

ECE 466

KNOWLEDGE-SYSTEM ENGINEERING
CONSTRAINT SATISFACTION

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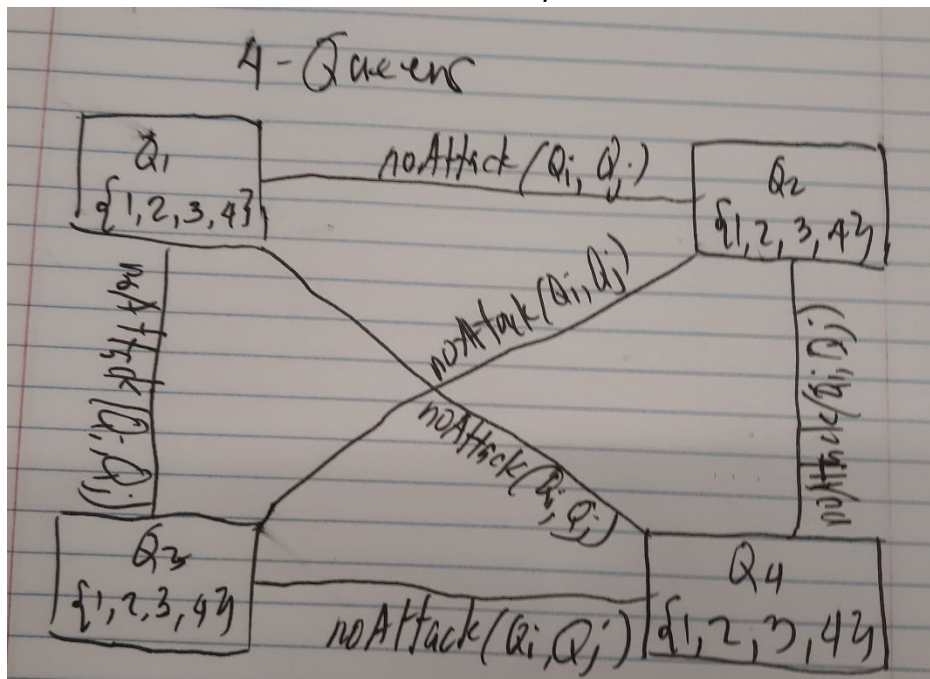
Variables (Z) = { Q1, Q2, Q3, Q4, Q5, Q6, Q7, Q8 }

Domain (D) = { 1, 2, 3, 4, 5, 6, 7, 8 }

Constraints =

- 8x8 Board
- Q_i cannot attack Q_j ($i \neq j$)
 - Vertically, Q_i cannot be placed in the same column as Q_j
 - Horizontally, Q_i cannot be placed in the same row as Q_j
 - Diagonally, Q_i and Q_j cannot be the same number of columns apart as they are rows apart, $|i-j| \neq |Q_i - Q_j|$

8-Queens Binary CSP



8-QUEENS SOLUTIONS

Queen at 1A:

Solution 1 with queen in 1A

The positions of the Queens are:

Row 1: 1A
Row 2: 2E
Row 3: 3H
Row 4: 4F
Row 5: 5C
Row 6: 6G
Row 7: 7B
Row 8: 8D

Total numbers of backtracks before this solution was found:

Forward Checking: 63

Directional Look Ahead: 6

Solution 2 with queen in 1A

The positions of the Queens are:

Row 1: 1A
Row 2: 2F
Row 3: 3H
Row 4: 4C
Row 5: 5G
Row 6: 6D
Row 7: 7B
Row 8: 8E

Total numbers of backtracks before this solution was found:

Forward Checking: 21

Directional Look Ahead: 3

Solution 3 with queen in 1A

The positions of the Queens are:

Row 1: 1A
Row 2: 2G
Row 3: 3D
Row 4: 4F
Row 5: 5H
Row 6: 6B
Row 7: 7E
Row 8: 8C

Total numbers of backtracks before this solution was found:

Forward Checking: 80

Directional Look Ahead: 8

Solution 4 with queen in 1A

The positions of the Queens are:

Row 1: 1A
Row 2: 2G

Row 3: 3E
Row 4: 4H
Row 5: 5B
Row 6: 6D
Row 7: 7F
Row 8: 8C

Total numbers of backtracks before this solution was found:

Forward Checking: 32

Directional Look Ahead: 4

Total numbers of backtracks before all solutions having queen in: 1A was found (or found there are no solutions):

Forward Checking: 196

Directional Look Ahead: 21

Queen at 1B:

Solution 1 with queen in 1B

The positions of the Queens are:

Row 1: 1B
Row 2: 2D
Row 3: 3F
Row 4: 4H
Row 5: 5C
Row 6: 6A
Row 7: 7G
Row 8: 8E

Total numbers of backtracks before this solution was found:

Forward Checking: 19

Directional Look Ahead: 4

Solution 2 with queen in 1B

The positions of the Queens are:

Row 1: 1B
Row 2: 2E
Row 3: 3G
Row 4: 4A
Row 5: 5C
Row 6: 6H
Row 7: 7F
Row 8: 8D

Total numbers of backtracks before this solution was found:

Forward Checking: 32

Directional Look Ahead: 2

Solution 3 with queen in 1B

The positions of the Queens are:

Row 1: 1B
Row 2: 2E
Row 3: 3G
Row 4: 4D
Row 5: 5A
Row 6: 6H
Row 7: 7F
Row 8: 8C

Total numbers of backtracks before this solution was found:

Forward Checking: 25

Directional Look Ahead: 4

Solution 4 with queen in 1B

The positions of the Queens are:

Row 1: 1B
Row 2: 2F
Row 3: 3A
Row 4: 4G
Row 5: 5D

Row 6: 6H
Row 7: 7C
Row 8: 8E

Total numbers of backtracks before this solution was found:
Forward Checking: 56
Directional Look Ahead: 5

Solution 5 with queen in 1B

The positions of the Queens are:

Row 1: 1B
Row 2: 2F
Row 3: 3H
Row 4: 4C
Row 5: 5A
Row 6: 6D
Row 7: 7G
Row 8: 8E

Total numbers of backtracks before this solution was found:
Forward Checking: 43
Directional Look Ahead: 5

Solution 6 with queen in 1B

The positions of the Queens are:

Row 1: 1B
Row 2: 2G
Row 3: 3C
Row 4: 4F
Row 5: 5H
Row 6: 6E
Row 7: 7A
Row 8: 8D

Total numbers of backtracks before this solution was found:
Forward Checking: 78
Directional Look Ahead: 9

