7002 Queen on Horse

The Staunton chess set is composed of king, rook, bishop, pawn, knight, queen. In general speaking, the king can attack (an opponent's piece on) one nearest square in 8 directions. The rook can attack any number of squares horizontally or vertically. The bishop can attack any number of squares diagonally. The pawn can attack a square diagonally in front of it on an adjacent column. The knight attacks any of the closest squares that are not on the same horizontal, vertical, diagonal lines. That is, the knight can attack positions (6, 5), (5, 6), (3, 6), (2, 5), (2, 3), (3, 2), (5, 2), (6, 3), if we put the knight on position (4, 4). The queen combines the power of the rook and bishop and can attack any number of squares vertically, horizontally, diagonally.

If we put all chess pieces on the same position, we can observe the attacking area of all pieces. In fact, the attacking area of the queen covers the attacking areas of king, rook, bishop, pawn, except the knight. The queen with an infinite power extends the attacking area along with the attacking direction of every chess piece (except the knight). For example, queen extends the attacking area of the king from distant 1 to any number in 8 directions.

Now it is special that the queen doesn't cover and extend the attacking area of the knight. So we define a type of chess piece called QHorse (Queen on Horse). The QHorse combines and extends the power of every kind of pieces: king, rook, bishop, pawn, queen and knight.

We assume that the squares of an $n \times n$ chessboard are tagged as $\{0, 1, 2, \ldots, n-1\} \times \{0, 1, 2, \ldots, n-1\}$. If a QHorse is placed on the square (r, c) of an $n \times n$ chessboard, then the attacked squares are defined as follows.

- $\{(r+k, c) | k \in N, 0 \le r+k \le n-1\}$
- $\{(r-k, c) | k \in N, 0 \le r-k \le n-1\}$
- $\{(r, c+k) | k \in N, 0 \le c+k \le n-1\}$
- $\{(r, c-k) | k \in N, 0 \le c-k \le n-1\}$
- $\{(r+k, c+k) | k \in N, 0 \le r+k, c+k \le n-1\}$
- $\{(r-k, c-k) | k \in N, 0 \le r-k, c-k \le n-1\}$
- $\{(r+k, c-k) | k \in N, 0 \le r+k, c-k \le n-1\}$
- $\{(r-k, c+k) | k \in N, 0 \le r-k, c+k \le n-1\}$
- $\{(r+2k, c+k) | k \in N, 0 \le r+2k, c+k \le n-1\}$
- $\{(r+k, c+2k) | k \in N, 0 \le r+k, c+2k \le n-1\}$
- $\{(r-k, c+2k) | k \in N, 0 \le r-k, c+2k \le n-1\}$
- $\{(r-2k, c+k) | k \in N, 0 \le r-2k, c+k \le n-1\}$
- $\{(r-2k, c-k) | k \in N, 0 \le r-2k, c-k \le n-1\}$
- $\{(r-k, c-2k) | k \in N, 0 \le r-k, c-2k \le n-1\}$
- $\{(r+k, c-2k) | k \in N, 0 \le r+k, c-2k \le n-1\}$
- $\{(r+2k, c-k) | k \in N, 0 \le r+2k, c-k \le n-1\}$

	0	1	2	3	4	5	6	7	8	9	10
0	*					*					*
1		*		*		*		*		*	
2			*			*			*		
3		*		*	*	*	*	*		*	
4				*	*	*	*	*			
5	*	*	*	*	*	Q	*	*	*	*	*
6				*	*	*	*	*			
7		*		*	*	*	*	*		*	
8			*			*			*		
9		*		*		*		*		*	
10	*					*					*

Figure 2: The attacking area of a QHorse on the center (5, 5) of 11×11 chess board.

Then, we consider an $n \times n$ chess board. Given a condition C that some pre-put QHorses are on some squares, how many QHorses (as many as possible) can we put on the board such that these QHorses (including pre-put ones) attack no others? Under the given condition C, the maximum number of non-attacking QHorses (including pre-put ones) is denoted as $Q(n, C)$. Under the given condition C, the number of methods that we can put $Q(n, C)$ QHorses on $n \times n$ board such that these QHorses attack no others is denoted as $N(n, C)$.

	0	1	2	3
0	Q			
1				Q
2				
3				

Figure 3: A valid solution to the maximum QHorses problem.

Figure 2 shows the attacking area of a QHorse on (5, 5). If we put a QHorse on (5, 5), then we can't put another non-attacking one on the square which is marked with '*'. Figure 3 shows that in a 4×4 chess board, we can put 2 non-attacking QHorses on (0, 0) and (1, 3). Indeed, the maximum number of non-attacking QHorses we can put on a 4×4 chess board is 2.

Now, please write a program to compute the $Q(n, C)$ and $N(n, C)$.

Technical Specification

- The dimension n of an $n \times n$ chess board is at most 19.
- There are at most 2 pre-put QHorses.

Input

The first line contains an integer N indicating the number of test cases. There are at most 10 test cases. Each test case is described in one line and contains the numbers n, ps and ps squares (x_k, y_k). For example, "4 2 0 0 1 3" means the dimension of the chess board is 4×4 ($n = 4$), and there are $ps = 2$ pre-put QHorses placed on square (0, 0) and square (1, 3).

Output

For the dimension n and the condition C described in the test case, please output two numbers. The first number is the maximum number $Q(n, C)$ of QHorses (including the pre-put QHorses) which can be placed on the chess board such that each QHorse attacks no others. The second number is the number of methods $N(n, C)$ such that we can put $Q(n, C)$ QHorses(including the pre-put QHorses) on the chess board such that each QHorse attacks no others.

Sample Input

```
6
4 0
4 1 0 0
4 2 0 0 1 3
5 0
5 1 0 0
5 2 0 0 3 1
```

Sample Output

```
2 20
2 4
2 1
3 24
3 4
3 1
```