

Basic Objectives

- B1** Design a tool in which one can input benchmark graphs in DIMACS standard format.
- B2** Implement a simple greedy algorithm, such as first-fit.
- B3** Use heuristics to alter the order in which vertices are considered when performing the greedy algorithm and see how this impacts the colourings produced.
- B4** Implement a number of other more advanced graph colouring heuristics that are more suited to specific graph classes.
- B5** Implement a graph colouring checker, which verifies that colourings are valid.

Intermediate Objectives

- I1** Develop a genetic algorithm that will be performed on the benchmark graphs.
- I2** Develop a simulated annealing algorithm that will be performed on the benchmark graphs.
- I3** Produce a hybrid algorithm that utilises aspects of both the genetic algorithm and simulated annealing.
- I4** Alter the algorithms developed up to this point so to improve their performance on a number of special-case graph classes.
- I5** Analyse the colourings yielded by the algorithms thus far and interpret how the algorithms exploit properties of particular graph classes.

Advanced Objectives

- A1** Produce a hybrid algorithm of genetic algorithm and tabu search.
- A2** Handle large graphs with 100s – 1000s of vertices, and very dense graphs.
- A3** Visualise the colouring process of the algorithms.