Solution 7 with queen in 1B

The positions of the Queens are:

Row 1: 1B
Row 2: 2G
Row 3: 3E
Row 4: 4H
Row 5: 5A
Row 6: 6D
Row 7: 7F
Row 8: 8C

Total numbers of backtracks before this solution was found:
Forward Checking: 56
Directional Look Ahead: 6

Solution 8 with queen in 1B

The positions of the Queens are:

Row 1: 1B
Row 2: 2H
Row 3: 3F
Row 4: 4A
Row 5: 5C
Row 6: 6E
Row 7: 7G
Row 8: 8D

Total numbers of backtracks before this solution was found:
Forward Checking: 107
Directional Look Ahead: 9

Total numbers of backtracks before all solutions having queen in: 1B was found (or found there are no solutions):
Forward Checking: 416
Directional Look Ahead: 44

Queen at 1C:

Solution 1 with queen in 1C

The positions of the Queens are:

Row 1: 1C
Row 2: 2A
Row 3: 3G
Row 4: 4E
Row 5: 5H
Row 6: 6B
Row 7: 7D
Row 8: 8F

Total numbers of backtracks before this solution was found:

Forward Checking: 30

Directional Look Ahead: 4

Solution 2 with queen in 1C

The positions of the Queens are:

Row 1: 1C
Row 2: 2E
Row 3: 3B
Row 4: 4H
Row 5: 5A
Row 6: 6G
Row 7: 7D
Row 8: 8F

Total numbers of backtracks before this solution was found:

Forward Checking: 19

Directional Look Ahead: 2

Solution 3 with queen in 1C

The positions of the Queens are:

Row 1: 1C
Row 2: 2E
Row 3: 3B
Row 4: 4H
Row 5: 5F
Row 6: 6D
Row 7: 7G
Row 8: 8A

Total numbers of backtracks before this solution was found:

Forward Checking: 33

Directional Look Ahead: 4

Solution 4 with queen in 1C

The positions of the Queens are:

Row 1: 1C
Row 2: 2E
Row 3: 3G
Row 4: 4A
Row 5: 5D

Row 6: 6B
Row 7: 7H
Row 8: 8F

Total numbers of backtracks before this solution was found:
Forward Checking: 24
Directional Look Ahead: 2

Solution 5 with queen in 1C

The positions of the Queens are:

Row 1: 1C
Row 2: 2E
Row 3: 3H
Row 4: 4D
Row 5: 5A
Row 6: 6G
Row 7: 7B
Row 8: 8F

Total numbers of backtracks before this solution was found:
Forward Checking: 51
Directional Look Ahead: 4

Solution 6 with queen in 1C

The positions of the Queens are:

Row 1: 1C
Row 2: 2F
Row 3: 3B
Row 4: 4E
Row 5: 5H
Row 6: 6A
Row 7: 7G
Row 8: 8D

Total numbers of backtracks before this solution was found:
Forward Checking: 32
Directional Look Ahead: 6

Solution 7 with queen in 1C

The positions of the Queens are:

Row 1: 1C
Row 2: 2F
Row 3: 3B
Row 4: 4G
Row 5: 5A
Row 6: 6D
Row 7: 7H
Row 8: 8E

Total numbers of backtracks before this solution was found:
Forward Checking: 56
Directional Look Ahead: 4

Solution 8 with queen in 1C

The positions of the Queens are:

Row 1: 1C
Row 2: 2F
Row 3: 3B
Row 4: 4G
Row 5: 5E
Row 6: 6A
Row 7: 7H
Row 8: 8D

Total numbers of backtracks before this solution was found:
Forward Checking: 35
Directional Look Ahead: 6

Solution 9 with queen in 1C

The positions of the Queens are:

Row 1: 1C
Row 2: 2F
Row 3: 3D
Row 4: 4A
Row 5: 5H
Row 6: 6E
Row 7: 7G
Row 8: 8B

Total numbers of backtracks before this solution was found:
Forward Checking: 61
Directional Look Ahead: 6

Solution 10 with queen in 1C

The positions of the Queens are:

Row 1: 1C
Row 2: 2F
Row 3: 3D
Row 4: 4B
Row 5: 5H
Row 6: 6E
Row 7: 7G
Row 8: 8A

Total numbers of backtracks before this solution was found:
Forward Checking: 39
Directional Look Ahead: 6

Solution 11 with queen in 1C

The positions of the Queens are:

Row 1: 1C
Row 2: 2F
Row 3: 3H
Row 4: 4A
Row 5: 5D
Row 6: 6G
Row 7: 7E
Row 8: 8B

Total numbers of backtracks before this solution was found:
Forward Checking: 67
Directional Look Ahead: 6

Solution 12 with queen in 1C

The positions of the Queens are:

Row 1: 1C
Row 2: 2F
Row 3: 3H
Row 4: 4A
Row 5: 5E
Row 6: 6G
Row 7: 7B
Row 8: 8D

Total numbers of backtracks before this solution was found:
Forward Checking: 42
Directional Look Ahead: 6

Solution 13 with queen in 1C

The positions of the Queens are:

Row 1: 1C
Row 2: 2F
Row 3: 3H
Row 4: 4B
Row 5: 5D
Row 6: 6A
Row 7: 7G
Row 8: 8E

Total numbers of backtracks before this solution was found:
Forward Checking: 71
Directional Look Ahead: 6

Solution 14 with queen in 1C

The positions of the Queens are:

Row 1: 1C
Row 2: 2G
Row 3: 3B
Row 4: 4H
Row 5: 5E
Row 6: 6A
Row 7: 7D
Row 8: 8F

Total numbers of backtracks before this solution was found:
Forward Checking: 60
Directional Look Ahead: 7

Solution 15 with queen in 1C

The positions of the Queens are:

Row 1: 1C
Row 2: 2G
Row 3: 3B

Row 4: 4H
Row 5: 5F
Row 6: 6D
Row 7: 7A
Row 8: 8E

Total numbers of backtracks before this solution was found:
Forward Checking: 74
Directional Look Ahead: 6

Solution 16 with queen in 1C
The positions of the Queens are:

Row 1: 1C
Row 2: 2H
Row 3: 3D
Row 4: 4G
Row 5: 5A
Row 6: 6F
Row 7: 7B
Row 8: 8E

Total numbers of backtracks before this solution was found:
Forward Checking: 91
Directional Look Ahead: 8

