TDT4136 - Exercise 5

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1 Code

Handed in seperatly in the file assigment5.py and is based on the skeleton code that was handed out. It's implemented in Python 2.7.

2 Solutions

2.1 Easy

```
8 1 7 | 6 9 3 | 2 5 4
5 2 3 | 7 4 1 | 9 8 6
9 6 4 | 5 2 8 | 3 1 7
------+-------+------
6 7 1 | 8 5 9 | 4 2 3
3 4 8 | 2 6 7 | 1 9 5
2 9 5 | 1 3 4 | 7 6 8
------+-------+------
7 5 6 | 3 1 2 | 8 4 9
1 3 9 | 4 8 5 | 6 7 2
4 8 2 | 9 7 6 | 5 3 1
```

Number of backtrack-runs: 1
Fails: 0

Here it only ran once, so it just runs one inference.

2.2 Medium

```
6 3 5 | 9 2 7 | 1 4 8
4 8 2 | 1 6 5 | 9 7 3
9 7 1 | 3 8 4 | 2 6 5
------+-------+------
5 2 9 | 7 1 6 | 3 8 4
8 4 6 | 2 9 3 | 5 1 7
7 1 3 | 5 4 8 | 6 9 2
------+-------+------
2 9 4 | 8 5 1 | 7 3 6
1 6 7 | 4 3 2 | 8 5 9
3 5 8 | 6 7 9 | 4 2 1
```

Number of backtrack runs: 1
Fails : 0

Here it only ran once, so it just runs one inference.

2.3 Hard

```
8 9 2 | 3 5 1 | 7 6 4
1 3 4 | 8 7 6 | 5 2 9
5 7 6 | 4 9 2 | 3 1 8
------+-------+------
7 1 5 | 6 2 9 | 4 8 3
4 6 3 | 5 1 8 | 2 9 7
2 8 9 | 7 4 3 | 6 5 1
------+-------+------
3 5 1 | 2 8 4 | 9 7 6
9 4 7 | 1 6 5 | 8 3 2
6 2 8 | 9 3 7 | 1 4 5
```

Number of backtrack runs: 3
Fails: 0

A harder puzzle, will of course take more backtrack-runs than the easier ones.

2.4 Very hard

```
3 4 7 | 9 6 1 | 8 2 5
6 5 8 | 4 2 3 | 9 7 1
9 1 2 | 5 7 8 | 4 3 6
------+-------+------
5 3 4 | 2 9 7 | 6 1 8
7 6 9 | 1 8 4 | 2 5 3
2 8 1 | 3 5 6 | 7 9 4
------+-------+------
1 7 6 | 8 3 2 | 5 4 9
8 9 3 | 7 4 5 | 1 6 2
4 2 5 | 6 1 9 | 3 8 7
```

Number of backtrack runs: 20
Fails: 17

As we have chosen a random variable with length bigger than one, we get a different number of backtrack-runs and fails every time we run this board. The best result we've seen is 2 backtrack-runs, and zero fails.