5 – SLAYER

One strategy for finding a solution to a number puzzle is to describe the solution by a set of algebraic constraints and then solve the constraints. Consider, for instance, the following puzzle:

United and the City are the names of two rival dance teams. United say to City: If one of you joins our team, then our team will be double the size of yours. City reply: If one of you joins our team, then the sizes of our teams will be equal. What are the sizes of the two teams?

If the sizes of United and City are denoted by u and c, respectively, then any solution to this puzzle satisfies the constraints: (u + 1) = 2(c – 1) and c + 1 = u – 1. Solving these constraints yields a solution to the puzzle, namely, u = 7 and c = 5.

While solving the constraints in this example is easy, solving constraints describing some number puzzles can be too hard. In such cases, another strategy is to guess possible solutions and then check if the guess works. Consider, for instance, the following puzzle:

What digits can replace the letters A, B and C to make a 3-digit number ABC for which the following equation is true: ABC = A·B·C·(A+B+C)

This puzzle is not easily solved directly. But any guess for the 3-digit number ABC can be easily checked to see if it satisfies the equation. For example, suppose you guess that ABC is 123. This guess does not work because it requires A = 1, B = 2, and C = 3, and 123 ≠ 1·2·3·(1+2+3). In contrast, the guess that ABC is 135 works since 135 = 1·3·5·(1+3+5).

You will write a program that can be used to check guesses for the following puzzle:

For what six-digit number SLAYER is the following equation true, where each letter stands for the digit in the position shown: SLAYER + SLAYER + SLAYER = LAYERS

```
### ECO CS 18 ##
### Project 5 ##

Guess a six-digit number SLAYER so that following equation is true, where each l
etter stands for the digit in the position shown: SLAYER + SLAYER + SLAYER = LAY
ERS
Enter your guess for SLAYER: 666666
Your guess is incorrect:
SLAYER + SLAYER + SLAYER = 1999998
LAYERS = 666666
Thanks for playing.

Enter your guess for SLAYER: 142857
Your guess is correct:
SLAYER + SLAYER + SLAYER = 428571
LAYERS = 428571
Thanks for playing.
```