Total numbers of backtracks before all solutions having queen in: 1C was found (or found there are no solutions):
Forward Checking: 785
Directional Look Ahead: 83

Queen at 1D:

Solution 1 with queen in 1D

The positions of the Queens are:

Row 1: 1D
Row 2: 2A
Row 3: 3E
Row 4: 4H
Row 5: 5B
Row 6: 6G
Row 7: 7C
Row 8: 8F

Total numbers of backtracks before this solution was found:

Forward Checking: 19

Directional Look Ahead: 5

Solution 2 with queen in 1D

The positions of the Queens are:

Row 1: 1D
Row 2: 2A
Row 3: 3E
Row 4: 4H
Row 5: 5F
Row 6: 6C
Row 7: 7G
Row 8: 8B

Total numbers of backtracks before this solution was found:

Forward Checking: 3

Directional Look Ahead: 0

Solution 3 with queen in 1D

The positions of the Queens are:

Row 1: 1D
Row 2: 2B
Row 3: 3E
Row 4: 4H
Row 5: 5F
Row 6: 6A
Row 7: 7C
Row 8: 8G

Total numbers of backtracks before this solution was found:

Forward Checking: 49

Directional Look Ahead: 8

Solution 4 with queen in 1D

The positions of the Queens are:

Row 1: 1D
Row 2: 2B
Row 3: 3G
Row 4: 4C
Row 5: 5F

Row 6: 6H
Row 7: 7A
Row 8: 8E

Total numbers of backtracks before this solution was found:
Forward Checking: 10
Directional Look Ahead: 0

Solution 5 with queen in 1D

The positions of the Queens are:

Row 1: 1D
Row 2: 2B
Row 3: 3G
Row 4: 4C
Row 5: 5F
Row 6: 6H
Row 7: 7E
Row 8: 8A

Total numbers of backtracks before this solution was found:
Forward Checking: 50
Directional Look Ahead: 8

Solution 6 with queen in 1D

The positions of the Queens are:

Row 1: 1D
Row 2: 2B
Row 3: 3G
Row 4: 4E
Row 5: 5A
Row 6: 6H
Row 7: 7F
Row 8: 8C

Total numbers of backtracks before this solution was found:
Forward Checking: 14
Directional Look Ahead: 0

Solution 7 with queen in 1D

The positions of the Queens are:

Row 1: 1D
Row 2: 2B
Row 3: 3H
Row 4: 4E
Row 5: 5G
Row 6: 6A
Row 7: 7C
Row 8: 8F

Total numbers of backtracks before this solution was found:
Forward Checking: 63
Directional Look Ahead: 8

Solution 8 with queen in 1D

The positions of the Queens are:

Row 1: 1D
Row 2: 2B
Row 3: 3H
Row 4: 4F
Row 5: 5A
Row 6: 6C
Row 7: 7E
Row 8: 8G

Total numbers of backtracks before this solution was found:
Forward Checking: 18
Directional Look Ahead: 0

Solution 9 with queen in 1D

The positions of the Queens are:

Row 1: 1D
Row 2: 2F
Row 3: 3A
Row 4: 4E
Row 5: 5B
Row 6: 6H
Row 7: 7C
Row 8: 8G

Total numbers of backtracks before this solution was found:
Forward Checking: 75
Directional Look Ahead: 11

Solution 10 with queen in 1D

The positions of the Queens are:

Row 1: 1D
Row 2: 2F
Row 3: 3H
Row 4: 4B
Row 5: 5G
Row 6: 6A
Row 7: 7C
Row 8: 8E

Total numbers of backtracks before this solution was found:
Forward Checking: 28
Directional Look Ahead: 0

Solution 11 with queen in 1D

The positions of the Queens are:

Row 1: 1D
Row 2: 2F
Row 3: 3H
Row 4: 4C
Row 5: 5A
Row 6: 6G
Row 7: 7E
Row 8: 8B

Total numbers of backtracks before this solution was found:
Forward Checking: 79
Directional Look Ahead: 11

Solution 12 with queen in 1D

The positions of the Queens are:

Row 1: 1D
Row 2: 2G
Row 3: 3A
Row 4: 4H
Row 5: 5E
Row 6: 6B
Row 7: 7F
Row 8: 8C

Total numbers of backtracks before this solution was found:
Forward Checking: 48
Directional Look Ahead: 3

Solution 13 with queen in 1D

The positions of the Queens are:

Row 1: 1D
Row 2: 2G
Row 3: 3C
Row 4: 4H
Row 5: 5B
Row 6: 6E
Row 7: 7A
Row 8: 8F

Total numbers of backtracks before this solution was found:
Forward Checking: 88
Directional Look Ahead: 14

Solution 14 with queen in 1D

The positions of the Queens are:

Row 1: 1D
Row 2: 2G
Row 3: 3E
Row 4: 4B
Row 5: 5F
Row 6: 6A
Row 7: 7C
Row 8: 8H

Total numbers of backtracks before this solution was found:
Forward Checking: 54
Directional Look Ahead: 6

Solution 15 with queen in 1D

The positions of the Queens are:

Row 1: 1D
Row 2: 2G
Row 3: 3E

Row 4: 4C
Row 5: 5A
Row 6: 6F
Row 7: 7H
Row 8: 8B

Total numbers of backtracks before this solution was found:
Forward Checking: 92
Directional Look Ahead: 15

Solution 16 with queen in 1D

The positions of the Queens are:

Row 1: 1D
Row 2: 2H
Row 3: 3A
Row 4: 4C
Row 5: 5F
Row 6: 6B
Row 7: 7G
Row 8: 8E

Total numbers of backtracks before this solution was found:
Forward Checking: 63
Directional Look Ahead: 6

Solution 17 with queen in 1D

The positions of the Queens are:

Row 1: 1D
Row 2: 2H
Row 3: 3A
Row 4: 4E
Row 5: 5G
Row 6: 6B
Row 7: 7F
Row 8: 8C

Total numbers of backtracks before this solution was found:
Forward Checking: 98
Directional Look Ahead: 15

Solution 18 with queen in 1D

The positions of the Queens are:

Row 1: 1D
Row 2: 2H
Row 3: 3E
Row 4: 4C
Row 5: 5A
Row 6: 6G
Row 7: 7B
Row 8: 8F

Total numbers of backtracks before this solution was found:
Forward Checking: 78
Directional Look Ahead: 6

