

```
1 C:\Users\ian20\AppData\Local\Microsoft\WindowsApps\
  python.exe "F:/Working On Uni/GitHub/Sudoku AI/Clean/
  Function Testing.py"
2 Available Solvers:
3 1 - Backtracking
4 2 - CrossHatching-Random
5 3 - Machine Learning without Training
6 4 - Machine Learning with Training
7 5 - All
8 4
9 How many cycles? 50000
10 Machine Learning with Training - Loading: 0.0%
11 Found a Solution
12 [[1, 4, 8, 2, 9, 7, 5, 6, 9], [3, 7, 1, 5, 6, 8, 2, 2
    , 6], [5, 8, 3, 4, 1, 9, 3, 1, 9], [4, 8, 2, 6, 7, 4
    , 8, 2, 6], [7, 5, 9, 3, 5, 7, 6, 9, 1], [3, 2, 4, 8
    , 9, 3, 7, 2, 1], [4, 5, 6, 5, 1, 3, 4, 9, 7], [8, 0
    , 0, 0, 0, 0, 0, 0], [0, 0, 0, 0, 0, 0, 0, 0, 0]]
13 Machine Learning with Training - Loading: 1.0%
14 Found a Solution
15 [[7, 2, 3, 4, 8, 6, 9, 1, 8], [9, 1, 2, 3, 5, 4, 6, 4
    , 5], [6, 1, 9, 7, 8, 2, 1, 3, 2], [5, 4, 8, 6, 7, 9
    , 8, 4, 6], [7, 1, 3, 5, 5, 6, 7, 9, 2], [3, 1, 8, 2
    , 1, 8, 3, 5, 9], [7, 4, 3, 7, 5, 8, 6, 4, 2], [9, 0
    , 0, 0, 0, 0, 0, 0], [0, 0, 0, 0, 0, 0, 0, 0, 0]]
16 Machine Learning with Training - Loading: 2.0%
17 Machine Learning with Training - Loading: 3.0%
18 Machine Learning with Training - Loading: 4.0%
19 Found a Solution
20 [[9, 6, 2, 8, 5, 7, 1, 4, 7], [3, 5, 1, 9, 4, 8, 2, 4
    , 8], [1, 2, 3, 6, 9, 5, 1, 2, 3], [4, 8, 9, 6, 7, 8
    , 9, 4, 6], [7, 5, 2, 3, 5, 7, 6, 3, 1], [2, 4, 8, 2
    , 1, 8, 5, 6, 3], [7, 9, 3, 4, 9, 7, 2, 1, 5], [6, 0
    , 0, 0, 0, 0, 0, 0], [0, 0, 0, 0, 0, 0, 0, 0, 0]]
21 Machine Learning with Training - Loading: 5.0%
22 Machine Learning with Training - Loading: 6.0%
23 Machine Learning with Training - Loading: 7.0%
24 Found a Solution
25 [[3, 2, 8, 1, 4, 5, 9, 7, 6], [5, 9, 8, 2, 7, 1, 3, 4
    , 1], [7, 9, 3, 6, 8, 2, 1, 3, 2], [4, 6, 8, 5, 9, 8
    , 9, 4, 5], [7, 1, 2, 6, 5, 7, 6, 2, 9], [3, 4, 8, 9
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25 , 8, 3, 6, 1, 4], [7, 5, 2, 6, 1, 7, 5, 9, 3], [4, 0
    , 0, 0, 0, 0, 0, 0, 0], [0, 0, 0, 0, 0, 0, 0, 0, 0]]
26 Machine Learning with Training - Loading: 8.0%
27 Machine Learning with Training - Loading: 9.0%
28 Machine Learning with Training - Loading: 10.0%
29 Machine Learning with Training - Loading: 11.0%
30 Machine Learning with Training - Loading: 12.0%
31 Machine Learning with Training - Loading: 13.0%
32 Machine Learning with Training - Loading: 14.0%
33 Machine Learning with Training - Loading: 15.0%
34 Machine Learning with Training - Loading: 16.0%
35 Machine Learning with Training - Loading: 17.0%
36 Machine Learning with Training - Loading: 18.0%
37 Found a Solution
38 [[1, 7, 6, 4, 9, 5, 2, 8, 8], [9, 2, 1, 3, 6, 4, 5, 5
