

# CSC 420 - Assignment 3

Robert Krenzy, kre1188@calu.edu

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## 1 Question 1

The Magic 3x3 Square is a 3x3 grid of the digits 1 to 9. Each grid cell has a unique number, and when arranged in a certain order, the sum of each row, column, and diagonal will each be 15.

Consider the following square, with letters marking each grid tile, and a possible solution:

A	B	C	6	1	8
D	E	F	7	5	3
G	H	I	2	9	4

This problem can be formulated as a Constraint Satisfaction Problem, with the following properties:

- Variables:  $X = \{ A, B, C, D, E, F, G, H, I \}$
- Domains:  $X_i = \{ 1, 2, 3, 4, 5, 6, 7, 8, 9 \}$
- Constraints:  $C = \{$ 
  - AllDifferent $\{ A, B, C, D, E, F, G, H, I \}$ ,
  - $A + B + C = 15$ ,
  - $D + E + F = 15$ ,
  - $G + H + I = 15$ ,
  - $A + D + G = 15$ ,
  - $B + E + H = 15$ ,
  - $C + F + I = 15$ ,
  - $A + E + I = 15$ ,
  - $C + E + G = 15 \}$

## 2 Question 2

The attached MiniZinc script produces the following output:

```
Running Magic15Square.mzn
847msec
```

```
4 9 2
3 5 7
8 1 6
```

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```
Finished in 847msec.
```