در این آزمایش، به بررسی حل مسئله KenKen با استفاده از دو روش Backtracking و CSP پرداخته شد. نتایج نشان داد که هر دو روش در حل پازل‌های KenKen با اندازه‌های کوچک و متوسط به‌خوبی عمل کرده و به‌سرعت به جواب صحیح رسیدند. زمان اجرای هر دو روش در این آزمایش به‌طور قابل ملاحظه‌ای پایین بود و تفاوت قابل توجهی در عملکرد مشاهده نشد. با این حال، با افزایش اندازه پازل‌ها، ممکن است تفاوت‌های بیشتری در سرعت و کارایی این دو روش مشاهده شود که بررسی بیشتر در ابعاد بزرگ‌تر می‌تواند به مقایسه دقیق‌تری بین این روش‌ها کمک کند.

Test Size = 3

```
Generated KenKen Cages:
Cage Cells: [(0, 0)], Operation: /, Target: 2
Cage Cells: [(0, 1), (0, 2)], Operation: *, Target: 3
Cage Cells: [(1, 0), (1, 1)], Operation: +, Target: 3
Cage Cells: [(1, 2)], Operation: +, Target: 3
Cage Cells: [(2, 0)], Operation: +, Target: 3
Cage Cells: [(2, 1), (2, 2)], Operation: +, Target: 3
-----------------------
Solved KenKen Puzzle (BackTracking):
2 3 1
1 2 3
3 1 2
time:  0.0
----------------------
Solved KenKen Puzzle (domain CSP):
2 3 1
1 2 3
3 1 2
time:  0.0
```

Generated KenKen Cages:

Cage Cells: [(0, 0), (1, 0), (1, 1)], Operation: *, Target: 2

Cage Cells: [(0, 1), (0, 2), (1, 2)], Operation: *, Target: 18

Cage Cells: [(2, 0), (2, 1), (2, 2)], Operation: *, Target: 6

Solved KenKen Puzzle (BackTracking):

1 3 2

2 1 3

3 2 1

time: 0.0

Solved KenKen Puzzle (domain CSP):

1 3 2

2 1 3

3 2 1

time: 0.0

Generated KenKen Cages:

Cage Cells: [(0, 0)], Operation: *, Target: 2

Cage Cells: [(0, 1)], Operation: -, Target: 1

Cage Cells: [(0, 2), (1, 2), (1, 1)], Operation: +, Target: 8

Cage Cells: [(1, 0)], Operation: /, Target: 1

Cage Cells: [(2, 0), (2, 1), (2, 2)], Operation: +, Target: 6

Solved KenKen Puzzle (BackTracking):

2 1 3

1 3 2

3 2 1

time: 0.0

Solved KenKen Puzzle (domain CSP):

2 1 3

1 3 2

3 2 1

time: 0.0

Generated KenKen Cages:

Cage Cells: [(0, 0), (0, 1)], Operation: +, Target: 3

Cage Cells: [(0, 2)], Operation: /, Target: 3

Cage Cells: [(1, 0)], Operation: -, Target: 3

Cage Cells: [(1, 1), (1, 2)], Operation: +, Target: 3

Cage Cells: [(2, 0)], Operation: -, Target: 2

Cage Cells: [(2, 1), (2, 2)], Operation: *, Target: 3

Solved KenKen Puzzle (BackTracking):

1 2 3

3 1 2

2 3 1

time: 0.0

Solved KenKen Puzzle (domain CSP):

1 2 3

3 1 2

2 3 1

time: 0.0

Overall

Backtrack:

Mean: 0

Variance: 0

CSP:

Mean: 0

Variance: 0

Mean: 0

Variance: 0

Test Size = 4

Generated KenKen Cages:

Cage Cells: [(0, 0), (0, 1), (0, 2), (1, 2)], Operation: +, Target: 13

Cage Cells: [(0, 3)], Operation: +, Target: 1

Cage Cells: [(1, 0), (1, 1), (2, 1)], Operation: +, Target: 5

Cage Cells: [(1, 3), (2, 3), (2, 2), (3, 2)], Operation: +, Target: 9

Cage Cells: [(2, 0), (3, 0)], Operation: *, Target: 12

Cage Cells: [(3, 1)], Operation: *, Target: 2

Cage Cells: [(3, 3)], Operation: +, Target: 3

Solved KenKen Puzzle (BackTracking):

