Assignment Backend

A micronutrient test revealed for users A, B and C that they have *daily nutrient deficits* (DND) according to the following table:

Micronutrient	A	B	C
Zinc	6.6 mg / d	2.6 mg / d	3.6 mg / d
Vitamin D3	1500 iU / d	3000 iU / d	3000 iU / d
Omega-3	-	1500 mg / d	2000 mg / d

DND is the amount of a nutrient which the human body needs to absorb daily to optimize the nutrient state. This can be achieved by the daily intake of dietary supplements from the following inventory:

Micronutrient	Amount / pill	Unit	Absorption
Zinc	22	mg	15 %
Zinc	30	mg	10 %
Zinc	50	mg	10 %
Vitamin D3	1000	iU	78 %
Vitamin D3	3000	iU	78 %
Omega-3	750	mg	100 %
Omega-3	1400	mg	100 %

The absorption coefficient determines the fraction of the given amount which is absorbed by the body.

Please write a dosing calculator which derives for each user the *minimal* daily number of pills under the following constraints:

- that the given dose needs to be in the range of DND +20% / -30%
- the given dose is as close as possible to the DND

a) Define a JSON object for the DND and for the nutrient inventory.

b) Implement a RESTful API which receives a list of DND and returns the recommended daily number of pills and the achieved dosing.

c) Extend the API in a way, that the DND can be cumulated over n days.

Example: The DND for Zinc is 2.5 mg and may be cumulated over 4 days, such that DND_{4d} *= 10 mg. Instead of giving every day one pill of Zinc à 30 mg, every second day a pill à 50 mg can be given.*

d) An amazing combinatory dietary supplement was developed, which contains in one pill:

Micronutrient	Amount / pill	Unit	Absorption
Vitamin D3	3000	iU	100 %
Omega-3	2000	mg	100 %

Add this dietary supplement to the inventory and take it into account in the calculator.

Extras:

- Build the supplement inventory as a separate api consumed by the recommender
- Consider additional input like user preferences (pill size, type, manufacturer)

Please share your solution zipped via email or private repository (Gith