ECE30018 Problem Solving Studio, Fall 2023

C8. Chinese or Pizza

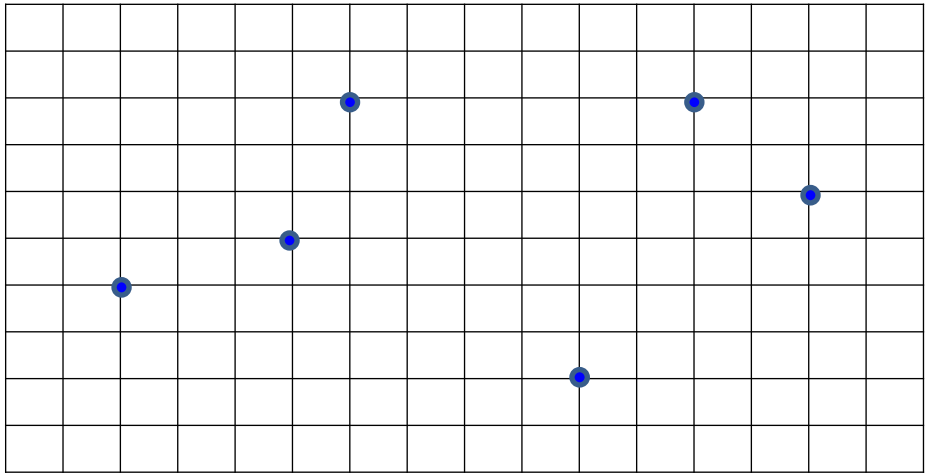
| Submission due: 1:00 PM, 10 Nov Fri

C10. Chinese or Pizza

You are franchisor of two restaurant brands, one for Pizza house and the other for Chinese restaurant. You also owns *N* bulidings in a city of course.

You want to open a restaurant with one of your brands on every building of your own. To maximize benefit, you do not open a restaurant of a brand if another restaurant of the same brand exists within 5 miles in Euclidean distance. Given *N* positions of buildings on a 2-D plane, there may exist various possible combinations of restaurants and buildings.

Write a program that receives the positions of *N* buildings and find out the minimum number of restaurants that a brand can open in all possible combinations.



```
A: (2, 4)
B: (5, 5)
C: (6, 8)
D: (10, 2)
E: (12, 8)
F: (14, 6)
```

Suppose that there are six buildings placed as above.

There are eight possible combinations of brands and buildings:

(Chinese: {A, C, E}, Pizza: {B, D, F}), (Chinese: {B, D, F}, Pizza: {A, C, E}),
(Chinese: {A, C, F}, Pizza: {B, D, E}), (Chinese: {B, D, E}, Pizza: {A, C, F}),
(Chinese: {A, C, D, F}, Pizza: {B, E}), (Chinese: {B, E}, Pizza: {A, C, D, F}),
(Chinese: {A, C, D, E}, Pizza: {B, F}), (Chinese: {B, F}, Pizza: {A, C, D, E})

Among these combinations, at least two buildings are chosen for a brand.

Input

- Input is given as text via the standard input
- The first line has one integers N for $1 \leq N \leq 50000$.
- From the second to the (N+1)-th lines, each line has two integers x_i and y_i for $1 \leq x_i \leq 500000$ and $1 \leq y_i \leq 500000$ that represents the position of the i-th building in mile.

Output

- Print the minimum number of restaurants that a brand can open. Your program should return the answer within 1.0 second.

Test case example

Input 1

```
6
2 4
5 5
6 8
10 2
12 8
14 6
```

Output 1

```
2
```

Input 2

```
2
20 20
60 40
```

Output 2

```
0
```