Problem L. Tavern Chess

Input file:	`standard input`
Output file:	`standard output`
Time limit:	4 seconds
Memory limit:	512 megabytes

One day, Alice and Bob are playing an online chess game named "Tavern Chess", where each player can choose at most 7 minions to build a team.



Welcome to Tavern

Each minion has its Hit Points (HP) and Attack (ATK), and **the HP is the same as the ATK initially**. A minion with positive HP is alive and can take attacks, and it dies immediately if its HP becomes zero or lower after an attack.

The battle begins after both Alice and Bob finish building their team and lasts until all the minions from one team are dead and the other team wins. In case the last alive minions from the two teams die simultaneously, the battle ends in a tie.

Alice and Bob's teams take turns to attack, and the team that has more minions takes the first attack. In case of a tie, it will be decided by a coin toss — 50% probability for Alice taking the first attack and the remaining 50% probability for Bob taking the first attack.

When a team takes the attack, the leftmost minion with the minimum number of taken attacks from the team attacks one of the alive minions from the other team uniformly at random, and then the other team takes attack.

If a minion with the HP h_1 and the ATK a_1 attacks another minion with the HP h_2 and the ATK a_2, each minion deals damages equal to its ATK to the other one, so the attacker minion will have the HP $h_1 - a_2$ and the attacked minion will have the HP $h_2 - a_1$ after the attack.

Given Alice's team and Bob's team, you need to calculate the probabilities that Alice's team wins the battle, Bob's team wins the battle, or the battle ends in a tie, respectively.

Input

The first line contains two integers n and m ($1 \le n, m \le 7$), indicating the number of minions in Alice's team and Bob's team respectively.

The second line contains n integers $a_1, a_2, \ldots, a_n$ ($1 \le a_i \le 10^9$), the i-th of which is the HP as well as the ATK of the i-th minions from the left from Alice's team.

The third line contains m integers $b_1, b_2, \ldots, b_m$ ($1 \le b_i \le 10^9$), the i-th of which is the HP as well as the ATK of the i-th minions from the left from Bob's team.

Output

Output three lines, each containing a single real number, indicating the probabilities that Alice's team wins the battle, Bob's team wins the battle, or the battle ends in a tie, respectively.

Your answer is acceptable if its absolute error does not exceed 10^{-9}. Formally speaking, suppose that your output is a and the jury's answer is b, your output is accepted if and only if $|a - b| \leq 10^{-9}$.

Examples

standard input	standard output
2 3 2 5 3 4 1	0.125 0.75 0.125
6 6 1 1 4 5 1 4 1 1 4 5 1 4	0.241867283950617 0.241867283950617 0.516265432098765