2 4 3 1

1 3 4 2

3 1 2 4

4 2 1 3

time: 0.0

Solved KenKen Puzzle (domain CSP):

2 4 3 1

1 3 4 2

3 1 2 4

4 2 1 3

time: 0.0

Generated KenKen Cages:

Cage Cells: [(0, 0), (1, 0), (1, 1), (0, 1)], Operation: *, Target: 24

Cage Cells: [(0, 2), (0, 3), (1, 3), (2, 3)], Operation: *, Target: 96

Cage Cells: [(1, 2), (2, 2)], Operation: -, Target: 1

Cage Cells: [(2, 0)], Operation: +, Target: 1

Cage Cells: [(2, 1), (3, 1), (3, 2)], Operation: +, Target: 10

Cage Cells: [(3, 0)], Operation: *, Target: 2

Cage Cells: [(3, 3)], Operation: /, Target: 1

Solved KenKen Puzzle (BackTracking):

3 1 4 2

4 2 1 3

1 3 2 4

2 4 3 1

time: 0.0

Solved KenKen Puzzle (domain CSP):

3 1 4 2

4 2 1 3

1 3 2 4

2 4 3 1

time: 0.0

Generated KenKen Cages:

Cage Cells: [(0, 0), (0, 1)], Operation: *, Target: 3

Cage Cells: [(0, 2)], Operation: *, Target: 2

Cage Cells: [(0, 3), (1, 3), (1, 2), (1, 1)], Operation: +, Target: 10

Cage Cells: [(1, 0), (2, 0), (2, 1), (3, 1)], Operation: +, Target: 13

Cage Cells: [(2, 2)], Operation: +, Target: 4

Cage Cells: [(2, 3), (3, 3), (3, 2)], Operation: *, Target: 6

Cage Cells: [(3, 0)], Operation: -, Target: 1

Solved KenKen Puzzle (BackTracking):

```
3 1 2 4
4 2 1 3
2 3 4 1
1 4 3 2
time:  0.0
----------------------
Solved KenKen Puzzle (domain CSP):
3 1 2 4
4 2 1 3
2 3 4 1
1 4 3 2
time:  0.0
```

```
Generated KenKen Cages:
Cage Cells: [(0, 0)], Operation: -, Target: 3
Cage Cells: [(0, 1), (0, 2)], Operation: *, Target: 2
Cage Cells: [(0, 3), (1, 3), (1, 2)], Operation: *, Target: 8
Cage Cells: [(1, 0)], Operation: *, Target: 4
Cage Cells: [(1, 1)], Operation: /, Target: 3
Cage Cells: [(2, 0)], Operation: -, Target: 2
Cage Cells: [(2, 1)], Operation: /, Target: 4
Cage Cells: [(2, 2), (3, 2), (3, 1), (3, 0)], Operation: +, Target: 10
Cage Cells: [(2, 3)], Operation: -, Target: 1
Cage Cells: [(3, 3)], Operation: +, Target: 3
----------------------
Solved KenKen Puzzle (BackTracking):
3 1 2 4
4 3 1 2
2 4 3 1
```

```
1 2 4 3
```

time: 0.0

Solved KenKen Puzzle (domain CSP):

```
3 1 2 4
4 3 1 2
2 4 3 1
1 2 4 3
```

time: 0.0

Overall

Backtrack:

Mean: 0

Variance: 0

CSP:

Mean: 0

Variance: 0

Test Size = 5

Generated KenKen Cages:

