Optimal Truck Load

User Story

As a planner, I want to load our truck fleet evenly in order to minimize operational costs.

Description

For a given list of boxes with the corresponding weights, we want to load these boxes on a given number of trucks such that the weight difference between all trucks is minimal (in order to not operate almost empty trucks next to almost full trucks). To this end, we want to return that minimal difference (i.e., the minimal maximum of weight differences between all pairs of trucks).

Assumptions

The list of box weights is not empty and all weights as well as the number of trucks are positive integers.

Example

Let the list of box weights be $[1; 2; 3; 4]$ and the number of trucks be 3. Here are the 12 possible load combinations (ignoring symmetric cases by always ordering the trucks from heaviest to lightest load) of the 4 boxes on the 3 trucks:

Truck 1	Truck 2	Truck 3	Maximum Difference
10	0	0	10
9	1	0	9
8	2	0	8
7	3	0	7
7	2	1	6
6	4	0	6
6	3	1	5
5	5	0	5
5	4	1	4
5	3	2	3
4	4	2	2
4	3	3	1

So the minimal maximum difference is 1 in this example.

Further Test Cases

boxes	trucks	result
[1; 2; 3; 4; 5]	1	0
[1; 2; 3; 4; 5]	3	0
[3]	10	3
[1; 2; 3; 4; 5]	10	5

boxes	trucks	result
[2; 5]	2	3
[2; 3; 5]	2	0
[2; 2; 8]	2	4
[2; 3; 5]	3	3

boxes	trucks	result
[4; 5; 6; 7; 8]	2	0
[2; 5; 6; 7; 8; 14]	3	0
[2; 5; 5; 8; 10; 12; 18; 19; 20]	3	0
[2; 5; 5; 8; 10; 12; 18; 19; 21]	3	1

Instructions

Please implement a program that solves the problem described in the user story for arbi-trary inputs matching the assumptions (so not only for the test cases delivered with the description). Focus on correctness - runtime or memory usage is not limited. You can choose any programming language, but please make sure that your program can be ex-ecuted on all widely used machines (so at least on currently available Windows, Linux, and Mac systems - add corresponding instructions to your submission on how to execute your program with arbitrary inputs). You should not take more than one hour to solve the actual problem (you might take more time to make your submission executable on any machine).