AI Assignment 4

Sudoku

Chris Borg – [cjborg@alaska.edu](mailto:cjborg@alaska.edu)

Elysha Menefee – [emenefee@alaska.edu](mailto:emenefee@alaska.edu)

Ryan Richter – [rdrichter@alaska.edu](mailto:rdrichter@alaska.edu)

The final solution we chose for our sudoku solver was not very good. We only implemented a recursive search that, given a board, would find the spot with the fewest number of possible moves, try the first move and then recursively go down the tree until it solved the board. Had we started sooner, we might have been able to implement a less complicated solver before the recursive solver is called.

We calculated the average hardness of the sudoku boards by averaging our runs and dividing the board with the longest run time by 5. This gave us a place we could put each board into.

|  |  |
| --- | --- |
| Time in minutes | Hardness Level |
| 0-3.132 | 1 |
| 3.133-6.265 | 2 |
| 6.266-9.397 | 3 |
| 9.398-12.529 | 4 |
| 12.53-15+ | 5 |

We only gathered data from two different runs as it takes an average of 38 minutes to run the whole program. In the end I would put our sudoku solver at a solid 3. It can solve any board that it is given, but it takes an enormous about of time as the hardness of the board goes up.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| File | R1 Seconds | R2 Minutes | R2 Seconds | R2 Minutes | Average | Difficulty |
| 17-1 | 58.0449991 | 0.967416652 | 57.140528 | 0.952342133 | 0.959879 | 1 |
| 17-2 | 8.4428109 | 0.140713515 | 8.7677295 | 0.146128825 | 0.143421 | 1 |
| 17-3 | 19.7930675 | 0.329884458 | 19.9904935 | 0.333174892 | 0.33153 | 1 |
| 17-4 | 457.061483 | 7.617691378 | 452.1413534 | 7.535689223 | 7.57669 | 3 |
| 17-5 | 7.1532755 | 0.119221258 | 7.048778 | 0.117479633 | 0.11835 | 1 |
| 17-6 | 3.32972 | 0.055495333 | 3.2873657 | 0.054789428 | 0.055142 | 1 |
| 17-7 | 6.2730768 | 0.10455128 | 6.3755033 | 0.106258388 | 0.105405 | 1 |
| 17-8 | 49.1507286 | 0.81917881 | 48.1916856 | 0.80319476 | 0.811187 | 1 |
| 17-9 | 3.3812157 | 0.056353595 | 3.3325584 | 0.05554264 | 0.055948 | 1 |
| 17-10 | 195.119832 | 3.251997203 | 195.3988411 | 3.256647352 | 3.254322 | 2 |
| 17-11 | 143.900335 | 2.398338912 | 144.4863675 | 2.408106125 | 2.403223 | 1 |
| 17-12 | 0.3243631 | 0.005406052 | 0.3105943 | 0.005176572 | 0.005291 | 1 |
| 17-13 | 31.214302 | 0.520238367 | 31.602877 | 0.526714617 | 0.523476 | 1 |
| 17-14 | 125.702662 | 2.095044368 | 124.6839628 | 2.078066047 | 2.086555 | 1 |
| 17-15 | 921.672969 | 15.36121616 | 957.8181252 | 15.96363542 | 15.66243 | 5 |
| 17-16 | 57.4573078 | 0.957621797 | 56.4828883 | 0.941381472 | 0.949502 | 1 |
| 17-17 | 118.200703 | 1.97001171 | 116.3348066 | 1.938913443 | 1.954463 | 1 |
| 17-18 | 2.7615037 | 0.046025062 | 2.9078852 | 0.048464753 | 0.047245 | 1 |
| 17-19 | 8.7630173 | 0.146050288 | 9.6342012 | 0.16057002 | 0.15331 | 1 |
| 17-20 | 39.344932 | 0.655748867 | 39.1888718 | 0.653147863 | 0.654448 | 1 |
| easy | 0.0807071 | 0.001345118 | 0.0809163 | 0.001348605 | 0.001347 | 1 |
| easy1 | 0.0695309 | 0.001158848 | 0.0692601 | 0.001154335 | 0.001157 | 1 |
| hardestinworld | 19.5300119 | 0.325500198 | 19.7111348 | 0.328518913 | 0.32701 | 1 |
|  |  |  |  |  | 38.18133 |  |
|  |  |  |  |  | Average run time of whole program | |