Harry Alexander Richards
Daniel Paulusma
Durham University

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Log Book

Date	Objectives
11/06/2018	Discuss project with Daniel, set initial goals.
15/09/2018	Look over DIMACS graph structure, begin creating input tool.
17/09/2018	Complete input tool, research best graph representations.
27/09/2018 - 25/10/2018	Literature Review.
16/10/2018	Implement adjacency list representation of graphs.
18/10/2018	Implement the first-fit algorithm.
20/10/2018	Implement vertex ordering heuristic - order by degree [smallest, largest and random].
06/11/2018	Implement graph colouring verify.
10/11/2018	Begin genetic algorithm, completed initialise population method.
12/11/2018	Implement fitness method, measuring number of conflcits and k value. Parent selection complete, begin the crossover method but has issues.
15/11/2018	Changed graph repesentation from adjacency lists to networkx as its more convenient for implementation.
16/11/2018	A simple crossover method implemented but not great in terms of reducing number of conflicts.
17/11/2018	Implemented a simple mutation method and iterate for fixed number of iterations, completed this simple genetic algorithm but not yet yielding proper colourings.
22/11/2018	Alter approach completely, must now simply use the genetic algorithm to look for k-colourings and fitness algorithm evaluates the 'number of conflicts' in each colouring.
05/12/2018	Finished altering existing genetic algorithm so that it now works for the above approach. It produces proper colourings but there quality isn't great for alrge graphs - also struggles with large/dense graphs.

09/12/2018	Alter current algorithms (greedy/first-fit and genetic), currently map vertices to a colour but now we work with partitions of the set of vertices.
10/12/2018	Altered both the initial population and the crossover method, now based aroudn those in Galinier and Hao's article. **Reminder: reference in paper**.
11/12/2018 - **11/01/2019**	Design report first draft.
17/01/2019 - **25/01/2019**	Received design report feedback, act on that and submit it.
25/01/2019	Begin design report presentation.
28/01/2019	Start simulated annealing, using the initial colouring method from genetic algorithm and use the mutation method to get solutions.
01/02/2019	Give design report presentation,
03/02/2019	Complete simulated annealing using temperature distribution defined.
05/02/2019	Began final report outline.
12/02/2019	Began GA-SA hybrid algorithm where a local search of simulated anneAling replaced the mutation operator.
17/02/2019	Prepared formative demonstration for Daniel.
22/02/2019	Completed the basic hybrid algorithm, doesn't work as well as expected.
24/02/2019	Used DSATUR algorithm (by Brelaz), to gain an initial upper bound for the chromatic number.
26/02/2019	Gave formative demonstration (later than expected due to illness).
03/03/2019	Used matplotlib and networkx in order to visualise colourings, unfortunately the method we used seems to use colours that look very similar in some cases.
09/03/2019	Research tabu search, it is said to be superior to simulated annealing when hybridised with GA.
17/03/2019	Began implementing tabu-GA hybrid, having issues with it producing empty sets.
25/03/2019	Above issue resolved.

26/03/2019	Began final report.
02/04/2019	Acquiring final results in order to obtain graphs for report.
19/04/2019	Draft report submitted.
29/04/2019	Draft report feedback acquired - test implementations on more graphs.
01/05/2019	All results acquired.
03/05/2019	Submitted report.