Total numbers of backtracks before all solutions having queen in: 1D was found (or found there are no solutions):

Forward Checking: 929

Directional Look Ahead: 116

Queen at 1E:

Solution 1 with queen in 1E

The positions of the Queens are:

Row 1: 1E
Row 2: 2A
Row 3: 3D
Row 4: 4F
Row 5: 5H
Row 6: 6B
Row 7: 7G
Row 8: 8C

Total numbers of backtracks before this solution was found:

Forward Checking: 4

Directional Look Ahead: 5

Solution 2 with queen in 1E

The positions of the Queens are:

Row 1: 1E
Row 2: 2A
Row 3: 3H
Row 4: 4D
Row 5: 5B
Row 6: 6G
Row 7: 7C
Row 8: 8F

Total numbers of backtracks before this solution was found:

Forward Checking: 15

Directional Look Ahead: 0

Solution 3 with queen in 1E

The positions of the Queens are:

Row 1: 1E
Row 2: 2A
Row 3: 3H
Row 4: 4F
Row 5: 5C
Row 6: 6G
Row 7: 7B
Row 8: 8D

Total numbers of backtracks before this solution was found:

Forward Checking: 10

Directional Look Ahead: 5

Solution 4 with queen in 1E

The positions of the Queens are:

Row 1: 1E
Row 2: 2B
Row 3: 3D
Row 4: 4F
Row 5: 5H

Row 6: 6C
Row 7: 7A
Row 8: 8G

Total numbers of backtracks before this solution was found:
Forward Checking: 24
Directional Look Ahead: 4

Solution 5 with queen in 1E

The positions of the Queens are:

Row 1: 1E
Row 2: 2B
Row 3: 3D
Row 4: 4G
Row 5: 5C
Row 6: 6H
Row 7: 7F
Row 8: 8A

Total numbers of backtracks before this solution was found:
Forward Checking: 14
Directional Look Ahead: 5

Solution 6 with queen in 1E

The positions of the Queens are:

Row 1: 1E
Row 2: 2B
Row 3: 3F
Row 4: 4A
Row 5: 5G
Row 6: 6D
Row 7: 7H
Row 8: 8C

Total numbers of backtracks before this solution was found:
Forward Checking: 30
Directional Look Ahead: 4

Solution 7 with queen in 1E

The positions of the Queens are:

Row 1: 1E
Row 2: 2B
Row 3: 3H
Row 4: 4A
Row 5: 5D
Row 6: 6G
Row 7: 7C
Row 8: 8F

Total numbers of backtracks before this solution was found:
Forward Checking: 23
Directional Look Ahead: 5

Solution 8 with queen in 1E

The positions of the Queens are:

Row 1: 1E
Row 2: 2C
Row 3: 3A
Row 4: 4F
Row 5: 5H
Row 6: 6B
Row 7: 7D
Row 8: 8G

Total numbers of backtracks before this solution was found:
Forward Checking: 50
Directional Look Ahead: 9

Solution 9 with queen in 1E

The positions of the Queens are:

Row 1: 1E
Row 2: 2C
Row 3: 3A
Row 4: 4G
Row 5: 5B
Row 6: 6H
Row 7: 7F
Row 8: 8D

Total numbers of backtracks before this solution was found:
Forward Checking: 27
Directional Look Ahead: 5

Solution 10 with queen in 1E

The positions of the Queens are:

Row 1: 1E
Row 2: 2C
Row 3: 3H
Row 4: 4D
Row 5: 5G
Row 6: 6A
Row 7: 7F
Row 8: 8B

Total numbers of backtracks before this solution was found:
Forward Checking: 60
Directional Look Ahead: 9

Solution 11 with queen in 1E

The positions of the Queens are:

Row 1: 1E
Row 2: 2G
Row 3: 3A
Row 4: 4C
Row 5: 5H
Row 6: 6F
Row 7: 7D
Row 8: 8B

Total numbers of backtracks before this solution was found:
Forward Checking: 39
Directional Look Ahead: 6

Solution 12 with queen in 1E

The positions of the Queens are:

Row 1: 1E
Row 2: 2G
Row 3: 3A
Row 4: 4D
Row 5: 5B
Row 6: 6H
Row 7: 7F
Row 8: 8C

Total numbers of backtracks before this solution was found:
Forward Checking: 64
Directional Look Ahead: 10

Solution 13 with queen in 1E

The positions of the Queens are:

Row 1: 1E
Row 2: 2G
Row 3: 3B
Row 4: 4D
Row 5: 5H
Row 6: 6A
Row 7: 7C
Row 8: 8F

Total numbers of backtracks before this solution was found:
Forward Checking: 52
Directional Look Ahead: 7

Solution 14 with queen in 1E

The positions of the Queens are:

Row 1: 1E
Row 2: 2G
Row 3: 3B
Row 4: 4F
Row 5: 5C
Row 6: 6A
Row 7: 7D
Row 8: 8H

Total numbers of backtracks before this solution was found:
Forward Checking: 68
Directional Look Ahead: 11

Solution 15 with queen in 1E

The positions of the Queens are:

Row 1: 1E
Row 2: 2G
Row 3: 3B

Row 4: 4F
Row 5: 5C
Row 6: 6A
Row 7: 7H
Row 8: 8D

Total numbers of backtracks before this solution was found:
Forward Checking: 53
Directional Look Ahead: 7

Solution 16 with queen in 1E
The positions of the Queens are:

Row 1: 1E
Row 2: 2G
Row 3: 3D
Row 4: 4A
Row 5: 5C
Row 6: 6H
Row 7: 7F
Row 8: 8B

Total numbers of backtracks before this solution was found:
Forward Checking: 75
Directional Look Ahead: 14

Solution 17 with queen in 1E
The positions of the Queens are:

Row 1: 1E
Row 2: 2H
Row 3: 3D
Row 4: 4A
Row 5: 5C
Row 6: 6F
Row 7: 7B
Row 8: 8G

Total numbers of backtracks before this solution was found:
Forward Checking: 83
Directional Look Ahead: 8

Solution 18 with queen in 1E
The positions of the Queens are:

Row 1: 1E
Row 2: 2H
Row 3: 3D
Row 4: 4A
Row 5: 5G
Row 6: 6B
Row 7: 7F
Row 8: 8C

Total numbers of backtracks before this solution was found:
Forward Checking: 78
Directional Look Ahead: 14

