SQRBR - Square Brackets

#dynamic-programming (/problems/tag/dynamic-programming)

You are given:

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

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

Illustration

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 integers n, k and an increasing sequence of k integers from input,
- computes the number of proper bracket expressions of length 2n with opening brackets appearing at positions $s_1, s_2, ... s_k$,
- writes the result to output.

Input

The first line of the input file contains one integer d, 1 <= d <= 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 <= n <= 19, 1 <= k <= 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 output should contain one integer - the number of proper bracket expressions of length 2n with opening brackets appearing at positions $s_1, s_2 \ldots s_k$.

Example

```
Sample input:
5
1 1
1
1 1
2
2 1
1
3 1
2
4 2
5 7

Sample output:
1
0
2
3
2
```

hide comments

angrajkarn (/users/angrajkarn): 2021-09-03 13:01:02
Just memoize man :)

karikaalan0207 (/users/karikaalan0207): 2020-10-02 17:52:30
recursion and mem ! kanni screams !!

Last edit: 2020-10-02 17:54:28
owaisrcoem (/users/owaisrcoem): 2020-07-19 06:47:27
Recursive solution of java is giving TLE , try analysing dp table and build a bottom up solution , got Ac after 10 wrong attempts of recursive solution : (

kushagra_2 (/users/kushagra_2): 2020-04-18 19:33:24
AC in one go ... recursion + Memo rocks !!

maskmanlucifer (/users/maskmanlucifer): 2020-04-05 07:44:44
nice problem AC in one go.