Cage Cells: [(0, 0), (0, 1), (1, 1), (1, 0)], Operation: *, Target: 36

Cage Cells: [(0, 2), (0, 3)], Operation: +, Target: 9

Cage Cells: [(0, 4), (1, 4), (1, 3)], Operation: +, Target: 10

Cage Cells: [(1, 2), (2, 2), (2, 3)], Operation: *, Target: 6

Cage Cells: [(2, 0), (3, 0)], Operation: -, Target: 3

Cage Cells: [(2, 1), (3, 1), (3, 2), (4, 2), (4, 3)], Operation: +, Target: 14

Cage Cells: [(2, 4), (3, 4), (3, 3)], Operation: +, Target: 9

Cage Cells: [(4, 0), (4, 1)], Operation: *, Target: 20

Cage Cells: [(4, 4)], Operation: *, Target: 3

Solved KenKen Puzzle (BackTracking):

1 2 4 5 3

3 4 1 2 5

5 1 2 3 4

2 3 5 4 1

4 5 3 1 2

time: 0.008443117141723633

Solved KenKen Puzzle (domain CSP):

2 3 4 5 1

3 2 1 4 5

1 5 3 2 4

4 1 5 3 2

5 4 2 1 3

time: 0.002312898635864258

Generated KenKen Cages:

Cage Cells: [(0, 0), (1, 0), (2, 0)], Operation: +, Target: 8

Cage Cells: [(0, 1), (1, 1), (2, 1), (2, 2)], Operation: +, Target: 10

Cage Cells: [(0, 2), (0, 3)], Operation: -, Target: 2

Cage Cells: [(0, 4), (1, 4), (1, 3), (2, 3), (3, 3)], Operation: +, Target: 19

Cage Cells: [(1, 2)], Operation: -, Target: 3

Cage Cells: [(2, 4), (3, 4), (4, 4), (4, 3)], Operation: *, Target: 18

Cage Cells: [(3, 0), (3, 1), (3, 2)], Operation: +, Target: 10

Cage Cells: [(4, 0), (4, 1), (4, 2)], Operation: *, Target: 20

Solved KenKen Puzzle (BackTracking):

1 2 5 3 4

2 4 3 1 5

4 3 1 5 2

3 5 2 4 1

5 1 4 2 3

time: 0.0005052089691162109

Solved KenKen Puzzle (domain CSP):

1 3 4 2 5

5 2 3 1 4

2 4 1 5 3

3 5 2 4 1

4 1 5 3 2

time: 0.007504940032958984

Generated KenKen Cages:

Cage Cells: [(0, 0), (0, 1), (0, 2), (0, 3)], Operation: *, Target: 60

Cage Cells: [(0, 4), (1, 4), (1, 3), (1, 2)], Operation: +, Target: 11

Cage Cells: [(1, 0), (1, 1)], Operation: +, Target: 6

Cage Cells: [(2, 0)], Operation: +, Target: 5

Cage Cells: [(2, 1), (2, 2), (3, 2), (3, 1)], Operation: +, Target: 14

Cage Cells: [(2, 3), (2, 4), (3, 4)], Operation: *, Target: 4

Cage Cells: [(3, 0), (4, 0), (4, 1), (4, 2)], Operation: *, Target: 18

Cage Cells: [(3, 3), (4, 3), (4, 4)], Operation: *, Target: 40

Solved KenKen Puzzle (BackTracking):

1 4 5 3 2

4 2 1 5 3

5 3 2 1 4

3 5 4 2 1

2 1 3 4 5

```
time:  0.03513002395629883
-----------------------
Solved KenKen Puzzle (domain CSP):
4 1 5 3 2
2 4 1 5 3
5 2 3 1 4
3 5 4 2 1
1 3 2 4 5
time:  0.0003457069396972656
```

```
Generated KenKen Cages:
Cage Cells: [(0, 0), (1, 0), (1, 1), (2, 1), (2, 0)], Operation: +, Target: 16
Cage Cells: [(0, 1), (0, 2), (0, 3)], Operation: *, Target: 12
Cage Cells: [(0, 4), (1, 4)], Operation: *, Target: 6
Cage Cells: [(1, 2), (2, 2)], Operation: *, Target: 20
Cage Cells: [(1, 3), (2, 3), (3, 3)], Operation: *, Target: 15
Cage Cells: [(2, 4), (3, 4), (4, 4), (4, 3)], Operation: +, Target: 12
Cage Cells: [(3, 0), (3, 1), (3, 2)], Operation: +, Target: 8
Cage Cells: [(4, 0)], Operation: +, Target: 4
Cage Cells: [(4, 1)], Operation: -, Target: 3
Cage Cells: [(4, 2)], Operation: /, Target: 1
-----------------------
Solved KenKen Puzzle (BackTracking):
5 1 3 4 2
2 4 5 1 3
3 2 4 5 1
1 5 2 3 4
4 3 1 2 5
time:  0.040581464767456055
```

