

Goods Delivery

"giaohangtocdo.vn" is a start-up company. Every day, the company delivers many kinds of products for n retail stores, called 1, 2... n . All stores are located on a long street: store i at position p_i on that street.

For simplicity, we assume that all kinds of products have the same size, same weight, and store i needs a fixed number n_i products each day.

The company uses many trucks to deliver products. Each truck can bring maximum k products. A truck can also deliver products for some stores in a trip. The company plans to build a grand-warehouse where all trucks pick up products and start a trip to the stores. They want to choose a location on the street to build the grand-warehouse to optimize the total distance of all trips in a day.

Input

+ The first line contains integer numbers n ($1 < n < 10^5$) and k ($0 < k < 10^9$)

+ There are n lines after that, where line i contains data for store i , that are p_i ($0 < p_i < 10^9$) and n_i ($0 < n_i < 10^9$) respectively

Output

Print the total distance of all trips (one-way delivery) in a day

Example

Input

6 5

1 7

2 2

3 6

8 9

10 11

15 13

Output

44