

First Bulgarian National Olympiad in Informatics

June 1 and 2, 1985

First Day.

Problem.

Let n be a positive integer such that $3 < n < 9$. Let T be the set of all points with positive integer coordinates (x,y) in the plane for which the inequality $x+y < n$ holds. Every point (x,y) of T is associated with the last digit of $|p \cdot x^2 + q \cdot y^2 + p|$, where p and q are integers. Two points of T are called neighbouring, if they lie on the coordinate axes or on lines parallel to them, and there are no other points of T between them.

Write a programme that

- inputs values of variables n , p and q ;
- prints out nicely the coordinates of points belonging to T and their associated digits, according to the above defined correspondence.
- finds and prints out the arithmetic mean of all n -digit decimal numbers $a_0a_1a_2...a_{(n-1)}$, that have digits $a_0, a_1, ..., a_{(n-1)}$ satisfying the following conditions:
 - every digit a_i is associated with a point of T according to the above given definition;
 - for any two digits a_i and $a_{(i+1)}$, $i = 0, 1, 2, ..., n-2$, their corresponding points t_i and $t_{(i+1)}$ are neighbouring;
 - a_0 is associated with $(0,0)$;
 - $a_{(n-1)}$ is associated with point (x,y) , such that $x+y=n-1$.
- for an input value of n , your programme computes and prints out the number of points belonging to T and the number of all the n -digit numbers, defined in c).

Source is taken from the jury materials.

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