Total numbers of backtracks before all solutions having queen in: 1E was found (or found there are no solutions):

Forward Checking: 769

Directional Look Ahead: 128

Queen at 1F:

Solution 1 with queen in 1F

The positions of the Queens are:

Row 1: 1F
Row 2: 2A
Row 3: 3E
Row 4: 4B
Row 5: 5H
Row 6: 6C
Row 7: 7G
Row 8: 8D

Total numbers of backtracks before this solution was found:

Forward Checking: 11

Directional Look Ahead: 4

Solution 2 with queen in 1F

The positions of the Queens are:

Row 1: 1F
Row 2: 2B
Row 3: 3G
Row 4: 4A
Row 5: 5C
Row 6: 6E
Row 7: 7H
Row 8: 8D

Total numbers of backtracks before this solution was found:

Forward Checking: 31

Directional Look Ahead: 4

Solution 3 with queen in 1F

The positions of the Queens are:

Row 1: 1F
Row 2: 2B
Row 3: 3G
Row 4: 4A
Row 5: 5D
Row 6: 6H
Row 7: 7E
Row 8: 8C

Total numbers of backtracks before this solution was found:

Forward Checking: 14

Directional Look Ahead: 5

Solution 4 with queen in 1F

The positions of the Queens are:

Row 1: 1F
Row 2: 2C
Row 3: 3A
Row 4: 4G
Row 5: 5E

Row 6: 6H
Row 7: 7B
Row 8: 8D

Total numbers of backtracks before this solution was found:
Forward Checking: 49
Directional Look Ahead: 7

Solution 5 with queen in 1F

The positions of the Queens are:

Row 1: 1F
Row 2: 2C
Row 3: 3A
Row 4: 4H
Row 5: 5D
Row 6: 6B
Row 7: 7G
Row 8: 8E

Total numbers of backtracks before this solution was found:
Forward Checking: 18
Directional Look Ahead: 5

Solution 6 with queen in 1F

The positions of the Queens are:

Row 1: 1F
Row 2: 2C
Row 3: 3A
Row 4: 4H
Row 5: 5E
Row 6: 6B
Row 7: 7D
Row 8: 8G

Total numbers of backtracks before this solution was found:
Forward Checking: 52
Directional Look Ahead: 7

Solution 7 with queen in 1F

The positions of the Queens are:

Row 1: 1F
Row 2: 2C
Row 3: 3E
Row 4: 4G
Row 5: 5A
Row 6: 6D
Row 7: 7B
Row 8: 8H

Total numbers of backtracks before this solution was found:
Forward Checking: 24
Directional Look Ahead: 7

Solution 8 with queen in 1F

The positions of the Queens are:

Row 1: 1F
Row 2: 2C
Row 3: 3E
Row 4: 4H
Row 5: 5A
Row 6: 6D
Row 7: 7B
Row 8: 8G

Total numbers of backtracks before this solution was found:
Forward Checking: 56
Directional Look Ahead: 7

Solution 9 with queen in 1F

The positions of the Queens are:

Row 1: 1F
Row 2: 2C
Row 3: 3G
Row 4: 4B
Row 5: 5D
Row 6: 6H
Row 7: 7A
Row 8: 8E

Total numbers of backtracks before this solution was found:
Forward Checking: 29
Directional Look Ahead: 10

Solution 10 with queen in 1F

The positions of the Queens are:

Row 1: 1F
Row 2: 2C
Row 3: 3G
Row 4: 4B
Row 5: 5H
Row 6: 6E
Row 7: 7A
Row 8: 8D

Total numbers of backtracks before this solution was found:
Forward Checking: 59
Directional Look Ahead: 7

Solution 11 with queen in 1F

The positions of the Queens are:

Row 1: 1F
Row 2: 2C
Row 3: 3G
Row 4: 4D
Row 5: 5A
Row 6: 6H
Row 7: 7B
Row 8: 8E

Total numbers of backtracks before this solution was found:
Forward Checking: 34
Directional Look Ahead: 11

Solution 12 with queen in 1F

The positions of the Queens are:

Row 1: 1F
Row 2: 2D
Row 3: 3A
Row 4: 4E
Row 5: 5H
Row 6: 6B
Row 7: 7G
Row 8: 8C

Total numbers of backtracks before this solution was found:
Forward Checking: 67
Directional Look Ahead: 9

Solution 13 with queen in 1F

The positions of the Queens are:

Row 1: 1F
Row 2: 2D
Row 3: 3B
Row 4: 4H
Row 5: 5E
Row 6: 6G
Row 7: 7A
Row 8: 8C

Total numbers of backtracks before this solution was found:
Forward Checking: 52
Directional Look Ahead: 14

Solution 14 with queen in 1F

The positions of the Queens are:

Row 1: 1F
Row 2: 2D
Row 3: 3G
Row 4: 4A
Row 5: 5C
Row 6: 6E
Row 7: 7B
Row 8: 8H

Total numbers of backtracks before this solution was found:
Forward Checking: 72
Directional Look Ahead: 11

Solution 15 with queen in 1F

The positions of the Queens are:

Row 1: 1F
Row 2: 2D
Row 3: 3G

Row 4: 4A
Row 5: 5H
Row 6: 6B
Row 7: 7E
Row 8: 8C

Total numbers of backtracks before this solution was found:
Forward Checking: 55
Directional Look Ahead: 14

Solution 16 with queen in 1F
The positions of the Queens are:

Row 1: 1F
Row 2: 2H
Row 3: 3B
Row 4: 4D
Row 5: 5A
Row 6: 6G
Row 7: 7E
Row 8: 8C

Total numbers of backtracks before this solution was found:
Forward Checking: 91
Directional Look Ahead: 14

Total numbers of backtracks before all solutions having queen in: 1F was found (or found there are no solutions):
Forward Checking: 714
Directional Look Ahead: 136

Queen at 1G:

Solution 1 with queen in 1G

The positions of the Queens are:

Row 1: 1G
Row 2: 2A
Row 3: 3C
Row 4: 4H
Row 5: 5F
Row 6: 6D
Row 7: 7B
Row 8: 8E

Total numbers of backtracks before this solution was found:

Forward Checking: 9

Directional Look Ahead: 3

Solution 2 with queen in 1G

The positions of the Queens are:

Row 1: 1G
Row 2: 2B
Row 3: 3D
Row 4: 4A
Row 5: 5H
Row 6: 6E
Row 7: 7C
Row 8: 8F

Total numbers of backtracks before this solution was found:

