|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Problem**  **Data** | **Solver** | **VAH** | **#Node** | **#BT** | **Time(ms)** |
| d-10-01 | BT | VAH1 | 142088 | 142030 | 107 |
| BT | VAH2 | 279592 | 279534 | 121 |
| BT | VAH3 | 357053 | 356995 | 135 |
| BT | VAH4 | 75192 | 75134 | 67 |
| BT | VAH5 | 75192 | 75134 | 46 |
| FC | VAH1 | 810 | 752 | 27 |
| FC | VAH2 | 98867827 | 98867769 | 98602 |
| FC | VAH3 | 58 | 0 | 10 |
| FC | VAH4 | 75192 | 75134 | 254 |
| FC | VAH5 | 75192 | 75134 | 312 |
| d-10-06  D-10-07  D-10-08 | BT | VAH1 | 14774 | 14716 | 26 |
| BT | VAH2 | 132886 | 132828 | 71 |
| BT | VAH3 | 23710 | 23652 | 10 |
| BT | VAH4 | 142445 | 142387 | 100 |
| BT | VAH5 | 142445 | 142387 | 68 |
| FC | VAH1 | 58 | 0 | 10 |
| FC | VAH2 | 30527489 | 30527431 | 28962 |
| FC | VAH3 | 58 | 0 | 12 |
| FC | VAH4 | 142445 | 142387 | 565 |
| FC | VAH5 | 142445 | 142387 | 477 |
| BT | VAH1 | 10975 | 10917 | 30 |
| BT | VAH2 | 102656 | 102598 | 85 |
| BT | VAH3 | 50420 | 50362 | 61 |
| BT | VAH4 | 10975 | 10917 | 27 |
| BT | VAH5 | 10975 | 10917 | 22 |
| FC | VAH1 | 135 | 77 | 14 |
| FC | VAH2 | 6901819 | 6901761 | 9048 |
| FC | VAH3 | 253 | 195 | 18 |
| FC | VAH4 | 10975 | 10917 | 65 |
| FC | VAH5 | **10975** | **10917** | **144** |
| BT | VAH1 | 62009 | 61951 | 56 |
| BT | VAH2 | 250884 | 250826 | 205 |
| BT | VAH3 | 22992349 | 22992291 | 6143 |
| BT | VAH4 | 15718 | 15660 | 27 |
| BT | VAH5 | 15718 | 15660 | 34 |
| FC | VAH1 | 80 | 22 | 12 |
| FC | VAH2 | 14094735 | 14094677 | 12580 |
| FC | VAH3 | 311 | 253 | 35 |
| FC | VAH4 | 17365 | 17307 | 84 |
| FC | VAH5 | 17365 | 17307 | 85 |
| d-10-09  d-15-01 | BT | VAH1 | 62009 | 61951 | 60 |
| BT | VAH2 | 250884 | 250836 | 96 |
| BT | VAH3 | 22992349 | 22992291 | 6364 |
| BT | VAH4 | 15718 | 15660 | 33 |
| BT | VAH5 | 15718 | 15660 | 26 |
| FC | VAH1 | 58 | 0 | 11 |
| FC | VAH2 | \* | \* | \* |
| FC | VAH3 | 70 | 12 | 21 |
| FC | VAH4 | 15718 | 15660 | 77 |
| FC | VAH5 | 15718 | 15660 | 149 |
| BT | VAH1 | \* | \* | \* |
| BT | VAH2 | \* | \* | \* |
| BT | VAH3 | \* | \* | \* |
| BT | VAH4 | \* | \* | \* |
| BT | VAH5 | \* | \* | \* |
| FC | VAH1 | 40026 | 39919 | 296 |
| FC | VAH2 | \* | \* | \* |
| FC | VAH3 | 253650 | 253543 | 1343 |
| FC | VAH4 | \* | \* | \* |
| FC | VAH5 | \* | \* | \* |

From the table we can conclude that variable heuristic 1 is much better than others as it gives maximum better output in most data cases.

**5 Types of variable heuristic that were used in this assignment:**

VAH1 The variable chosen is the one with the smallest domain

VAH2 The variable chosen is the one with the maximum degree to unassigned variables. Also, called max-forward-degree

VAH3 The variable chosen by VAH1, Ties are broken by VAH2

VAH4 The variable chosen is the one that minimizes the VAH1 / VAH2

VAH5 A random unassigned variable is chosen [From randomness we just choose the static value from the domain-list]

**Value order Heuristic**For value order we choose that value from the domain list which has least possible places in the same row and same column.

**Conclusion:**

Variable heuristic 1 is better as it gives good solution in most of the data cases. Again except Variable heuristic 2, forward checking is better than normal backtracking.