Problem 1

In this problem, we are asked to do out the N-queens problem by hand with N=9.

Below is a table containing our solution.

For each queen we have assigned a color as follows:

queen 1 — red
queen 2 — blue
queen 3 — green
queen 4 — yellow
queen 5 — cyan
queen 6 — teal
queen 7 — magenta
queen 8 — olive

·	·	Q_1	·	·	·	·	·	·
·	x_1	x_1	x_1	·	·	·	·	Q_2
x_1	Q_3	x_1	·	x_1	·	·	x_2	x_2
x_3	x_3	x_1	·	·	x_1	x_2	Q_4	x_2
Q_5	x_3	x_1	x_3	·	x_2	x_1	x_4	x_2
x_5	x_3	x_1	Q_6	x_2	x_4	·	x_1	x_2
x_5	x_3	x_1	x_2	x_4	x_3	Q_7	x_4	x_1
x_5	x_3	x_1	x_4	Q_8	x_6	x_3	x_4	x_2
x_5	x_2	x_1	x_6	x_5	x_8	x_6	x_3	x_2

In the above table we demonstrate the use of the Monte Carlo approach to generate an estimate of the total cost to solve the N-queens problem with N=9. In the below table we give the row sums for all of the options, and then the total sum which represents the overall cost to solve the problem:

Row #	**Choices**	**Cost**
1	9	9
2	6	$9 \cdot 6$
3	4	$9 \cdot 6 \cdot 4$
4	3	$9 \cdot 6 \cdot 4 \cdot 3$
5	2	$9 \cdot 6 \cdot 4 \cdot 3 \cdot 2$
6	2	$9 \cdot 6 \cdot 4 \cdot 3 \cdot 2 \cdot 2$
7	1	$9 \cdot 6 \cdot 4 \cdot 3 \cdot 2 \cdot 2 \cdot 1$
8	1	$9 \cdot 6 \cdot 4 \cdot 3 \cdot 2 \cdot 2 \cdot 1 \cdot 1$
9	0	0
Total		**9999**