Forward Checking: 29

Directional Look Ahead: 6

Solution 3 with queen in 1G

The positions of the Queens are:

Row 1: 1G
Row 2: 2B
Row 3: 3F
Row 4: 4C
Row 5: 5A
Row 6: 6D
Row 7: 7H
Row 8: 8E

Total numbers of backtracks before this solution was found:

Forward Checking: 22

Directional Look Ahead: 4

Solution 4 with queen in 1G

The positions of the Queens are:

Row 1: 1G
Row 2: 2C
Row 3: 3A
Row 4: 4F
Row 5: 5H

Row 6: 6E
Row 7: 7B
Row 8: 8D

Total numbers of backtracks before this solution was found:
Forward Checking: 51
Directional Look Ahead: 10

Solution 5 with queen in 1G

The positions of the Queens are:

Row 1: 1G
Row 2: 2C
Row 3: 3H
Row 4: 4B
Row 5: 5E
Row 6: 6A
Row 7: 7F
Row 8: 8D

Total numbers of backtracks before this solution was found:
Forward Checking: 40
Directional Look Ahead: 5

Solution 6 with queen in 1G

The positions of the Queens are:

Row 1: 1G
Row 2: 2D
Row 3: 3B
Row 4: 4E
Row 5: 5H
Row 6: 6A
Row 7: 7C
Row 8: 8F

Total numbers of backtracks before this solution was found:
Forward Checking: 75
Directional Look Ahead: 14

Solution 7 with queen in 1G

The positions of the Queens are:

Row 1: 1G
Row 2: 2D
Row 3: 3B
Row 4: 4H
Row 5: 5F
Row 6: 6A
Row 7: 7C
Row 8: 8E

Total numbers of backtracks before this solution was found:
Forward Checking: 46
Directional Look Ahead: 5

Solution 8 with queen in 1G

The positions of the Queens are:

Row 1: 1G
Row 2: 2E
Row 3: 3C
Row 4: 4A
Row 5: 5F
Row 6: 6H
Row 7: 7B
Row 8: 8D

Total numbers of backtracks before this solution was found:
Forward Checking: 107
Directional Look Ahead: 19

Total numbers of backtracks before all solutions having queen in: 1G was found (or found there are no solutions):
Forward Checking: 379
Directional Look Ahead: 66

Queen at 1H:

Solution 1 with queen in 1H

The positions of the Queens are:

Row 1: 1H
Row 2: 2B
Row 3: 3D
Row 4: 4A
Row 5: 5G
Row 6: 6E
Row 7: 7C
Row 8: 8F

Total numbers of backtracks before this solution was found:

Forward Checking: 26

Directional Look Ahead: 0

Solution 2 with queen in 1H

The positions of the Queens are:

Row 1: 1H
Row 2: 2B
Row 3: 3E
Row 4: 4C
Row 5: 5A
Row 6: 6G
Row 7: 7D
Row 8: 8F

Total numbers of backtracks before this solution was found:

Forward Checking: 11

Directional Look Ahead: 0

Solution 3 with queen in 1H

The positions of the Queens are:

Row 1: 1H
Row 2: 2C
Row 3: 3A
Row 4: 4F
Row 5: 5B
Row 6: 6E
Row 7: 7G
Row 8: 8D

Total numbers of backtracks before this solution was found:

Forward Checking: 43

Directional Look Ahead: 0

Solution 4 with queen in 1H

The positions of the Queens are:

Row 1: 1H
Row 2: 2D
Row 3: 3A
Row 4: 4C
Row 5: 5F

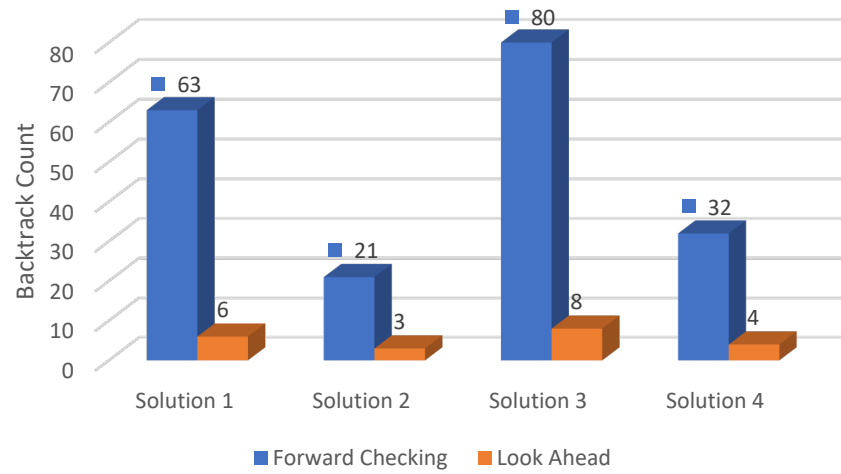
Row 6: 6B
Row 7: 7G
Row 8: 8E

Total numbers of backtracks before this solution was found:
Forward Checking: 32
Directional Look Ahead: 0

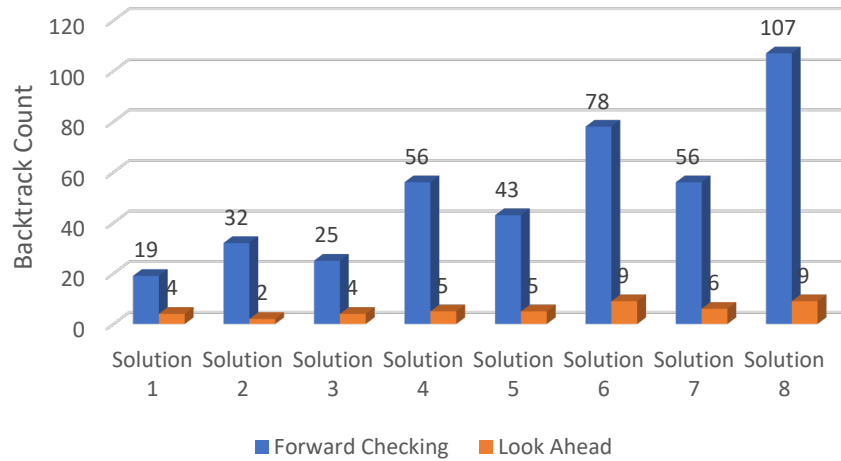
Total numbers of backtracks before all solutions having queen in: 1H was found (or found there are no solutions):
Forward Checking: 112
Directional Look Ahead: 0