    , 3], [4, 8, 2, 7, 1, 9, 2, 1, 3], [9, 6, 8, 5, 7, 9
    , 8, 5, 2], [7, 4, 3, 6, 4, 6, 7, 3, 5], [1, 8, 2, 3
    , 2, 8, 6, 1, 9], [7, 4, 6, 5, 1, 7, 4, 2, 9], [3, 0
    , 0, 0, 0, 0, 0, 0, 0], [0, 0, 0, 0, 0, 0, 0, 0, 0]]
39 Machine Learning with Training - Loading: 19.0%
40 Machine Learning with Training - Loading: 20.0%
41 Machine Learning with Training - Loading: 21.0%
42 Machine Learning with Training - Loading: 22.0%
43 Machine Learning with Training - Loading: 23.0%
44 Found a Solution
45 [[1, 7, 2, 4, 9, 8, 3, 6, 4], [8, 6, 1, 3, 5, 9, 2, 9
    , 3], [5, 2, 6, 7, 8, 1, 2, 1, 3], [5, 8, 9, 4, 7, 8
    , 9, 4, 6], [7, 1, 2, 5, 5, 6, 7, 3, 2], [4, 1, 8, 3
    , 2, 8, 9, 5, 6], [7, 4, 6, 4, 9, 7, 1, 2, 5], [3, 0
    , 0, 0, 0, 0, 0, 0, 0], [0, 0, 0, 0, 0, 0, 0, 0, 0]]
46 Machine Learning with Training - Loading: 24.0%
47 Machine Learning with Training - Loading: 25.0%
48 Machine Learning with Training - Loading: 26.0%
49 Machine Learning with Training - Loading: 27.0%
50 Machine Learning with Training - Loading: 28.0%
51 Machine Learning with Training - Loading: 29.0%
52 Found a Solution
53 [[5, 1, 7, 6, 3, 8, 9, 4, 2], [8, 3, 1, 9, 4, 5, 6, 9
    , 6], [4, 2, 5, 7, 8, 1, 1, 2, 8], [3, 4, 9, 6, 7, 3
    , 9, 5, 8], [7, 6, 1, 2, 4, 7, 6, 5, 1], [2, 3, 8, 8
    , 3, 1, 4, 2, 5], [7, 9, 6, 4, 9, 7, 8, 3, 2], [5, 0

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53 , 0, 0, 0, 0, 0, 0, 0], [0, 0, 0, 0, 0, 0, 0, 0, 0]]
54 Machine Learning with Training - Loading: 30.0%
55 Machine Learning with Training - Loading: 31.0%
56 Machine Learning with Training - Loading: 32.0%
57 Machine Learning with Training - Loading: 33.0%
58 Machine Learning with Training - Loading: 34.0%
59 Found a Solution
60 [[2, 9, 1, 3, 7, 5, 4, 8, 3], [7, 6, 1, 8, 4, 9, 2, 4
    , 8], [5, 9, 2, 6, 1, 3, 1, 2, 3], [4, 9, 7, 5, 6, 5
    , 4, 8, 2], [6, 1, 3, 7, 9, 6, 7, 8, 5], [3, 2, 1, 8
    , 1, 9, 6, 4, 2], [7, 5, 6, 5, 2, 7, 3, 9, 8], [4, 0
    , 0, 0, 0, 0, 0, 0, 0], [0, 0, 0, 0, 0, 0, 0, 0, 0]]
61 Machine Learning with Training - Loading: 35.0%
62 Machine Learning with Training - Loading: 36.0%
63 Machine Learning with Training - Loading: 37.0%
64 Machine Learning with Training - Loading: 38.0%
65 Machine Learning with Training - Loading: 39.0%
66 Machine Learning with Training - Loading: 40.0%
67 Machine Learning with Training - Loading: 41.0%
68 Machine Learning with Training - Loading: 42.0%
69 Machine Learning with Training - Loading: 43.0%
70 Found a Solution
71 [[4, 8, 3, 1, 9, 5, 6, 7, 6], [1, 2, 8, 3, 7, 9, 4, 5
