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**36th Annual High School Programming Contest**

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##### April 12, 2024

###### Gold Problem #2: A Poem and a Square Root Number Puzzle

Background Information:

When I was in the 8th grade,

My teacher explained to me,

Take THIS and THAT, use your head,

And make them as close as they can be.

The THIS was quite unsightly,

compared to THAT which was simply Z.

I sighed and said politely,

the puzzles’s not clear to me.

She said $\sqrt{ABC } - \sqrt{DE}$ - $\sqrt{F}$ is THIS.

And I will give you Z.

She wrote both with a flourish.

Now I think that you will see.

For example, when Z = 0 $\sqrt{132}-\sqrt{89}$ - $\sqrt{4}$ is approximately 0.055144 which is very good but it’s not the best. $\sqrt{145 }-\sqrt{92}$ - $\sqrt{6}$ is approximately 0.000442 which is the closest the expression can get Z = 0.

Write a program that inputs a non-negative integer Z ≤ 999 and outputs six digits: A, B, C, D, E, and F, where all six digits are between 1 and 9, all are different and $\sqrt{ABC } - \sqrt{DE}$ - $\sqrt{F}$ is as close as possible to Z.

Programming Problem:

Input:  A non-negative integer Z ≤ 999.

Output: Six unique digits A to F, one digit per line, so that $\sqrt{ABC } - \sqrt{DE}$ - $\sqrt{F}$ is as close as possible to Z.

Example 1: Example 2: Example 3: Example 4:

Input: 0 Input: 2 Input: 5 Input: 999

Output: 1 Output: 1 Output: 2 Output: 9

 4 8 5 8

 5 5 6 7

 9 7 8 1

 2 4 1 3

 6 9 4 2