

Deipnosophist

Description

Eddy is a deipnosophist, who is an adept conversationalist at table. What? You say you don't know why Eddy is a deipnosophist? No problem, we are going to tell you why Eddy is a deipnosophist.

Eddy attends a competition and he knows the strength of other competitors. Actually, we can rank the competitors from 1 to N , including Eddy. The higher rank competitor will beat the lower rank competitor. Since Eddy knows the schedule of competition, he knows the performance he can be in the competition. That's the reason why he is deipnosophist.

The competition will be held in multiple stages. For each stage, the a_{2k} -th competitor will compete with the a_{2k+1} -th competitor, and the competitor with higher rank will win the match. If the number of the competitors is odd, the last one will advance directly. The competition ends when there is only one competitor.

For example, for a schedule as $a_0 = 3, a_1 = 2, a_2 = 1$, the competitors with rank 3 and rank 1 will advance in first stage. And the competitor with rank 3 will win in second stage.

Can you help Eddy to calculate the number of stages that he can advance with given schedule?

Input

The first line contains an integer T indicating the total number of test cases. For each test case, the first line contains two integers N, K , indicating the number of competitors and the rank of Eddy. The second line contains N integers which is a permutation of 1 to N , indicating the schedule of competition.

- $1 \leq T \leq 1000$
- $1 \leq N \leq 65536$
- There are at most 20 test cases with $N > 128$

Output

For each test case, output one integer indicating the number of stages Eddy can advance.

Sample Input

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

Sample Output

```
1
2
0
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