

Cow Lineup

Farmer John has hired a professional photographer to take a picture of some of his cows. Since FJ's cows represent a variety of different breeds, he would like the photo to contain at least one cow from each distinct breed present in his herd. FJ's N cows are all standing at various positions along a line, each described by an integer position (i.e., its x coordinate) as well as an integer breed ID. FJ plans to take a photograph of a contiguous range of cows along the line. The cost of this photograph is equal its size -- that is, the difference between the maximum and minimum x coordinates of the cows in the range of the photograph. Please help FJ by computing the minimum cost of a photograph in which there is at least one cow of each distinct breed appearing in FJ's herd.

Input

Input description...

Output

Output description...

Example

Input:

etc.

Output:

etc.