Casablanca's hippodrome has grown tired of old-fashioned dual racing and has kicked it up a notch: they will now be organizing hyperduals.

During a hyperdual, only two horses will participate in the race. In order for the race to be interesting, it is necessary to try to select two horses with similar strength.

Write a program which, using a given number of strengths, identifies the two closest strengths and shows their difference with an integer.

In a hyperdual, a horse's strength is a bidimensional *(Velocity,Elegance)*vector. The distance between two strengths *(V1,E1)* and *(V2,E2)* is *abs(V2-V1)+abs(E2-E1)*.

(This is a harder version of training puzzle "Horse-racing duals". You may want to solve that problem first.)
(To date there is no specific achievement if you solve this one in pure bash. Rest assured it *is* possible nonetheless!)
Input
Line 1: the number N of horses
***N* following lines:** the speed Vi and elegance Ei of each horse, space-separated
Output
Line 1: the distance D between the two closest strengths
Constraints
$10 \leq N \leq 600$
$0 \leq Vi,Ei \leq 10000000$
$D \geq 0$
All values are integral.