

Hyperrectangle GCD

Let there be a K-dimensional [Hyperrectangle](#), where each dimension has a length of $n_1, n_2, \dots, n_k$. Each of the Hyperrectangle's unit cells is addressed at $(i, j, k, \dots)$ and has a value which is equivalent to $\text{GCD}(i, j, k, \dots)$ where $1 \leq i \leq n_1, 1 \leq j \leq n_2, \dots$

The goal is to sum all the $\text{GCD}(i, j, k, \dots)$ cell values and print the result modulo $10^9 + 7$. Note that indexing is from 1 to N and not 0 to N-1.

Input Format

The first line contains an integer T. T testcases follow.
Each testcase contains 2 lines, the first line being K (K-dimension) and the second line contains K space separated integers indicating the size of each dimension - $n_1 \ n_2 \ n_3 \ \dots \ n_k$

Output Format

Print the sum of all the hyperrectangle cell's GCD values modulo $10^9 + 7$ in each line corresponding to each test case.

Constraints

- $1 \leq T \leq 1000$
- $2 \leq K \leq 500$
- $1 \leq n_k \leq 100000$

Sample Input #00

```
2
2
4 4
2
3 3
```

Sample Output #00

```
24
12
```

Sample Input #01

```
1
3
3 3 3
```

Sample Output #01

```
30
```

Explanation #00

For the first test case, it's a 4X4 2-dimension Rectangle. The (i, j) address and GCD values of each

element at (i,j) will look like

1,1	1,2	1,3	1,4		1	1	1	1
2,1	2,2	2,3	2,4	=> GCD(i,j)	1	2	1	2
3,1	3,2	3,3	3,4		1	1	3	1
4,1	4,2	4,3	4,4		1	2	1	4

Sum of these values is 24

Explanation #00

Similarly for 3X3 GCD (i,j) would look like

1,1	1,2	1,3		1	1	1
2,1	2,2	2,3	=> GCD(i,j)	1	2	1
3,1	3,2	3,3		1	1	3

Sum is 12

Explanation #01

Here we have a 3-dimensional 3X3X3 Hyperrectangle or a cube. We can write it's GCD (i,j,k) values in 3 layers.

1,1,1	1,1,2	1,1,3		2,1,1	2,1,2	2,1,3		3,1,1	3,1,2	3,1,3
1,2,1	1,2,2	1,2,3		2,2,1	2,2,2	2,2,3		3,2,1	3,2,2	3,2,3
1,3,1	1,3,2	1,3,3		2,3,1	2,3,2	2,3,3		3,3,1	3,3,2	3,3,3
GCD (i,j,k)										
1	1	1		1	1	1		1	1	1
1	1	1		1	2	1		1	1	1
1	1	1		1	1	1		1	1	3

Total Sum = 30

Timelimits Timelimits for this challenge is given [here](#)