

# Biology

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## 2017 Fall Waterloo Local ACM Contest, Problem B

Vera has  $A \times B$  cards. Each card has a rank, an integer between 0 and  $A - 1$ , and a suit, an integer between 0 and  $B - 1$ . All cards are distinct. A set of five different cards is known as a *hand*. Each hand is in exactly one of nine categories numbered from 1 to 9. If a hand satisfies the conditions for membership in multiple categories, it is considered to be in the lowest-numbered such category. The rules for each category are:

1. Straight flush: is a Straight and a Flush.
2. Four of a kind: four of the cards have the same rank.
3. Full house: three of the cards have the same rank and the remaining two have the same rank.
4. Flush: all five cards have the same suit.
5. Straight: the ranks of the cards in increasing order are  $x, x + 1, x + 2, x + 3, x + 4$  for some integer  $x$ .
6. Three of a kind: three of the cards have the same rank.
7. Two pair: two cards have the same rank and two other cards have the same rank.
8. One pair: two cards have the same rank.
9. High card: if a hand does not satisfy any other category.

Currently, Vera has two cards with ranks  $a_1, a_2$  and suits  $b_1, b_2$ . Of the remaining cards, Vera will choose three more cards and form a hand with her two current cards. Compute the number of different hands formed in this way that belong in each category.

## Input

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Line 1 contains integers  $A$  and  $B$  ( $5 \leq A \leq 25, 1 \leq B \leq 4$ ).

Line 2 contains integers  $a_1, b_1, a_2, b_2$  ( $0 \leq a_1, a_2 \leq A - 1, 0 \leq b_1, b_2 \leq B - 1, (a_1, b_1) \neq (a_2, b_2)$ ).

## Output

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Print one line with nine integers, the number of different of hands that belong in each category in increasing order of categories (from Straight flush to High card).

## Sample Input 1

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5 2
1 0 3 1
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## Sample Output 1

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0 0 0 0 8 0 12 36 0
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## Sample Input 2

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13 4  
0 0 1 0
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## Sample Output 2

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1 2 18 164 63 308 792 7920 10332
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## Note

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Let  $(a, b)$  denote a card with rank  $a$  and suit  $b$ .

For the first example, Vera currently has cards  $(1, 0)$  and  $(3, 1)$ . If she chooses additional cards  $(3, 0)$ ,  $(4, 0)$ ,  $(4, 1)$ , her hand will be a Two pair as there are two cards with rank 3 and two other cards with rank 4. Note that this hand also satisfies being a One pair, but Two pair is the lower-numbered category.