Solved KenKen Puzzle (domain CSP):

5 1 3 4 2

2 4 5 1 3

3 2 4 5 1

1 5 2 3 4

4 3 1 2 5

time: 0.0010902881622314453

Overall

Backtrack:

Mean: 0.021164954

Variance: 0.00038689809

CSP:

Mean: 0.0028134584

Variance: 0.000010439891

Test Size = 6

Generated KenKen Cages:

Cage Cells: [(0, 0), (1, 0), (1, 1), (0, 1), (0, 2)], Operation: *, Target: 288

Cage Cells: [(0, 3), (1, 3), (2, 3), (2, 2)], Operation: +, Target: 13

Cage Cells: [(0, 4), (0, 5)], Operation: +, Target: 5

Cage Cells: [(1, 2)], Operation: +, Target: 3

Cage Cells: [(1, 4)], Operation: *, Target: 4

Cage Cells: [(1, 5)], Operation: -, Target: 5

Cage Cells: [(2, 0), (2, 1)], Operation: -, Target: 1

Cage Cells: [(2, 4)], Operation: +, Target: 2

Cage Cells: [(2, 5), (3, 5), (3, 4), (4, 4)], Operation: +, Target: 12

Cage Cells: [(3, 0), (4, 0)], Operation: *, Target: 6

Cage Cells: [(3, 1), (3, 2), (4, 2)], Operation: *, Target: 25

Cage Cells: [(3, 3), (4, 3), (5, 3), (5, 2)], Operation: *, Target: 96

Cage Cells: [(4, 1), (5, 1), (5, 0)], Operation: *, Target: 12

Cage Cells: [(4, 5), (5, 5), (5, 4)], Operation: *, Target: 90

Solved KenKen Puzzle (BackTracking):

1 4 6 5 3 2

6 2 3 1 4 5

5 6 4 3 2 1

3 5 1 2 6 4

2 3 5 4 1 6

4 1 2 6 5 3

time: 0.062415122985839844

Solved KenKen Puzzle (domain CSP):

4 1 6 5 3 2

6 2 3 1 4 5

5 6 4 3 2 1

3 5 1 2 6 4

2 4 5 6 1 3

1 3 2 4 5 6

time: 0.006783008575439453

Generated KenKen Cages:

Cage Cells: [(0, 0)], Operation: *, Target: 1

Cage Cells: [(0, 1), (0, 2), (0, 3), (0, 4), (0, 5), (1, 5)], Operation: +, Target: 24

Cage Cells: [(1, 0)], Operation: *, Target: 3

Cage Cells: [(1, 1), (2, 1)], Operation: /, Target: 2.5

Cage Cells: [(1, 2)], Operation: /, Target: 6

Cage Cells: [(1, 3)], Operation: +, Target: 2

Cage Cells: [(1, 4), (2, 4), (2, 3), (2, 2), (3, 2)], Operation: *, Target: 48

Cage Cells: [(2, 0), (3, 0), (4, 0), (4, 1)], Operation: *, Target: 120

Cage Cells: [(2, 5), (3, 5), (4, 5)], Operation: *, Target: 18

Cage Cells: [(3, 1)], Operation: +, Target: 3

Cage Cells: [(3, 3), (3, 4), (4, 4)], Operation: *, Target: 40

Cage Cells: [(4, 2), (5, 2)], Operation: *, Target: 12

Cage Cells: [(4, 3), (5, 3), (5, 4), (5, 5)], Operation: +, Target: 14

Cage Cells: [(5, 0), (5, 1)], Operation: *, Target: 12

Solved KenKen Puzzle (BackTracking):

