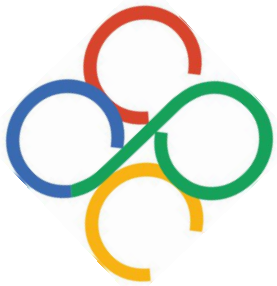
China Collegiate Programming Contest
Guangzhou Site

CCPC 2021

November 13 (Practice Session)



Problems

A Addition

B Kongming's Password

C Save Labman No.004

Do not open before the contest starts.

Prepared by Peking University

Problem A. Addition

Input file:	`standard input`
Output file:	`standard output`
Time limit:	1 second
Memory limit:	512 megabytes

The numbers in the computer are usually stored in binary form. But in Little A's computer, the numbers are stored in a different way.

The computer uses n bits to store a number. The value it stores is $\sum_{i=0}^{n-1} v_i \cdot sgn_i \cdot 2^i$, where v is an array of length n containing only 0 and 1, and sgn is a predefined array of length n containing only -1 and 1. It is not difficult to find that every expressible integer has a unique expression.

Little A gives you the binary representation of a and b in his computer, and you should report the binary representation of $a + b$ in his computer. When $max\{|a|, |b|\} \leq 10^8$, all integers in $[-10^9, 10^9]$ can be expressed in his computer.

Input

The first line contains an integer n, which represents the number of bits used to store an integer.

The second line contains n integers, and the i-th of them represents sgn_{i-1}.

The third line contains n integers, and the i-th of them represents va_{i-1}. The value of a is $\sum_{i=0}^{n-1} va_i \cdot sgn_i \cdot 2^i$.

The fourth line contains n integers, and the i-th of them represents vb_{i-1}. The value of b is $\sum_{i=0}^{n-1} vb_i \cdot sgn_i \cdot 2^i$.

It is guaranteed that $32 \leq n \leq 60$, $sgn_i \in \{-1, 1\}$, $va_i, vb_i \in \{0, 1\}$, and $max\{|a|, |b|\} \leq 10^8$.

Output

Output one line containing n integers, separated by spaces. The i-th of them represents $vc_{i-1} \in \{0, 1\}$. There should be no extra spaces at the end of the line.

Your solution should satisfy that $a + b = \sum_{i=0}^{n-1} vc_i \cdot sgn_i \cdot 2^i$.

Your output **must** be in a single line.

Example

standard input	standard output
32 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 -1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

Note

There are no extra line breaks in the test cases. It is just for the convenience of displaying. The correct sample input and output format can be seen in the online statement.

Problem B. Kongming's Password

Input file:	`standard input`
Output file:	`standard output`
Time limit:	1 second
Memory limit:	512 megabytes

In the ancient period of Three Kingdoms, Zhuge Kongming, the Prime Minister of Kingdom Shu, was the most famous and wise statesman. His enemy was Sima Zhongda, the Grand Preceptor of Kingdom Wei. Zhongda always looked stupid when fighting against Kongming. But it was Zhongda who laughed to the end. Kongming had led his army across the Mountain Qi to attack Kingdom Wei six times, which all failed. Because of the long journey, the food supply was a big problem.

Kongming invented a kind of transportation robot called "Wooden Bull & Floating Horse" (in abbreviation, WBFH) to carry food for the army. Every WBFH had a password lock. A WBFH would move if and only if a soldier entered the correct password. Kongming was always worrying about everything and always did trivial things by himself. Since he put Ma Youchang to death due to losing the Battle of Jieting, Kongming did not trust anyone's IQ anymore. He thought the soldiers might forget the password of WBFHs. So he made two password cards for each WBFH. If the soldier operating a WBFH forgot the password or got killed, the password still could be recovered by those two password cards.

Once, Zhongda defeated Kongming again and got many WBFHs on the battlefield. But he did not know the passwords. Youchang's son betrayed Kongming and came to Zhongda. He told Zhongda the way to figure out the password from the two cards. He said to Zhongda:

"A password card is a square grid consisting of $N \times N$ cells. In each cell, there is a number. Two password cards are of the same size. If you overlap them, you get two numbers in each cell. Those two numbers in a cell may be the same or different. You can turn a card by 0 degree, 90 degrees, 180 degrees, or 270 degrees, and then overlap it on another. But flipping is not allowed. The maximum amount of cells that contain two equal numbers after overlapping, is the password. Please note that the two cards must be totally overlapped. You cannot only overlap a part of them."

Now you should find a way to figure out the password for each WBFH as quickly as possible.

Input

There are several test cases. In each test case:

The first line contains an integer N ($0 < N \leq 30$) — the password card is an $N \times N$ grid.

Then an $N \times N$ matrix follows, describing one password card. Each element is an integer in a cell.

Then another $N \times N$ matrix follows, describing the other password card.

Those integers are all no less than 0 and less than 300.

The input ends with $N = 0$.

Output

For each test case, print the password.

Example

standard input	standard output
2 1 2 3 4 5 6 7 8 2 10 20 30 13 90 10 13 21 0	0 2

Problem C. Save Labman No.004

Input file:	`standard input`
Output file:	`standard output`
Time limit:	1 second
Memory limit:	512 megabytes

Due to the preeminent research conducted by Dr Kyouma, human beings have a breakthrough in the understanding of time and the universe. According to the research, the universe in common sense is not the only one. Multiple World Lines are running simultaneously. In simplicity, let us use a straight line in a three-dimensional coordinate system to indicate a single World Line.

During the research in World Line Alpha, the assistant of Dr Kyouma, a.k.a. the Labman No.004, Christina dies. Dr Kyouma wants to save his assistant. Thus, he has to build a Time Tunnel to jump from World Line Alpha to World Line Beta in which Christina can be saved. More specifically, a Time Tunnel is a line segment connecting World Line Alpha and World Line Beta. In order to minimize the risks, Dr Kyouma wants you, Labman No.003 to build a Time Tunnel with the shortest length.

Input

The first line contains an integer T ($T \leq 10\,000$) — the number of test cases.

Each case contains a single line with 12 floating-point numbers (x_{a1}, y_{a1}, z_{a1}), (x_{a2}, y_{a2}, z_{a2}), (x_{b1}, y_{b1}, z_{b1}), and (x_{b2}, y_{b2}, z_{b2}) — two points in World Line Alpha and another two points in World Line Beta.

Note that a World Line is a three-dimensional line with infinite length. The absolute value of any coordinate is not greater than 10 000.

Output

For each test case, please print three lines.

The first line contains one floating-point number — the length of the shortest Time Tunnel.

The second and the third line contain three floating-point numbers on each line, indicating the endpoints of the best Time Tunnel (x_a, y_a, z_a) and (x_b, y_b, z_b) in World Line Alpha and World Line Beta, respectively.

All the output floating-point numbers should be round to 6 digits after the decimal point. Test data guarantee the uniqueness of the shortest Time Tunnel.

Example

standard input	standard output
1 1 0 1 0 1 1 0 0 0 1 1 1	0.408248 0.500000 0.500000 1.000000 0.666667 0.666667 0.666667