AI assignment 4: Constraint Satisfaction Problems

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1 Backtracking

The following table shows the average calls for the N-Queens problem with $n = 10$.

Nr.	calls
1	20
2	229
3	56
4	438
5	50
6	165
7	243
8	206
9	14
10	95

The mean is 151.6 and the standard deviation is 132.67. It is obvious that there is a great variation in the amount of calls.

2 Forward checking

The following table shows the average calls for the N-Queens problem with $n = 50$ and forward checking.

Nr.	calls
1	9581
2	9335
3	1597
4	9190
5	487
6	5859
7	5724
8	55
9	536
10	504

The mean is 4286.8 and the standard deviation is 4083.18. Even though the standard deviation is larger with than without forward checking, it is still better since there needs to be less backtracking.

When using MRV and LCV the amount of calls for the same problem is reduced to 53. This method is obviously faster since it reduces the amount of backtracking to an absolute minimum. It does this by creating the most optimal order of variables and values.

3 AC3

The amount of calls for the N-Queens problem met $n = 50$ and AC3 is 60 with MRV LCV and an average of 309 calls without. It is obvious that MRV and LCV create an improvement. The reason for

this is the same as in the previous section.

4 Sudoku

I did not manage to solve the hard puzzle with my program. I think this is the result of a suboptimal orderDomains function.