1 4 5 6 3 2

3 5 6 2 1 4

2 6 1 5 4 3

4 3 2 1 5 6

5 2 3 4 6 1

6 1 4 3 2 5

time: 0.3082399368286133

Solved KenKen Puzzle (domain CSP):

1 4 5 3 6 2

3 5 6 2 1 4

5 2 1 6 4 3

6 3 2 4 5 1

4 1 3 5 2 6

2 6 4 1 3 5

time: 0.0165402889251709

Generated KenKen Cages:

Cage Cells: [(0, 0), (1, 0), (2, 0), (2, 1), (1, 1)], Operation: *, Target: 100

Cage Cells: [(0, 1), (0, 2), (0, 3), (0, 4)], Operation: +, Target: 14

Cage Cells: [(0, 5), (1, 5)], Operation: *, Target: 12

Cage Cells: [(1, 2)], Operation: -, Target: 5

Cage Cells: [(1, 3), (2, 3), (2, 4), (3, 4), (3, 3)], Operation: *, Target: 48

Cage Cells: [(1, 4)], Operation: /, Target: 3

Cage Cells: [(2, 2), (3, 2), (4, 2), (5, 2), (5, 3), (5, 4)], Operation: *,
Target: 1440

Cage Cells: [(2, 5), (3, 5), (4, 5), (5, 5)], Operation: *, Target: 60

Cage Cells: [(3, 0), (4, 0), (4, 1), (5, 1), (5, 0)], Operation: *, Target: 216

Cage Cells: [(3, 1)], Operation: +, Target: 4

Cage Cells: [(4, 3), (4, 4)], Operation: *, Target: 30

Solved KenKen Puzzle (BackTracking):

5 6 1 3 4 2

1 2 5 4 3 6

2 5 3 1 6 4

3 4 6 2 1 5

4 1 2 6 5 3

6 3 4 5 2 1

time: 0.15629911422729492

Solved KenKen Puzzle (domain CSP):

5 6 1 3 4 2

1 2 5 4 3 6

2 5 4 1 6 3

3 4 6 2 1 5

4 3 2 6 5 1

6 1 3 5 2 4

time: 0.07734441757202148

```
Solved KenKen Puzzle (BackTracking):

1 3 5 4 6 2

4 5 2 1 3 6

2 1 3 6 4 5

6 2 4 3 5 1

3 6 1 5 2 4

5 4 6 2 1 3

time:  0.10040044784545898

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Solved KenKen Puzzle (domain CSP):

4 3 1 5 6 2

1 5 2 4 3 6

2 1 3 6 4 5

6 2 4 3 5 1

3 6 5 1 2 4

5 4 6 2 1 3

time:  0.31825709342956543
```

Overall

Backtrack:

Mean: 0.021164954

Variance: 0.011674571

CSP:

Mean: 0.1047312

Variance: 0.021238276

Test Size = 7

Generated KenKen Cages:

Cage Cells: [(0, 0), (1, 0)], Operation: /, Target: 2.0

Cage Cells: [(0, 1), (0, 2), (1, 2)], Operation: *, Target: 147

Cage Cells: [(0, 3), (0, 4)], Operation: +, Target: 8

Cage Cells: [(0, 5), (1, 5)], Operation: -, Target: 4

Cage Cells: [(0, 6), (1, 6)], Operation: /, Target: 4.0

Cage Cells: [(1, 1), (2, 1)], Operation: +, Target: 8

Cage Cells: [(1, 3), (2, 3)], Operation: *, Target: 18

Cage Cells: [(1, 4)], Operation: -, Target: 5

Cage Cells: [(2, 0), (3, 0), (3, 1), (4, 1)], Operation: *, Target: 36

Cage Cells: [(2, 2), (3, 2), (3, 3), (4, 3), (5, 3), (5, 2)], Operation: *,
Target: 420

