

Fishing Game

Fishing is a card game that is played with a deck of cards consisting of $3N$ ($1 \leq N < 100$) pairs of cards, numbered from 1 to $3N$ (the deck contains $6N$ cards overall).

Three friends (A, B and C) play Fishing. The rules are as follows:

- (1) Initially, each player receives $2N$ cards.
- (2) Then, each player discards all same-value pairs of cards they have.
- (3) **Rounds** consisting of three steps are played until all remaining cards get discarded:
 - (3a) A passes one of his cards to B (unless A doesn't have any). If B now has a pair of same-value cards, it gets discarded.
 - (3b) B passes one of his cards to C (unless B doesn't have any). If C now has a pair of same-value cards, it gets discarded.
 - (3c) C passes one of his cards to A (unless C doesn't have any). If A now has a pair of same-value cards, it gets discarded.

You are given the hands of the three players at the end of step (1). It's known that at least one pair of same-value cards has to be discarded during each **round** described at point (3).

Compute the number of different ways the game can play out. Since this number can be quite large, output it modulo $1\ 000\ 000\ 007$.

Two ways the game can play out are considered different if during one step the current player chooses to pass a different card.

Input

The first line of input contains two integers N and T ($1 \leq T \leq 10$), where T is the number of game scenarios to analyse.

The description of T game scenarios follows. Each game scenario consists of three lines:

The first line contains $2N$ card values - player A's hand at the end of step (1).

The second line contains $2N$ card values - player B's hand at the end of step (1).

The third line contains $2N$ card values - player C's hand at the end of step (1).

Output

For each game scenario, print the number of different ways the game can play out modulo $1\ 000\ 000\ 007$ on a separate line.

Subtasks

- (1) $N = 2, T = 3$ (10 points)
- (2) $N = 3, T = 5$ (10 points)
- (3) $N = 10, T = 5$ (10 points)
- (4) $N = 20, T = 5$ (10 points)
- (5) $N = 50, T = 10$ (10 points)
- (6) $N = 60, T = 10$ (10 points)
- (7) $N = 70, T = 10$ (10 points)
- (8) $N = 80, T = 10$ (10 points)
- (9) $N = 90, T = 10$ (10 points)
- (10) $N = 99, T = 10$ (10 points)

Example(s)

Standard Input	Standard Output
1 1 1 2 3 3 2 1	2

Explanation:

First, during step (2), player B discards all their cards. At this point, the players' hands are:

A : 1, 2

B : no cards

C : 1, 2

There are two ways the game can play out from this point:

- (1) A passes card 1 to B. Then, B passes it to C. This way, C discards the pair of cards with value 1. Then, C has to pass his remaining card to A, who discards it.
- (2) A passes card 2 to B. Then, B passes it to C. This way, C discards the pair of cards with value 2. Then, C has to pass his remaining card to A, who discards it.