Distributed graph colouring

Open source study project
A proper vertex colouring is a labeling of a graph such that no two adjacent vertices share a label.
Vertex colouring

A proper vertex colouring is a labeling of a graph such that no two adjacent vertices share a label.
Chromatic Number

The Chromatic Number, $K$, of a graph is the minimal number of labels required to colour a graph.

Determining the Chromatic Number of a graph is NP-Hard.

Here $K = 4$.
Applications

Graph colouring has many applications:

- Resource Allocation
- GraphLab Chromatic Engine
- Clustering
A naive synchronous algorithm can colour a graph of $n$ vertices in $O(n)$ rounds using $\Delta + 1$ colours.

But for most graphs better colourings exists.

Much more efficient algorithms are also known.
This project will explore the existing graph colouring algorithms using the graphlab platform.

The goal is to implement and evaluate well known graph-colouring algorithms.

Study the trade-offs between the time complexity of algorithms and the quality of the colourings they produce.

Certain graphs (e.g., bipartite, triangle-free or trees) allow for faster colourings, would it make sense to try to discover the structure of the graph before colouring it?
Discussion

Any feedback or suggestions?
References: