

Problem 1

Placing Queens Column Wise

2431

	Q			Collisions = 1
			Q	
		Q		
Q				

1234

Q				Collisions = 3
	Q			
		Q		
			Q	

2132

	Q			Collisions = 3
Q				
		Q		
	Q			

4311

			Q	Collisions = 3
		Q		
Q				
Q				

String No	Initial Population	X Value	f(x) Value	Probability Count	Expected Count	Actual Count
1	2431	2431	1	0.1	0.4	0
2	1234	1234	3	0.333	1.2	1
3	2132	2132	3	0.333	1.2	1
4	4311	4311	3	0.333	1.2	1
Total			10	1	4	
Average			2.5			

Pairs Selected:

String No = { (2,3), (3,4) }

Crossover:

(2,3)	(3,4)
12 34 21 32	21 32 43 11
12 32 21 34	21 11 43 32

First Generation:

1232

Q				Collisions = 4
	Q			
		Q		
	Q			

2134

	Q			Collisions = 2
Q				
		Q		
			Q	

2111

	Q			Collisions = 3
Q				
Q				
Q				

4332

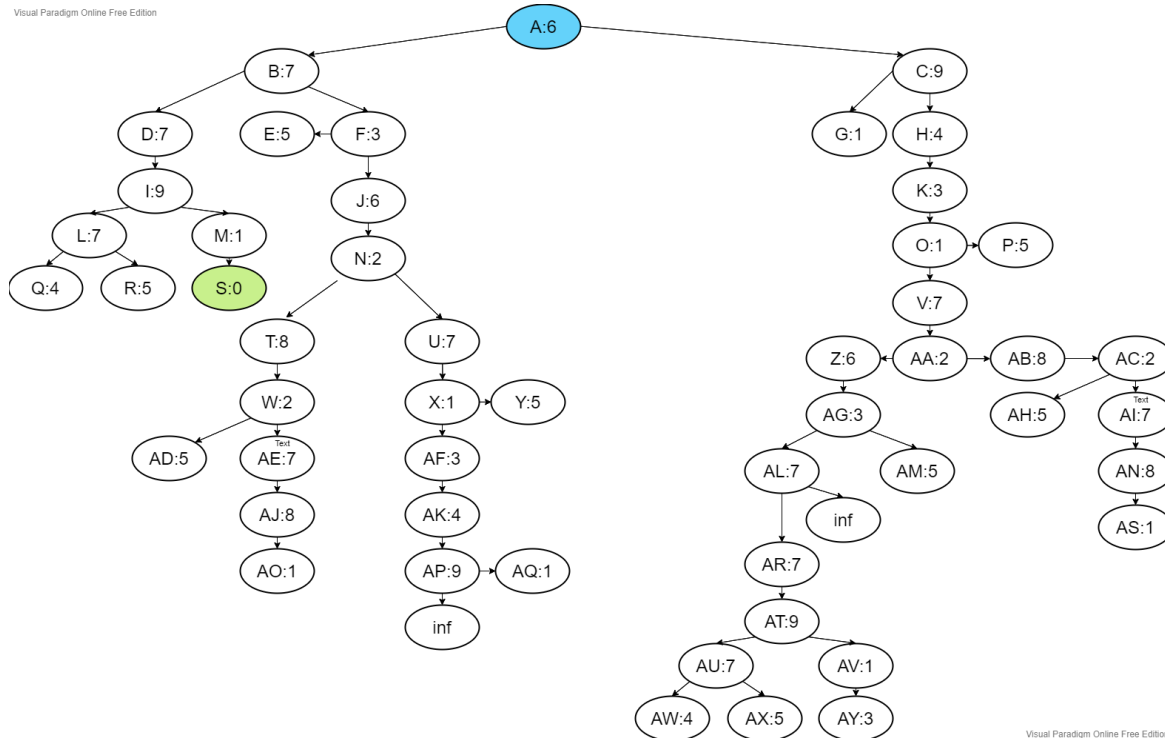
			Q	Collisions = 3
		Q		
		Q		
	Q			

Problem 2

Uninformed Search

DFS is selected as our uninformed search method. Although it is not a complete and optimal solution, it gives us a very fast time complexity related solution.

