The Map

After a new administrative division of Byteland cartographic office works on a new demographic map of the country. Because of technical reasons only a few colors can be used. The map should be colored so that regions with the same or similar population (number of inhabitants) have the same color. For a given color *k* let **A**(*k*) be the number, such that:

- at least half of regions with color *k* has population not greater than **A**(*k*)
- at least half of regions with color *k* has population not less than **A**(*k*)

A coloring error of a region is an absolute value of the difference between **A**(*k*) and the region's population. **A cumulative error** is a sum of coloring errors of all regions. We are looking for an optimal coloring of the map (the one with the minimal cumulative error).

Task

Write a program which:

- reads the population of regions in Byteland from the standard input,
- computes the minimal cumulative error,
- writes the result to the standard output.

Input

The number of test cases t is in the first line of input, then t test cases follow separated by an empty line. In the first line of each test case an integer *n* is written, which is the number of regions in Byteland, $10 < n < 3000$. In the second line the number *m* denoting the number of colors used to color the map is written, $2 <= m <= 10$. In each of the following *n* lines there is one non-negative integer - a population of one of the regions of Byteland. No population exceeds 2^{30}.

Output

Your program should write for each test case one integer number equal to a minimal cumulative error, which can be achieved while the map is colored (optimally).

Example

Sample input:
1
11
3
21
14
6
18
10
2
15
12
3
2

2

Sample output:

15