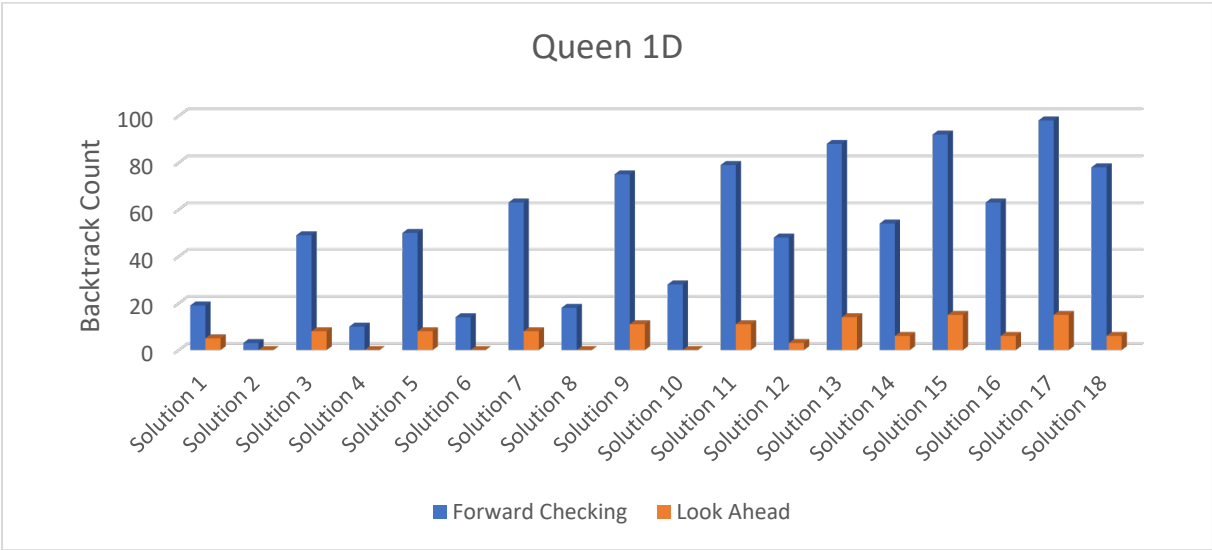
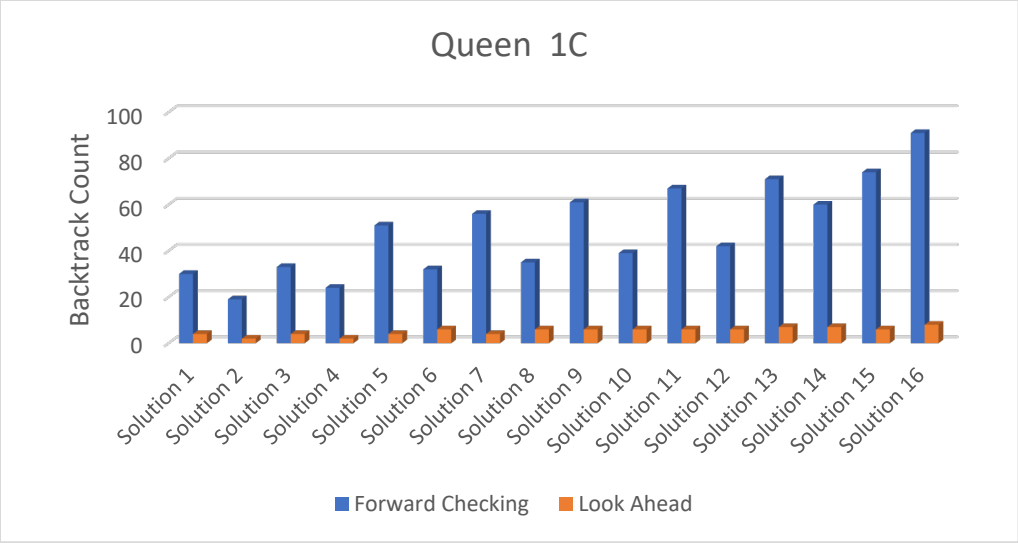
Histograms

