CSCI 446 Artificial Intelligence Test Run Intro

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1 Introduction

The following graphs are the results from test runs performed on five map coloring algorithms: Minimum Conflicts, Simple Backtracking, Backtracking with Forward Checking, Backtracking with Constraint propagation, and Genetic. Each algorithm was run on the same data set consisting of maps with sizes ranging from 10 to 100 vertices in 10 vertice increments. To gather better data, 10 maps of each size were generated and the average result was plotted. In addition error bars representing the maximum and minimum values encountered are added.

For each algorithm three values are plotted: vertex read, vertex write, and an algorithm specific metric. The vertex read and write graphs indicate how many times a vertex was read from or written to. The algorithm specific metric is slightly different for each algorithm, but it is generally the number of recursive calls or the the number of times through the main control loop for the algorithm.

2 Minimum Conflicts

For Minimum conflicts the algorithm specific metric is designated as the number of times a vertex is selected to be minimized.

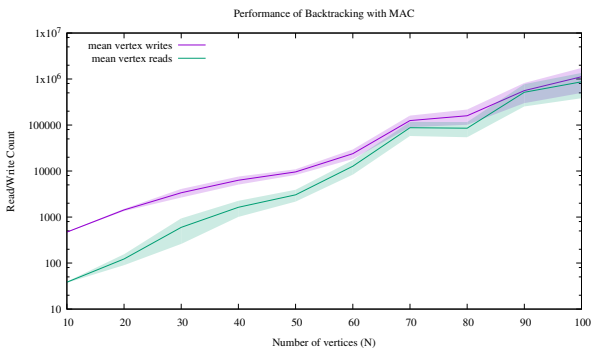

Figure 1: *Results of a test run on Simple Backtracking*

3 Simple Backtracking

For Simple Backtracking the algorithm specific metric is designated as the number of times the Backtracking algorithm is called.

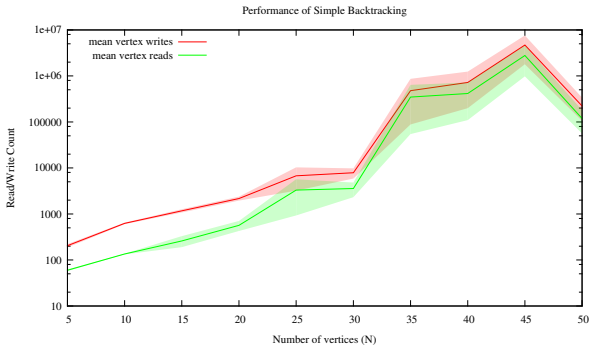

Figure 2: *Results of a test run on Simple Backtracking*

4 Backtracking with Forward Checking

For Backtracking with Forward Checking the algorithm specific metric is designated as the number of times the Backtracking with Forward Checking algorithm is called.

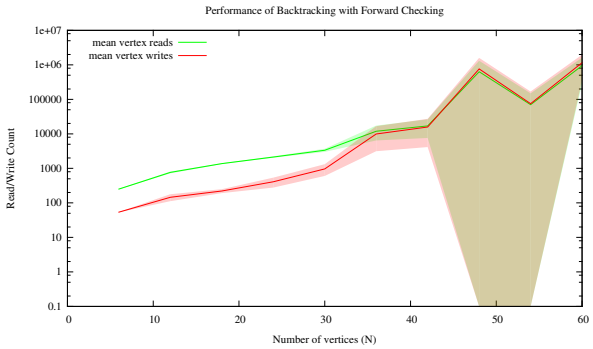

Figure 3: *Results of a test run on Backtracking with Forward Checking*

5 Backtracking with Constraint Propagation

For Backtracking with Constraint Propagation the algorithm specific metric is designated as the number of times the Backtracking with Constraint Propagation algorithm is called.

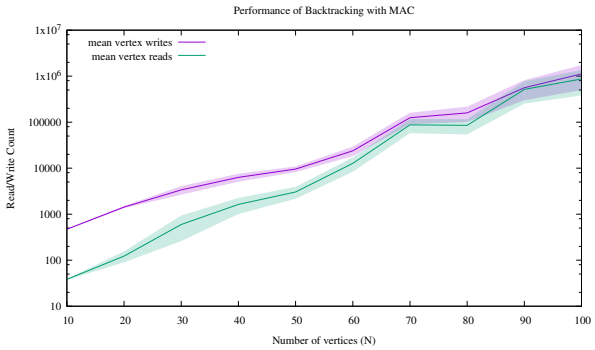

Figure 4: *Results of a test run on Backtracking with Constraint Propagation*

6 Local Search Using a Genetic Algorithm

For local search using a genetic algorithm the algorithm specific metric is designated as the number of generations the algorithm goes through.

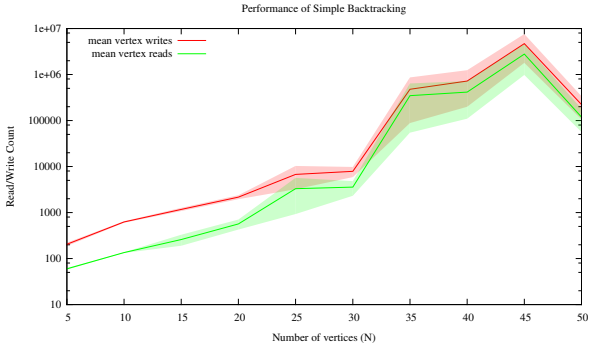

Figure 5: *Results of a test run on the Genetic Algorithm*

7 Comparative Graphs

The number of vertices written and read metrics for each algorithm are compared to each other in separate graphs to compare performance.

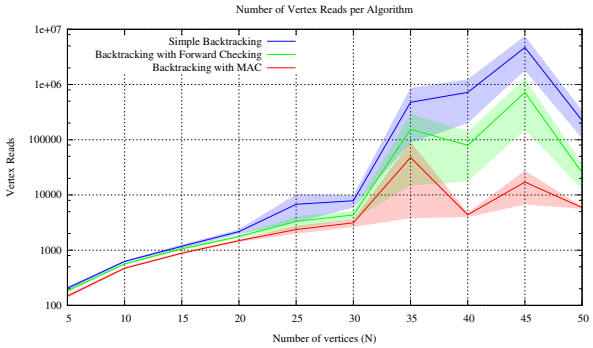

Figure 6: *Comparing read performance*

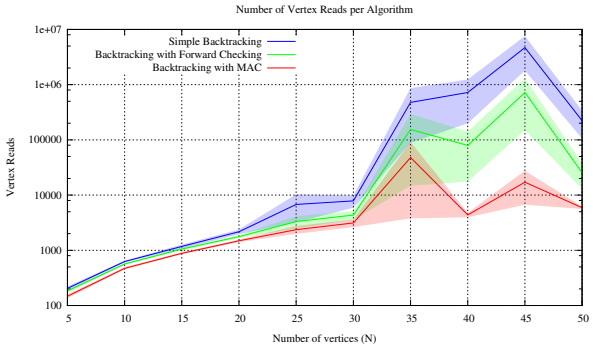

Figure 7: *Comparing write performance*