Graphical Representation (blue starting point and green is goal):



Expanded Node	Fringe
	{A:6}
A:6	{B:7, C:9}
B:7	{D:7, F:3, C:9}
D:7	{I:9, F:3, C:9}
I:9	{M:1, L:7, F:3, C:9}
M:1	{S:0, L:7, F:3, C:9}
S:0	{L:7, F:3, C:9}

Uninformed Search

Greedy Best First Search is chosen for this one to provide a quick and optimal solution for our problem.

Expanded Node	Fringe
	{A:6}
A:6	{B:7, C:9}
B:7	{F:3, D:7, C:9}
F:3	{J:6, D:7, C:9}
J:6	{N:2, D:7, C:9}
N:2	{D:7, U:7, T:8, C:9}
D:7	{U:7, T:8, I:9, C:9}
U:7	{X:1, Y:5, T:8, I:9, C:9}
X:1	{AF:3, Y:5, T:8, I:9, C:9}
AF:3	{AK:4, Y:5, T:8, I:9, C:9}
AK:4	{Y:5, T:8, I:9, C:9, AP:9}
Y:5	{ T:8, I:9, C:9, AP:9}
T:8	{W:2, I:9, C:9, AP:9}
W:2	{AD:5, AE:7, I:9, C:9, AP:9}
AD:5	{AE:7, I:9, C:9, AP:9}
AE:7	{AJ:8, I:9, C:9, AP:9}
AJ:8	{AO:1, I:9, C:9, AP:9}
Ao:1	{ I:9, C:9, AP:9}
I:9	{M:1, L:7, C:9, AP:9}
M:1	{S:0, L:7, C:9, AP:9}
S:0	{ L:7, C:9, AP:9}

[Full Code for Both Searches](#)

Output

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-----DIRECTED-----
A -> [(B: 7), (C: 9)]
B -> [(D: 7), (F: 3)]
C -> [(G: 1), (H: 4)]
D -> [(I: 9)]
E -> []
F -> [(E: 5), (J: 6)]
G -> []
H -> [(K: 3)]
I -> [(M: 1), (L: 7)]
J -> [(N: 2)]
K -> [(O: 1)]
L -> [(Q: 4), (R: 5)]
M -> [(S: 0)]
N -> [(T: 8), (U: 7)]
O -> [(P: 5), (V: 7)]
P -> []
Q -> []
R -> []
S -> []
T -> [(W: 2)]
U -> [(X: 1)]
V -> [(AA: 2)]
W -> [(AD: 5), (AE: 7)]
X -> [(Y: 5), (AF: 3)]
Y -> []
Z -> [(AG: 3)]
AA -> [(Z: 6), (AB: 8)]
AB -> [(AC: 2)]
AC -> [(AH: 5), (AI: 7)]
AD -> []
AE -> [(AJ: 8)]
AF -> [(AK: 4)]
AG -> [(AL: 7), (AM: 5)]
AH -> []
AI -> [(AN: 8)]
AJ -> [(AO: 1)]
AK -> [(AP: 9)]
AL -> [(AR: 7)]
AM -> []
AN -> [(AS: 1)]
AO -> []
AP -> [(AQ: 1)]
AQ -> []
AR -> [(AT: 9)]
AS -> []
AT -> [(AU: 7), (AV: 1)]
AU -> [(AW: 4), (AX: 5)]
AV -> [(AY: 3)]
AW -> []
AX -> []
AY -> []

DFS: ['A', 'B', 'D', 'I', 'M', 'S']
Greedy BFS: ['A', 'B', 'E', 'E', 'J', 'N', 'U', 'X', 'AF', 'AK', 'Y', 'D', 'T', 'W', 'AD', 'AE', 'AJ', 'AO', 'I', 'M', 'S']

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