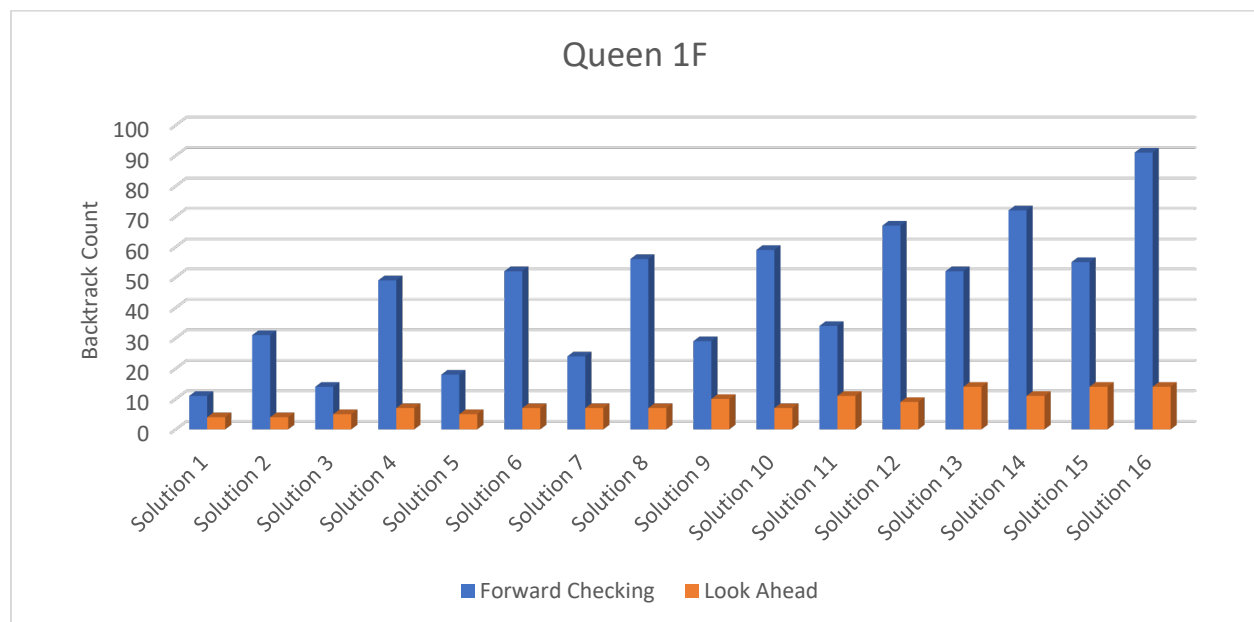
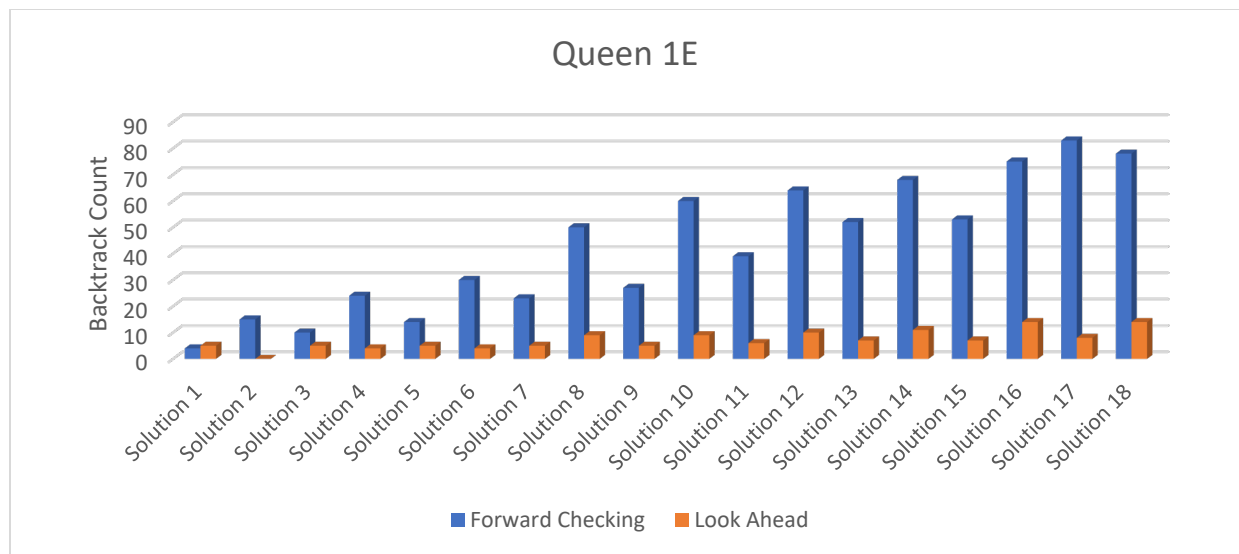
Queen 1A

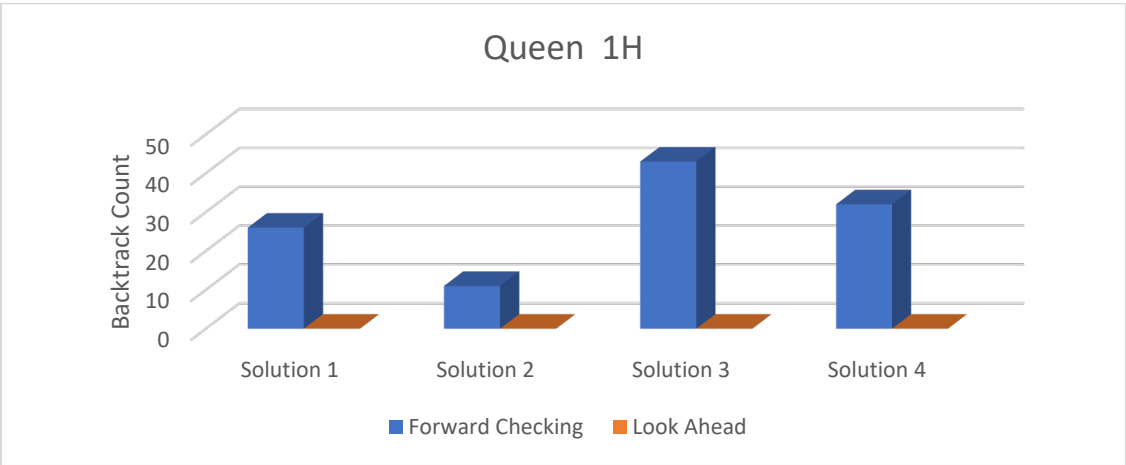
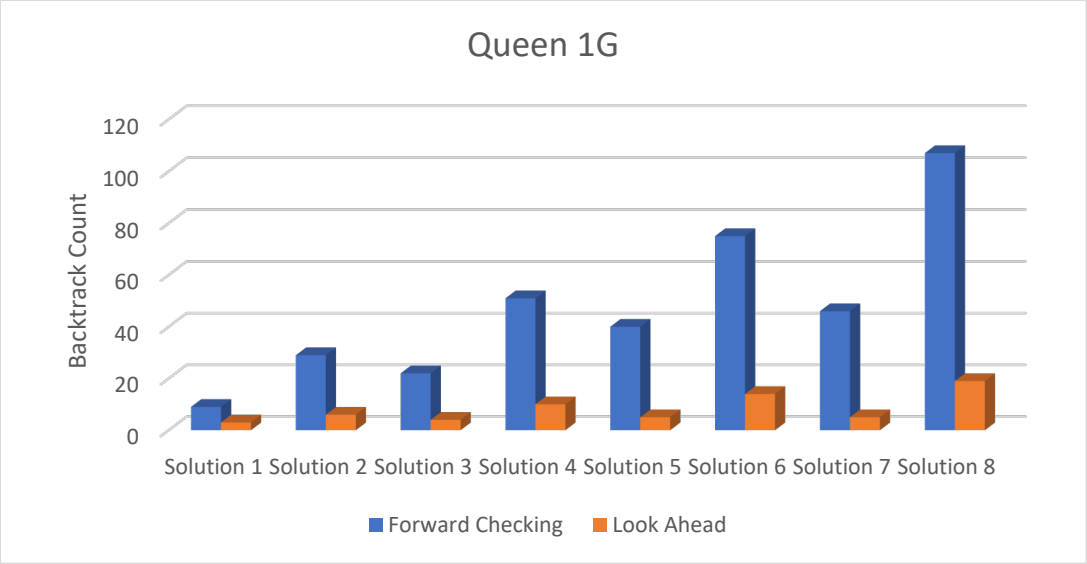


Queen 1B









Total Backtracks for each Queen Placement

