

Problem D

The coconut-nut

Time limit: 1 second

Boboy has a big coconut field inside a mysterious island. He wants to make fences for his big coconut field to protect all of his coconut trees inside from the outer wildlife (maybe bear, cheetah, or even dragon!). Unfortunately, he has a very limited budget to make the fences. Boboy then called Vincent for help to calculate the most efficient fences (which means the minimal perimeter of all fences) to protect all the coconut trees inside.

INPUT

The input file will contain records of data for several cases. The first line of each record contains the number T ($2 < T < 10000$) of trees for that case. Subsequent lines of the record contain 2 real numbers that are the x - and y -coordinates of the tree locations. Data within a single record will not be duplicated. End of input is indicated by a case with 0 trees.

OUTPUT

Output for a single region is displayed on at least 2 lines:

First line: The number of the Case. (The first record corresponds to Case #1, the second to Case #2, etc.)

Second line: The length of the perimeter of the region rounded to 2 decimal places.

One blank line must separate output from consecutive input records.

Sample Input:	Sample Output:
3	Case #1:
0 0	Minimum perimeter length = 12.00
0 4	
3 4	Case #2:
6	Minimum perimeter length = 16.50
0 0	
1 2	Case #3:
3.1 1.3	Minimum perimeter length = 19.64
3 4.5	
1 2.1	
4 -2	
7	
1 0.5	
1 0	
4 1.5	
1 -0.2	
2.5 -1.5	
0 0	
8 4	
0	