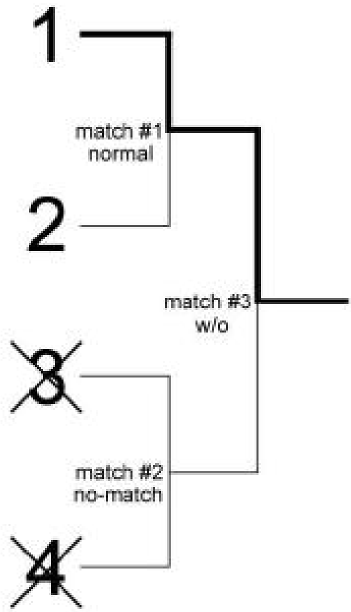
In Jollybee Chess Championship 2008, there are a number of players who have withdrawn themselves from the championship of 64 players (in this problem, we generalized it into 2^N players). Due to the nature of the competition, which is a regular knock-out tournament, and also the short notice of the withdrawals, some matches had been walkover matches (also known as a w/o, a victory due to the absent of the opponent).

If both players are available then there will be a normal match, one of them will advance to the next phase. If only one player is available then there will be a walkover match, and he/she will automatically advance. If no player is available then there will be no match.



In the right figure, the player #3 and #4 are withdrawn from the tournament, leaving a total of one w/o match (at match #3).

Given the list of players who withdraw right before the tournament start, calculate how many w/o matches to happen in the whole tournament, assuming that all of the remaining players play until the end of the tournament (winning or knocked-out).

Input

The first line of input contains an integer T, the number of test cases to follow. Each case begins with two integers, N $(1 \leq N \leq 10)$ and M $(0 \leq M \leq 2^N)$. The next line contains M integers, denoting the players who have withdrawn themselves right before the tournament. The players are numbered from 1 to 2^N, ordered by their position in the tournament draw.

Output

For each case, print in a single line containing the number of walkover matches.

Sample Input

```
3
2 2
3 4
3 5
1 2 3 4 5
2 1
2
```

Sample Output

```
1
2
1
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