

9-th Bulgarian National Olympiad in Informatics

June, 5 and 6, 1993

Selection round

First day

CmsD company produces various kinds of construction toys. Using a new set, children can build racing speedways for Legocars. The speedways are closed loops with no self-crossing. They are built by connecting two type of elements:

-- "A" type elements in a form of a straight line segment by a unit length;

-- "B" type elements in a form of an arc, which is a quarter part of a circle by a unit radius.

It is permitted to join together two "A" elements, or one "A" with one "B" element. It is not permitted to join together two "B" elements. Using "B" elements, we can build left or right turns of $+90$ or -90 degrees.

The following problems are proposed:

Problem 1.

Given p "A" type elements and q "B" type elements, built (if possible) n speedways, using the maximal number of "B" elements and no more than p "A" elements.

Problem 2.

Save into a text file the results obtained in the previous problem. Render on the computer screen the first k speedways you have built.

Problem 3.

Within a plain rectangle with sides i and j , build a speedway as long as possible. Your program should output the speedway, its length and the area of the domain surrounded by the speedway.

Remark: The values of p , q , n , k , i and j , which are integers, are entered by the keyboard.

Tests:

	p	q	n	k	i	j
Test 1	3	4	2	2	6	6
Test 2	5	5	2	2	7	8
Test 3	12	6	6	6	7	8
Test 4	10	9	6	6	7	11

Source: Obuchenieto po matematika i informatika, journal published by Bulgarian Ministry of Education, n. 5, 1993, pp. 57-59.

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