

A. Teamwork

time limit per test: 1 s.
 memory limit per test: 256 MB

Professor Oak is giving a group of n math students a welcome party in a math club. He wants to teach new students how to work in a group.

In order to teach students about teamwork, he gives these students n integers, i.e.

a_1, a_2, \dots, a_n .

He asks the students a question, whether these students can pick one integer of their own x_i and as a group, for every number a_i in a_1, a_2, \dots, a_n you can always find a pair of students j and k (not necessarily distinct), for which the difference between the numbers they pick $x_j - x_k$ equals exactly to a_i .

In other words. Can these students pick n integers x_1, x_2, \dots, x_n such that the following property holds?

- For each $1 \leq i \leq n$, there exist two (not necessarily distinct) students j and k ($1 \leq j, k \leq n$) such that $a_i = x_j - x_k$.

Input

The first line contains a single integer t ($1 \leq t \leq 20$) — the number of test cases. Then t test cases follow.

The first line of each test case contains one integer n ($1 \leq n \leq 10$).

The second line of each test case contains the n integers a_1, \dots, a_n ($-10^5 \leq a_i \leq 10^5$).

Output

For each test case, output a line containing YES if a sequence x_1, \dots, x_n satisfying the required property exists, and NO otherwise.

Example

| input | Copy |
|---|------|
| 4 3 52 -23 23 9 30 -16 27 57 -43 13 1 -42 -28 3 9 99 999 3 13 -2 -4 | |
| output | Copy |
| YES YES NO NO | |

Note

In the **first test case**, the sequence $x = [50, 73, 21]$ satisfies the property. Indeed, the following holds:

- $a_1 = 52 = 73 - 21 = x_2 - x_3$;

UIUC CS 491 Spring 2025

Private

Participant



→ About Group

[Group website](#)

→ Group Contests

- Line Sweep - Homework (Extra Credit)
- Convex Hull - Preclass
- Number Theory I - Homework
- Line Sweep - Preclass
- Number Theory II - Homework
- Combinatorics - Homework
- Geometry - Preclass
- Geometry - Homework
- Convex Hull - Homework (Extra Credit)
- Rabin Karp - Homework
- Number Theory II - Preclass
- Combinatorics - Preclass
- DP TSP - Homework
- KMP - Homework
- DP Tree - Homework
- Number Theory I - Preclass
- KMP - Preclass
- DP Palindromes - Homework
- Rabin Karp - Preclass
- DP Edit Distance - Homework
- DP Knapsack - Homework
- DP TSP - Preclass
- DP Longest Increasing Subsequence - Homework
- DP Intro - Homework
- DP Tree - Preclass
- Greedy - Homework
- Fenwick Tree - Homework

- $a_2 = -23 = 50 - 73 = x_1 - x_2$;
- $a_3 = 23 = 73 - 50 = x_2 - x_1$;

In the **third** and **forth test case**, it is possible to show that no sequence x of length 3 staisfies either of the professor's inputs.

- DP Knapsack - Preclass
- DP Edit Distance - Preclass
- Segment Tree - Homework
- DP Palindromes - Preclass
- Lazy Segment Tree - Homework
- LCA and Binary Lifting - Homework
- DP intro - Preclass
- Square Root Decomposition - Homework
- DP Longest Increasing Subsequence - Preclass
- Greedy - Preclass
- Fenwick Tree - Preclass
- Bit Manipulation - Homework
- Square Root Decomposition - Preclass
- Fast Exponentiation - Homework
- MST - Homework
- Lazy Segment Tree - Preclass
- LCA and Binary Lifting - Preclass
- Segment Tree - Preclass
- Bit Manipulation - Preclass
- Fast Exponentiation - Preclass
- MST - Preclass
- Graph Traversal 2 - Homework
- Graph Traversal 2 - In Class
- All Pairs Shortest Path - Homework
- All Pairs Shortest Path - In Class
- Single Source Shortest Path - Homework
- Single Source Shortest Path - In Class
- Graph Traversal 1 - Homework
- Graph Traversal 1 - In Class
- Binary Search Tree - Homework
- Binary Search Tree - In Class
- Disjoint Sets - Homework
- Disjoint Sets - In Class
- Divide and Conquer - Homework
- Divide and Conquer - In Class
- Complete Search - Homework
- Complete Search - In Class
- STL - Homework
- STL - In Class
- IO Problems - Preclass
- Test Contest