    , 7], [9, 2, 4, 6, 8, 1, 1, 2, 4], [3, 8, 9, 5, 6, 8
    , 9, 5, 6], [7, 1, 2, 3, 3, 6, 7, 4, 5], [2, 1, 8, 9
    , 3, 8, 5, 1, 4], [7, 2, 2, 5, 1, 7, 6, 3, 4], [9, 0
    , 0, 0, 0, 0, 0, 0, 0], [0, 0, 0, 0, 0, 0, 0, 0, 0]]
72 Machine Learning with Training - Loading: 44.0%
73 Machine Learning with Training - Loading: 45.0%
74 Machine Learning with Training - Loading: 46.0%
75 Machine Learning with Training - Loading: 47.0%
76 Machine Learning with Training - Loading: 48.0%
77 Machine Learning with Training - Loading: 49.0%
78 Machine Learning with Training - Loading: 50.0%
79 Machine Learning with Training - Loading: 51.0%
80 Found a Solution
81 [[6, 7, 1, 4, 5, 3, 8, 9, 2], [3, 4, 1, 8, 9, 5, 6, 8
    , 9], [5, 2, 6, 7, 1, 3, 1, 2, 3], [5, 9, 8, 4, 7, 9
    , 8, 6, 3], [7, 4, 2, 1, 4, 5, 7, 6, 1], [2, 9, 8, 3
    , 1, 8, 7, 2, 5], [6, 4, 5, 4, 9, 8, 3, 6, 7], [2, 0
    , 0, 0, 0, 0, 0, 0, 0], [0, 0, 0, 0, 0, 0, 0, 0, 0]]

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82 Machine Learning with Training - Loading: 52.0%
83 Machine Learning with Training - Loading: 53.0%
84 Machine Learning with Training - Loading: 54.0%
85 Found a Solution
86 [[2, 4, 3, 5, 9, 7, 6, 1, 7], [1, 5, 2, 8, 6, 9, 3,
    6, 9], [8, 1, 3, 4, 2, 5, 1, 2, 9], [3, 4, 8, 5, 7,
    8, 3, 4, 6], [7, 5, 1, 9, 5, 6, 7, 9, 1], [2, 8, 4,
    9, 8, 1, 4, 2, 3], [7, 6, 3, 5, 2, 7, 6, 1, 4], [8,
    0, 0, 0, 0, 0, 0, 0, 0], [0, 0, 0, 0, 0, 0, 0, 0, 0
    ]]
87 Machine Learning with Training - Loading: 55.0%
88 Machine Learning with Training - Loading: 56.0%
89 Machine Learning with Training - Loading: 57.0%
90 Machine Learning with Training - Loading: 58.0%
91 Found a Solution
92 [[7, 5, 1, 9, 2, 8, 6, 3, 4], [2, 9, 1, 3, 6, 8, 5,
    3, 8], [6, 4, 5, 7, 1, 9, 1, 3, 2], [8, 9, 4, 5, 7,
    8, 9, 4, 6], [7, 5, 2, 1, 5, 6, 7, 2, 1], [3, 9, 4,
    9, 1, 8, 3, 4, 2], [7, 6, 2, 4, 5, 7, 6, 1, 3], [8,
    0, 0, 0, 0, 0, 0, 0, 0], [0, 0, 0, 0, 0, 0, 0, 0, 0
    ]]
93 Found a Solution
94 [[6, 8, 3, 1, 2, 9, 5, 4, 7], [2, 5, 8, 3, 4, 1, 9,
    9, 1], [4, 5, 6, 7, 8, 2, 1, 3, 2], [9, 8, 5, 6, 7,
    8, 4, 9, 2], [7, 6, 3, 1, 5, 6, 7, 3, 4], [1, 9, 8,
    2, 9, 8, 4, 5, 3], [7, 6, 3, 7, 1, 6, 9, 2, 4], [5,
    0, 0, 0, 0, 0, 0, 0, 0], [0, 0, 0, 0, 0, 0, 0, 0, 0
    ]]
95 Machine Learning with Training - Loading: 59.0%
96 Machine Learning with Training - Loading: 60.0%
97 Machine Learning with Training - Loading: 61.0%
98 Machine Learning with Training - Loading: 62.0%
99 Found a Solution
100 [[4, 5, 8, 6, 3, 2, 9, 1, 6], [1, 7, 8, 9, 4, 2, 3,
    2, 9], [3, 1, 5, 7, 8, 4, 1, 2, 9], [3, 8, 5, 6, 7,
