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September 30, 2015

Assignment 4 Writeup

**1. What is the size of the state space for this problem?**

nm

where:

n = number of vertices

m = number of colors

**2. Describe any implmentation choices you made that you felt were important. Mention anything else we should know when evaluating your program**.

I kept track of my domains with a reference counter array. If I removed a color from the domain, I would increase the counter corresponding to that color. When backtracking, I would decrease the counter corresponding to that color.

If I got a node ‘for free’, i.e. the domain was one color, I did not count it as a branching node. I also counted before validating whether or not I could use that color.

All of my algorithms were recursive.

**3.** **What’s the average speedup you get for fc over dfs? For mcv over fc?**

I will be using the queen\_8\_12 example with 12 colors to determine the speedup.

|  |  |  |
| --- | --- | --- |
| **Algorithm** | **Nodes Expanded** | **Percent Speedup** |
| DFS | 15798874 |  |
| FC | 721044 | ~95.44% |
| MCV | 233 | ~99.99% |

**4. What suggesitons do you have for improving this assignment in the future?**

Be more precise on what exactly a branched node is. Professor Ruml in class said to not count nodes that you got “for free”, but the reference solution counts those nodes.

**Small transcript:**

-bash-4.3$ ./color-validator ./run.sh **dfs** 12 < queen8\_12.col.txt

Executing planner...

Picked up JAVA\_TOOL\_OPTIONS: -Xmx256m

Execution time: 0.726861953735 seconds

Parsing plan...

15798874 branching nodes explored.

Validating plan...

Valid coloring!

-bash-4.3$ ./color-validator ./run.sh **fc** 12 < queen8\_12.col.txt

Executing planner...

Picked up JAVA\_TOOL\_OPTIONS: -Xmx256m

Execution time: 1.46826004982 seconds

Parsing plan...

721251 branching nodes explored.

Validating plan...

Valid coloring!

-bash-4.3$ ./color-validator ./run.sh **mcv** 12 < queen8\_12.col.txt

Executing planner...

Picked up JAVA\_TOOL\_OPTIONS: -Xmx256m

Execution time: 0.432862043381 seconds

Parsing plan...

233 branching nodes explored.

Validating plan...

Valid coloring!