Cage Cells: [(2, 4), (3, 4), (4, 4), (4, 5), (4, 6)], Operation: +, Target: 17

Cage Cells: [(2, 5), (3, 5), (3, 6), (2, 6)], Operation: *, Target: 840

Cage Cells: [(4, 0), (5, 0), (5, 1)], Operation: +, Target: 15

Cage Cells: [(4, 2)], Operation: *, Target: 4

Cage Cells: [(5, 4), (6, 4), (6, 3), (6, 2), (6, 1), (6, 0)], Operation: *,
Target: 840

Cage Cells: [(5, 5), (5, 6), (6, 6), (6, 5)], Operation: *, Target: 252

Solved KenKen Puzzle (BackTracking):

1 7 3 2 6 5 4

4 2 7 6 5 1 3

2 6 1 3 4 7 5

3 1 2 5 7 4 6

6 5 4 7 3 2 1

5 4 6 1 2 3 7

7 3 5 4 1 6 2

time: 249.992999792099

Solved KenKen Puzzle (domain CSP):

4 7 3 2 6 5 1

2 3 7 6 5 1 4

1 5 2 3 7 4 6

3 2 6 1 4 7 5

5 6 4 7 1 2 3

6 4 1 5 2 3 7

7 1 5 4 3 6 2

time: 229.70199990272522

Generated KenKen Cages:

Cage Cells: [(0, 0), (1, 0), (2, 0)], Operation: *, Target: 35

Cage Cells: [(0, 1), (1, 1), (1, 2), (2, 2)], Operation: *, Target: 28

Cage Cells: [(0, 2), (0, 3)], Operation: /, Target: 2.0

Cage Cells: [(0, 4), (0, 5), (1, 5)], Operation: +, Target: 15

Cage Cells: [(0, 6), (1, 6), (2, 6), (3, 6)], Operation: *, Target: 36

Cage Cells: [(1, 3), (1, 4), (2, 4)], Operation: +, Target: 11

Cage Cells: [(2, 1), (3, 1), (4, 1), (4, 2), (4, 3), (3, 3)], Operation: +,
Target: 26

Cage Cells: [(2, 3)], Operation: +, Target: 6

Cage Cells: [(2, 5), (3, 5), (4, 5), (5, 5), (5, 6), (6, 6)], Operation: +,
Target: 30

Cage Cells: [(3, 0)], Operation: /, Target: 2

Cage Cells: [(3, 2)], Operation: *, Target: 5

Cage Cells: [(3, 4), (4, 4), (5, 4), (6, 4)], Operation: +, Target: 12

Cage Cells: [(4, 0), (5, 0), (6, 0)], Operation: *, Target: 72

Cage Cells: [(4, 6)], Operation: *, Target: 5

Cage Cells: [(5, 1), (5, 2), (6, 2), (6, 1)], Operation: +, Target: 20

Cage Cells: [(5, 3), (6, 3)], Operation: +, Target: 6

Cage Cells: [(6, 5)], Operation: -, Target: 1

Solved KenKen Puzzle (BackTracking):

1 3 6 4 7 5 2

5 1 7 2 4 3 6

7 2 1 6 5 4 3

```
2 4 5 3 6 7 1

3 6 4 7 1 2 5

4 5 2 1 3 6 7

6 7 3 5 2 1 4

time:  165.10899996757507

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Solved KenKen Puzzle (domain CSP):

5 1 2 4 7 3 6

7 4 1 2 6 5 3

1 5 7 6 3 4 2

2 3 5 7 4 6 1

4 2 6 3 1 7 5

3 6 4 1 5 2 7

6 7 3 5 2 1 4

time:  82.11899995803833
```

Generated KenKen Cages:

Cage Cells: [(0, 0), (1, 0), (1, 1)], Operation: *, Target: 56

Cage Cells: [(0, 1), (0, 2), (1, 2), (2, 2)], Operation: +, Target: 16

Cage Cells: [(0, 3)], Operation: +, Target: 4

Cage Cells: [(0, 4), (0, 5), (1, 5), (2, 5), (3, 5)], Operation: +, Target: 19

Cage Cells: [(0, 6), (1, 6), (2, 6), (3, 6), (4, 6), (5, 6)], Operation: +, Target: 26

