

# Mandradora Forest



The evil forest is guarded by vicious mandragoras. Garnet and her **pet** must make a journey through. She starts with **1** health point (*s*) and **0** experience points.

As she encounters each mandragora, her choices are:

1. Garnet's pet *eats* mandragora *i*. This increments *s* by **1** and defeats mandragora *i*.
2. Garnet's pet *battles* mandragora *i*. This increases *p* by  $s \times H[i]$  experience points and defeats mandragora *i*.

Once she defeats a mandragora, it is out of play. Given a list of mandragoras with various health levels, determine the maximum number of experience points she can collect on her journey.

For example, as always, she starts out with  $s = 1$  health point and  $p = 0$  experience points. Mandragoras have the following health values:  $H = [3, 2, 5]$ . For each of the beings, she has two choices, *eat* or *battle*. We have the following permutations of choices and outcomes:

Action	s	p
e, e, e	4	0
e, e, b	3	15
e, b, b	2	14
b, b, b	1	10
b, b, e	2	10
b, e, e	3	9
b, e, b	2	16
e, b, e	3	6

Working through a couple of rows, first, her pet can eat all three and she does not gain any experience points. In the second row, her pet eats the first two to have  $1 + 2 = 3$  health points, then battles the beast with **5** health points to gain  $3 * 5 = 15$  experience points. We see that the best option is to eat the beast with **2** points and battle the others to achieve  $2 \times (3 + 5) = 16$  experience points.

## Function Description

Complete the *mandragora* function in the editor below. It must return an integer that denotes the maximum number of experience points that Garnet can earn.

mandragora has the following parameter(s):

- *H*: an array of integers that represents the health values of mandragoras

## Input Format

The first line contains an integer, *t*, denoting the number of test cases. Each test case is described over two lines:

1. The first line contains a single integer *n*, the number of mandragoras in the forest.
2. The second line contains *n* space-separated integers describing the respective health points for the mandragoras  $H[H[1], H[2] \dots H[n]]$ .

## Constraints

- $1 \leq t \leq 10^5$
- $1 \leq n \leq 10^5$
- $1 \leq H[i] \leq 10^7$ , where  $1 \leq i \leq n$
- The sum of all  $n$ s in a single test case is  $\leq 10^6$

## Output Format

For each test case, print a single line with an integer denoting the maximum number of experience points that Garnet can earn.

## Sample Input

```
1
3
3 2 2
```

## Sample Output

```
10
```

## Explanation

There are  $n = 3$  mandragoras having the following health points:  $H = [3, 2, 2]$ . Initially,  $s = 1$  and  $p = 0$ . The following is an optimal sequence of actions for achieving the maximum number of experience points possible:

1. *Eat* the second mandragora ( $H[2] = 2$ ).  $s$  is increased from  $1$  to  $2$ , and  $p$  is still  $0$ .
2. *Battle* the first mandragora ( $H[1] = 3$ ).  $s$  remains the same, but  $p$  increases by  $s \times H[1] = 2 \times 3 = 6$  experience points.
3. *Battle* the third mandragora ( $H[3] = 2$ ).  $s$  remains the same, but  $p$  increases by  $s \times H[3] = 2 \times 2 = 4$  experience points.

Garnet earns  $p = 6 + 4 = 10$  experience points.