

Alphametic riddle solver

Version 1.0.0

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What is an alphametic riddle?

„An alphametic is a peculiar type of mathematical puzzle, in which a set of words is written down in the form of an ordinary "long-hand" addition sum, and it is required that the letters of the alphabet be replaced with decimal digits so that the result is a valid arithmetic sum.“ [1] A popular example of an alphametic puzzle would be:

$$\begin{array}{r} \text{SEND} \\ + \text{MORE} \\ \hline \text{MONEY} \end{array}$$

The rules of the riddle state, that the first characters of each word are not allowed to be zero. Every other character can have a Digit from 0 → 9. The solution to the above-mentioned riddle would be:

$$\begin{array}{r} 9567 \\ + 1085 \\ \hline 10652 \end{array}$$

There are a lot of variations of puzzles available with the number of words changing drastically. Alphametic puzzles are a fun way to waste a couple of hours ;-)

How does the program work?

Because this program was my first ever, the approach is not that efficient but it gets the job done. You'll be able to give three variables into the constructor. In the first stage, the characters of the variables get written down into the character String. In the second stage, the numbers are distributed from 1 \rightarrow 0. Why one to zero? The rules of the riddle state, that the first characters are not allowed to be zero. And by setting the last character to zero, will eliminate the need to check if it is a first letter of a variable. The assigning of the numbers is similar to an array, the index of the first character has the number in the same index in the „number“-String.

After the numbers have been distributed, the program will check if the resulting numbers of the variables in sum are the solution as the number. If not, the number needs to be increased by one. But we have to check every time we increase it if the first characters are zero or duplicate digits exist. If that is the case increase again. Then we check again if the resulting numbers of the variables in sum are the solution as the number. If that's true, we are done and the numbers will be printed to the console. As you already may have noticed the solution is being brute forcefully calculated...

On the following page, there will be a graphic that will show, how the program calculates the solution.

Literature

- [1] Uni Bielefeld: „The Alphametics Page“.
<https://www.math.uni-bielefeld.de/~silke/PUZZLES/ALPHAMETIC/>
Current Status: 06.03.2023.