

## Problem C. Crimson ant Turquoise

Its easy to see that all planks except maybe from last must be painted with the same shade of crimson:  $c_1 = c_3 = c_4$ , if we take the first 5 planks,  $c_2 = c_4 = c_5$  if we take the planks from 2 to 6, so  $c_1 = c_2 = c_3 = c_4 = c_5$  when we consider 6 planks. Similarly we can see that the colors  $c_i$  are equal for all  $i < n$ , if we have  $n$  planks.

So we can choose  $a$  shades for first 2023 planks and  $b$  shades for last one, so the answer is  $a * b$ .

## Problem D. Digital Coolness

For any number, it is possible to achieve a minimum coolness of 8 (by repeating the last digit 7 times). If the last  $d$  digits of the prefix match, the result for repetitions is  $d + 7$ .

Next, we build the maximum possible decreasing sequence (from the last digit down) and the maximum possible increasing sequence (from the last digit up) and compare the length of the largest of them (taking into account the part belonging to the prefix) with  $d + 7$ . Obviously, if the lengths of the decreasing and increasing sequences are equal, they will be less than 7, thus the most beautiful number is achieved by repetitions. So, only one such sequence can “compete” with repetitions.

If its length is less than  $d + 7$ , the answer is 1.

If they are equal, the answer is  $1 + (10 \text{ to the power of the remaining free digits at the end})$ , for example,  $1323456789^*$  for the prefix 1323 gives 10 numbers.

If it is greater, the answer is 10 to the power of the remaining free digits at the end.