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Badge Progress

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Mandragora Forest 🔖

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The evil forest is guarded by N vicious mandragoras. Each ith mandragora has H_i health points ($1 \le i \le N$).

Garnet and her pet begin their journey through the evil forest with $S = 1$ strength points and $P = 0$ experience points. For each undefeated mandragora i, she can perform *either* of the following actions:

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.

Each mandragora can only be defeated once, and Garnet can defeat the mandragoras in any order. Given the respective health points for each mandragora, can you find the maximum number of experience points she can earn from defeating all N 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, denoting the number of mandragoras in the forest.

2. The second line contains N space-separated integers describing the respective health points for the mandragoras (i.e., $H_1, H_2, \ldots, H_N$).

Constraints

- $1 \le T \le 10^5$
- $1 \le N \le 10^5$
- $1 \le H_i \le 10^7$, where $1 \le i \le N$
- The sum of all Ns in a single test case is $\le 10^6$

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 ($H_1 = 2$). S is increased from 1 to 2, and P is still 0.

2. *Battle* the first mandragora ($H_0 = 3$). S remains the same, but P increases by $S \times H_0 = 2 \times 3 = 6$ experience points.

3. *Battle* the third mandragora ($H_2 = 2$). S remains the same, but P increases by $S \times H_2 = 2 \times 2 = 4$ experience points.

Garnet earns $P = 6 + 4 = 10$ experience points, so we print 10 on a new line.

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Submissions: 4910
Max Score: 50
Difficulty: Medium

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More

Current Buffer (saved locally, editable) ⌄ 🕓   Java 8   ⌄   ⤢   ⚙

```java
import java.io.*;
import java.util.*;

public class Solution {

    public static void main(String[] args) throws IOException{

        BufferedReader br = new BufferedReader(new InputStreamReader(System.in));
        int tst = Integer.parseInt(br.readLine());

        for(int i = 0 ; i < tst ; i++){

            int N = Integer.parseInt(br.readLine());

            String line = br.readLine();
            String[] numbers = line.split("\\s");
            int arr[] = new int[N];

            long total = 0;

            for(int j = 0 ; j < N ; j++){
                arr[j] = Integer.parseInt(numbers[j]);
                total += arr[j];
            }

            Arrays.sort(arr);

            long output = total;

            int s = 1;

            for(int a = 0 ; a < N ; a++){

                s++;

                total -= arr[a];

                long newOut = s * total;

                if(newOut > output){
                    output = newOut;
                }
            }
            System.out.println(output);
        }
    }
}
```

Line: 1 Col: 1

⬆ Upload Code as File   ☐ Test against custom input   Run Code   Submit Code

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