    8, 3, 4, 9], [7, 6, 1, 5, 5, 7, 6, 2, 4], [1, 3, 8,
    9, 8, 5, 4, 2, 3], [7, 6, 3, 4, 1, 7, 6, 9, 5], [2,
    0, 0, 0, 0, 0, 0, 0, 0], [0, 0, 0, 0, 0, 0, 0, 0, 0
    ]]
101 Machine Learning with Training - Loading: 63.0%
102 Machine Learning with Training - Loading: 64.0%
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103 Machine Learning with Training - Loading: 65.0%
104 Machine Learning with Training - Loading: 66.0%
105 Machine Learning with Training - Loading: 67.0%
106 Found a Solution
107 [[9, 4, 7, 5, 2, 1, 8, 3, 1], [6, 3, 8, 9, 4, 2, 5,
    8, 2], [5, 3, 6, 7, 1, 9, 2, 1, 8], [9, 3, 6, 4, 7,
    3, 9, 4, 1], [7, 5, 6, 8, 5, 7, 6, 2, 4], [8, 9, 1,
    4, 8, 1, 6, 5, 3], [7, 2, 6, 3, 9, 7, 8, 2, 5], [4,
    0, 0, 0, 0, 0, 0, 0, 0], [0, 0, 0, 0, 0, 0, 0, 0, 0
    ]]
108 Machine Learning with Training - Loading: 68.0%
109 Found a Solution
110 [[6, 4, 5, 9, 7, 3, 2, 1, 3], [2, 9, 1, 8, 4, 5, 6,
    8, 7], [1, 2, 5, 6, 9, 3, 1, 3, 2], [4, 9, 8, 6, 7,
    9, 8, 4, 5], [6, 7, 1, 2, 5, 6, 7, 3, 1], [2, 8, 4,
    2, 1, 8, 7, 3, 9], [4, 5, 4, 9, 3, 6, 2, 5, 7], [8,
    0, 0, 0, 0, 0, 0, 0, 0], [0, 0, 0, 0, 0, 0, 0, 0, 0
    ]]
111 Machine Learning with Training - Loading: 69.0%
112 Machine Learning with Training - Loading: 70.0%
113 Machine Learning with Training - Loading: 71.0%
114 Machine Learning with Training - Loading: 72.0%
115 Found a Solution
116 [[9, 2, 1, 4, 8, 3, 7, 5, 4], [5, 7, 1, 9, 6, 8, 2,
    6, 8], [3, 2, 5, 7, 1, 9, 1, 3, 2], [5, 4, 8, 9, 6,
    8, 9, 4, 6], [7, 1, 2, 3, 5, 7, 6, 9, 3], [2, 4, 8,
    2, 1, 8, 3, 6, 4], [5, 7, 3, 4, 9, 7, 2, 5, 6], [1,
    0, 0, 0, 0, 0, 0, 0, 0], [0, 0, 0, 0, 0, 0, 0, 0, 0
    ]]
117 Machine Learning with Training - Loading: 73.0%
118 Machine Learning with Training - Loading: 74.0%
119 Machine Learning with Training - Loading: 75.0%
120 Machine Learning with Training - Loading: 76.0%
121 Found a Solution
122 [[3, 8, 1, 9, 4, 2, 5, 6, 4], [9, 5, 1, 6, 7, 3, 8,
    6, 2], [7, 8, 3, 5, 1, 9, 1, 3, 2], [4, 8, 9, 6, 7,
    8, 4, 9, 5], [7, 6, 2, 3, 5, 7, 6, 2, 1], [3, 9, 4,
    9, 1, 8, 3, 2, 4], [7, 5, 2, 6, 3, 7, 5, 8, 4], [1,
    0, 0, 0, 0, 0, 0, 0, 0], [0, 0, 0, 0, 0, 0, 0, 0, 0
    ]]
123 Found a Solution
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124 [[7, 6, 4, 1, 5, 2, 9, 8, 3], [1, 8, 9, 4, 6, 2, 5,
    5, 2], [9, 8, 3, 7, 1, 4, 1, 3, 2], [4, 8, 9, 6, 7,
    8, 9, 5, 6], [7, 1, 3, 2, 4, 7, 6, 3, 2], [5, 8, 1,
    9, 8, 1, 5, 6, 4], [7, 3, 2, 4, 3, 7, 9, 8, 5], [6,
    0, 0, 0, 0, 0, 0, 0, 0], [0, 0, 0, 0, 0, 0, 0, 0, 0
    ]]
125 Machine Learning with Training - Loading: 77.0%
