Problem A. Attractive Game

It is the easiest task in the problemset. Just do what it is said in the statement for each possible patch: letter patch, minor patch and major patch, and print the results in order

Problem E. Effective Pricing

For each number, the change in the number of "nines" occurs as follows:

- Two "nines" are added (due to .99).
- If the number ends with n zeros, n "nines" are added.
- If a "nine" was at the end of the number or immediately before the ending zeros, one less "nine" is required (because this "nine" will turn into an eight).

Read each number as a string and count the number of zeros at the end of this string, as well as check if the rightmost non-zero digit is a "nine", then calculate the number of additional "nines" for this number and add it to the total number of additional "nines".

Problem C. Chessboard And Two Pieces

If you place the first piece on c3, then you can distinguish all options except for the queen and the rook: for the pawn the answer will be `c`, for the knight - `abde`, for the bishop - `abdefgh`, for the king - `bcd`. The answer `abcdefgh` will be given for both the queen and the rook; moreover, regardless of the choice of the field, the rook and the queen on the unobstructed board control all verticals. So in the worst case, you will have to take two actions, and with the answer `abcdefgh`, you place the piece on b3 as the second action. If the first piece has only `cdefgh` left, then it is a rook, otherwise it is a queen.

For the second piece - for the pawn the answer is `b`, for the knight - `acd`, for the bishop - `acdefg`, for the king - `abc`, for the queen - `abcdefg`, for the rook - `ab`.

Thus, with two requests, you can uniquely determine both pieces.

Problem F. Find The Ratio

Obviously, at least for $q = 100$, the answer exists (since a number with two decimal places is an integer divided by 100).

For each test case, we iterate through all q from 2 to 100, multiply A by q, and check if the closest numbers to the right and left of the product give the required number of matching digits when divided by q. If they do, we exit.

Problem G. Generate Interesting Numbers

Expand the brackets in the number representation. We get that the number has the form

$$a_0 + a_1 b_1 + a_2 b_1 b_2 + \ldots + a_{n-1} b_1 \ldots b_{n-1}$$

The sum of the digits is $a_0 + a_1 + \ldots + a_{n-1}$. That is, if x is a interesting number, then the number $a_1(b_1 - 1) + a_2(b_1 b_2 - 1) + \ldots + a_{n-1}(b_1 b_2 \ldots b_{n-1} - 1)$ should be divisible by x for any values of a_i. If any of the brackets is not divisible by x, then we take a_i for this bracket equal to 1, take the rest of the a_i equal to 0, and get a number that is not divisible by x, that is, all brackets must be divisible by x. It is easy to notice that if all brackets are divisible by x, then the sum is also divisible by x, that is, the condition is necessary and sufficient.

If $b_1 - 1$ is divisible by x, then $b_1 = 1 \bmod x$. Substituting into the second bracket, we get $b2 \cdot 1 = 1 \bmod x$, and so on, that is, we get that x is a common divisor of all $b_i - 1$. As is known, any common divisor of a set of numbers is a divisor of the greatest common divisor of the set of these numbers, that is, we calculate the greatest common divisor by applying the Euclidean algorithm sequentially (the final complexity is no worse than $N \log N$), after which we output all divisors of the resulting number d in ascending order (generating them in $O\sqrt{d}$).