E Baseball Elimination

Time limit: 1.0s
Memory limit: 256MB

You are given a sports league with N teams. Team i has:

- $w[i]$: wins so far
- $l[i]$: losses so far
- $r[i]$: remaining games to play
- $g[i][j]$: remaining games between teams i and j

Determine for each team whether it is mathematically eliminated from finishing the season in (or tied for) first place. A team is eliminated if no assignment of outcomes for remaining games allows it to finish with at least as many wins as every other team.

A team x is trivially eliminated if $w[x] + r[x] < w[i]$ for some other team i. Otherwise, decide elimination by considering all possible outcomes of the remaining games.

Input

The first line contains an integer T — the number of test cases.

Each test case starts with an integer N. Each of the next N lines describes one team and contains:

$$w[i]\ l[i]\ r[i]\ g[i][0]\ g[i][1]\ \ldots\ g[i][N-1]$$

The following constraints hold:

- $g[i][i] = 0$
- $g[i][j] = g[j][i]$
- $r[i] = \sum_{j=0}^{N-1} g[i][j]$
- $1 \leq T \leq 100$
- $1 \leq N \leq 30$
- $0 \leq w[i], l[i], r[i], g[i][j] \leq 1000$

Sum of all N across test cases is at most 300

Output

For each test case, print N digits in one line, in input order:

$$b[0]b[1]\ldots b[N-1]$$

where $b[i]$ is `1` if team i is eliminated and `0` otherwise.

Samples

Sample input 1	Sample output 1
1 4 10 2 3 0 1 1 1 9 3 3 1 0 1 1 8 4 3 1 1 0 1 2 10 3 1 1 1 0	0001

Sample input 2	Sample output 2
2 2 5 0 1 0 1 4 1 1 1 0 3 6 0 0 0 0 0 3 3 0 0 0 0 3 3 0 0 0 0	00 011

Notes

In Example 1, team 3 has at most $2 + 3 = 5$ wins and is therefore eliminated because other teams already have more than 5 wins. Teams 0, 1, and 2 are not eliminated (output `0001`).

In the first test of Example 2, each team has one remaining game against the other. Team 1 can still tie team 0 in wins, so neither team is eliminated (output `00`). In the second test of Example 2, team 0 already has the most wins and no games remain, so team 1 and team 2 cannot catch up and are eliminated (output `100`).

Scoring

- 10%: sample tests.
- 30%: $n \leq 3$.
- 30%: $n \leq 10$.
- 30%: $n \leq 30$.