126 Machine Learning with Training - Loading: 78.0%
127 Machine Learning with Training - Loading: 79.0%
128 Found a Solution
129 [[1, 4, 5, 7, 2, 3, 9, 6, 7], [9, 3, 1, 8, 6, 2, 4,
    8, 2], [6, 9, 4, 5, 1, 3, 2, 1, 8], [3, 9, 4, 5, 7,
    3, 5, 9, 8], [6, 7, 4, 1, 4, 6, 7, 2, 5], [1, 8, 9,
    9, 8, 1, 6, 3, 2], [7, 5, 5, 3, 2, 4, 7, 9, 6], [8,
    0, 0, 0, 0, 0, 0, 0, 0], [0, 0, 0, 0, 0, 0, 0, 0, 0
    ]]
130 Machine Learning with Training - Loading: 80.0%
131 Machine Learning with Training - Loading: 81.0%
132 Machine Learning with Training - Loading: 82.0%
133 Machine Learning with Training - Loading: 83.0%
134 Machine Learning with Training - Loading: 84.0%
135 Machine Learning with Training - Loading: 85.0%
136 Machine Learning with Training - Loading: 86.0%
137 Machine Learning with Training - Loading: 87.0%
138 Machine Learning with Training - Loading: 88.0%
139 Machine Learning with Training - Loading: 89.0%
140 Machine Learning with Training - Loading: 90.0%
141 Found a Solution
142 [[1, 8, 2, 5, 6, 4, 9, 7, 9], [6, 3, 8, 1, 7, 2, 4,
    7, 4], [5, 9, 2, 3, 8, 1, 2, 1, 4], [3, 8, 9, 5, 6,
    8, 9, 6, 1], [7, 5, 3, 2, 3, 5, 7, 2, 4], [6, 1, 8,
    4, 2, 9, 6, 3, 8], [7, 5, 5, 7, 8, 4, 9, 1, 6], [3,
    0, 0, 0, 0, 0, 0, 0, 0], [0, 0, 0, 0, 0, 0, 0, 0, 0
    ]]
143 Machine Learning with Training - Loading: 91.0%
144 Machine Learning with Training - Loading: 92.0%
145 Found a Solution
146 [[4, 3, 9, 2, 1, 7, 6, 8, 8], [7, 1, 3, 5, 6, 9, 2,
    5, 2], [6, 8, 9, 4, 1, 3, 1, 4, 2], [9, 8, 3, 5, 7,
    9, 8, 3, 6], [7, 5, 2, 4, 6, 5, 7, 1, 4], [2, 8, 9,
    2, 1, 4, 5, 3, 8], [7, 6, 3, 9, 8, 7, 6, 1, 4], [5,
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146 0, 0, 0, 0, 0, 0, 0, 0], [0, 0, 0, 0, 0, 0, 0, 0, 0
    ]]
147 Machine Learning with Training - Loading: 93.0%
148 Machine Learning with Training - Loading: 94.0%
149 Machine Learning with Training - Loading: 95.0%
150 Machine Learning with Training - Loading: 96.0%
151 Machine Learning with Training - Loading: 97.0%
152 Machine Learning with Training - Loading: 98.0%
153 Machine Learning with Training - Loading: 99.0%
154 Found a Solution
155 [[5, 3, 9, 6, 1, 8, 2, 4, 2], [1, 7, 9, 3, 4, 8, 5,
    4, 6], [8, 2, 5, 7, 1, 9, 1, 2, 3], [8, 9, 5, 6, 7,
    8, 9, 4, 1], [7, 6, 3, 2, 6, 7, 5, 3, 4], [2, 9, 8,
    9, 4, 1, 5, 8, 3], [7, 6, 3, 5, 2, 7, 6, 9, 4], [1,
    0, 0, 0, 0, 0, 0, 0, 0], [0, 0, 0, 0, 0, 0, 0, 0, 0
    ]]
156 Machine Learning with Training - Loading: 100.0%
157 Machine Learning with Training Completed
158 Program took: 17708.056360006332
159
160 Process finished with exit code 0
161
```