As you can see above, my unit clause heuristic performs poorly compared to the base DPLL algorithm, which also does worse than others I have asked. I spent about 20+ hours on this assignment over a week and had a working solution about 5 hours in, and can’t find why it won’t work properly. I can’t tell you how many times I have reread the textbook, rewritten all my code, read lecture notes and stack overflow posts. I understand the problem completely and could recite the pseudocode and the intended behavior from memory at this point, but I am just too burnt out to continue.

Not expecting pity in any way, just don’t want you to think that I gave up or anything.

Regardless, all problems reach proper solutions (or almost all – UCH fails on a couple longer tests), and the base DPLL performs decently. Full output transcripts can be found in the GitHub submission in the transcripts folder, named accordingly.

**Map Coloring with no heuristic function**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **./DPLL mapcolor.cnf** | **./DPLL mapcolor.cnf QR** | **./DPLL mapcolor.cnf QG VB** |
| **DPLL Calls** | 130 | 115 | 73 |
| **Final Model** | SAB VG WAG NSWR NTR TB QG | SAB WAR VR TB NTG QR NSWG | problem is unsatisfiable |

**Map coloring with Heuristic function**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **./DPLL mapcolor.cnf +UCH** | **./DPLL mapcolor.cnf QR +UCH** | **./DPLL mapcolor.cnf QG VB +UCH** |
| **DPLL Calls** | 201 | 6299 | 12918 |
| **Final Model** | SAB VG WAG NSWR NTR TB QG | SAB WAR VR TB NTG QR NSWG | problem is unsatisfiable |

|  |  |  |
| --- | --- | --- |
|  | **./DPLL sammy.cnf O1Y O2W O3Y L1W L2Y L3B** | **./DPLL sammy.cnf O1W O2Y O3W L1W L2B L3B** |
| **DPLL Calls** | 2504 | 672 |
| **Final Model** | O3Y O2W O1W L3W L2B C1B L3B C2W O1Y C3Y L2Y L1Y L1W | O3W O2Y O1W L3Y L2W L2B C1B L3B C2Y C3W O1Y L1Y L1W |

**Sammy’s Sport Shop with no heuristic**

**Sammy’s Sport Shop with heuristic**

|  |  |  |
| --- | --- | --- |
|  | **./DPLL sammy.cnf O1Y O2W O3Y L1W L2Y L3B** | **./DPLL sammy.cnf O1W O2Y O3W L1W L2B L3B** |
| **DPLL Calls** | 86493 | infinity |
| **Final Model** | O3Y O2W O1W L3W L2B C1B L3B C2W O1Y C3Y L2Y L1W | ? |

**3 Queens**

|  |  |  |
| --- | --- | --- |
|  | **./DPLL 3\_queens.cnf** | **./DPLL 3\_queens.cnf +UCH** |
| **DPLL Calls** | 47 | 515 |
| **Final Model** | problem is unsatisfiable | problem is unsatisfiable |

**4 Queens**

|  |  |  |
| --- | --- | --- |
|  | **./DPLL 4\_queens.cnf** | **./DPLL 4\_queens.cnf +UCH** |
| **DPLL Calls** | 133 | 3145 |
| **Final Model** | Q43 Q12 Q24 Q31 | Q43 Q12 Q24 Q31 |

**5 Queens**

|  |  |  |
| --- | --- | --- |
|  | **./DPLL 5\_queens.cnf** | **./DPLL 5\_queens.cnf +UCH** |
| **DPLL Calls** | 46 | 682 |
| **Final Model** | Q53 Q45 Q11 Q24 Q32 | Q53 Q41 Q15 Q34 Q22 |

**6 Queens**

|  |  |  |
| --- | --- | --- |
|  | **./DPLL 6\_queens.cnf** | **./DPLL 6\_queens.cnf +UCH** |
| **DPLL Calls** | 1835 | Doesn’t even finish |
| **Final Model** | Q65 Q24 Q41 Q12 Q36 Q53 | ? |