

4177 Buster's Cookie

Buster wants a cookie, and not just any cookie: he wants a *big* cookie, the most surface area he can get. Fortunately, Buster's friend Arnie is famous for his yummy cookie dough and it just so happens that Arnie has dough rolled and ready to be cut. (For an unknown reason, Arnie always rolls the dough in the shape of a convex polygon.) Buster would be happy to put it in the oven as is but Arnie insists that a proper cookie must have a proper shape — a circle, that is. Buster needs your help to determine the largest possible circle which can be cut out of the dough.

Input

The first line contains n , the number of vertices of the polygon. You may assume that n is between 3 and 100. The next n lines contain two integers each, separated by white space — the i -th line contains the x - and y -coordinates of the i -th vertex of the polygon.

You may assume that the points define a convex polygon, i.e., if we connect all consecutive points and the first and the last point by straight lines we get a path that is not self-intersecting and the inside angle at the i -th point is always less than 180 degrees.

Output

The output is a single line with a single integer — the diameter of the largest circle completely contained by the polygon (it can touch but not intersect the sides of the polygon), rounded down to the nearest integer.

Sample Input

```
5
0 0
2 0
2 2
1 3
0 2
```

Sample Output

```
2
```

