III Akademickie Mistrzostwa Polski w Programowaniu Zespołowym

ALLTEL   **Andersen Consulting**   **Microsoft**   **Novell.**   **MT**

TRAINING PROBLEM A

Brackets

We are given:

- a positive integer n,
- an integer k, $1 \le k \le n$,
- an increasing sequence of k integers $0 < s_1 < s_2 < \ldots < s_k \le 2n$.

What is the number of proper bracket expressions of length $2n$ with opening brackets appearing in positions $s_1, s_2, \ldots, s_k$?

Example

Several proper bracket expressions:

```
[[]][[[]][]]
[[[]]][][[]]
```

An improper bracket expression:

```
[[[]]]][]][[]]
```

There is exactly one proper expression of length 8 with opening brackets in positions 2, 5 and 7.

Task

Write a program which for each data set from a sequence of several data sets:

- reads from the text file `A.IN` integers n, k and an increasing sequence of k integers,
- computes the number of proper bracket expressions of length $2n$ with opening brackets appearing in positions $s_1, s_2, \ldots, s_k$,
- writes the result to the text file `A.OUT`.

Input

The first line of the input file `A.IN` contains one integer d, $1 \le d \le 10$, which is the number of data sets. The data sets follow. Each data set occupies two lines of the input file. The first line contains two integers n and k separated by single space, $1 \le n \le 19$, $1 \le k \le n$. The second line contains an increasing sequence of k integers from the interval $[1..2n]$ separated by single spaces.

Output

The i-th line of the output file `A.OUT` should contain one integer—the number of proper bracket expressions of length $2n$ with opening brackets appearing in positions $s_1, s_2, \ldots, s_k$?

Example

For the input file `A.IN`:

```
5
1 1
1
1 1
2
2 1
1
3 1
2
4 2
5 7
```

the correct answer is:

```
1
0
2
3
2
```