Cage Cells: [(1, 3), (2, 3), (2, 4), (1, 4)], Operation: *, Target: 882

Cage Cells: [(2, 0), (2, 1), (3, 1), (4, 1), (4, 2), (5, 2)], Operation: +, Target: 16

Cage Cells: [(3, 0)], Operation: /, Target: 6

Cage Cells: [(3, 2)], Operation: -, Target: 5

Cage Cells: [(3, 3), (3, 4), (4, 4), (4, 3), (5, 3)], Operation: +, Target: 17

Cage Cells: [(4, 0), (5, 0), (6, 0), (6, 1)], Operation: *, Target: 120

Cage Cells: [(4, 5), (5, 5), (5, 4), (6, 4), (6, 3)], Operation: *, Target: 80

Cage Cells: [(5, 1)], Operation: +, Target: 7

Cage Cells: [(6, 2)], Operation: +, Target: 7

Cage Cells: [(6, 5), (6, 6)], Operation: +, Target: 8

Solved KenKen Puzzle (BackTracking):

1 5 6 4 2 3 7

4 6 1 3 7 2 5

2 3 4 7 6 5 1

6 2 5 1 3 7 4

7 4 2 6 5 1 3

5 7 3 2 1 4 6

3 1 7 5 4 6 2

time: 32.73800015449524

Solved KenKen Puzzle (domain CSP):

7 5 6 4 2 3 1

4 2 1 7 6 5 3

1 6 4 3 7 2 5

6 1 5 2 3 7 4

5 3 2 6 1 4 7

2 7 3 5 4 1 6

3 4 7 1 5 6 2

time: 3.183000087738037

Generated KenKen Cages:

Cage Cells: [(0, 0), (0, 1)], Operation: /, Target: 1.5

Cage Cells: [(0, 2), (0, 3), (0, 4), (0, 5)], Operation: *, Target: 42

Cage Cells: [(0, 6), (1, 6)], Operation: +, Target: 9

Cage Cells: [(1, 0), (2, 0)], Operation: *, Target: 2

Cage Cells: [(1, 1), (1, 2), (2, 2)], Operation: *, Target: 36

Cage Cells: [(1, 3)], Operation: -, Target: 7

Cage Cells: [(1, 4), (1, 5)], Operation: -, Target: 1

Cage Cells: [(2, 1), (3, 1), (4, 1)], Operation: *, Target: 35

Cage Cells: [(2, 3), (2, 4), (3, 4)], Operation: +, Target: 9

Cage Cells: [(2, 5), (3, 5), (3, 6), (4, 6), (5, 6), (6, 6), (6, 5)], Operation: +, Target: 28

Cage Cells: [(2, 6)], Operation: +, Target: 3

Cage Cells: [(3, 0)], Operation: /, Target: 4

Cage Cells: [(3, 2), (4, 2), (4, 3), (5, 3), (5, 2), (5, 1), (6, 1)], Operation: *, Target: 3360

Cage Cells: [(3, 3)], Operation: +, Target: 6

Cage Cells: [(4, 0), (5, 0), (6, 0)], Operation: +, Target: 15

Cage Cells: [(4, 4), (4, 5), (5, 5), (5, 4), (6, 4), (6, 3)], Operation: +, Target: 23

Cage Cells: [(6, 2)], Operation: +, Target: 4

Solved KenKen Puzzle (BackTracking):

6 4 2 3 7 1 5

1 2 3 7 6 5 4

2 5 6 4 1 7 3

4 1 5 6 3 2 7

3 7 1 5 2 4 6

5 3 7 1 4 6 2

7 6 4 2 5 3 1

time: 39.44275259971619

Solved KenKen Puzzle (domain CSP):

6 4 3 1 2 7 5

1 3 2 7 6 5 4

2 7 6 5 1 4 3

4 1 5 6 3 2 7

7 5 1 2 4 3 6

3 6 7 4 5 1 2

5 2 4 3 7 6 1

time: 10.80822491645813

Overall

    Backtrack:

        Mean: 121.82069

        Variance: 11007.956

    CSP:

        Mean: 81.453056

        Variance: 11031.696