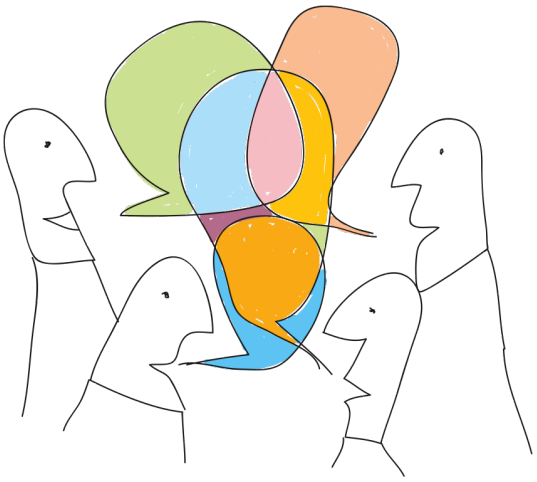
Distributed Graph Languages



Remember the seventies, when there were major advances in the study of Turing Machines and Formal Languages? For a fixed language, the task was to design an algorithm (a Turing Machine) that accepts this language, i.e., given *any* word w, the algorithm determines whether w is contained in the language or not.

Similar notions are currently studied in the setting where computers are connected in some network. This is typically modeled using a graph. The nodes in the graph correspond to computers that communicate among each other via the graph's edges. In this thesis, we wish to study what kind of languages a network can accept.

Consider, for example, the set of "all 3-colored graphs". This corresponds to a language in the original setting, and the words of that language are exactly the graphs that are 3-colored. In other words, given any colored graph, the task is to come up with a *distributed algorithm* that determines whether the graph is properly 3-colored.

Of course, there are many more examples of "graph languages". Just like in the seventies, some graph languages can be accepted by a distributed algorithm, while others cannot. In this thesis, you task is to design and study graph languages and distributed algorithms for them.

Goals

- Develop a deeper understanding of "distributed graph languages".
- Determine which languages can be accepted by a distributed algorithm, and which cannot.

Requirements

- You should not be afraid of graphs and networks.
- The ability to work independently on the topic.

Interested? For more details please contact

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