

4847 Binary Search Tree

A binary search tree is a binary tree. It may be empty. If it is not empty, it satisfies the following properties:

- (1) Every node has a key, and no two nodes have the same key.
- (2) The keys in a nonempty left subtree must be smaller than the key in the root of the subtree.
- (3) The keys in a nonempty right subtree must be larger than the key in the root of the subtree.
- (4) The left and right subtrees are also binary search trees.

Sample binary search trees are shown in Figure 1.

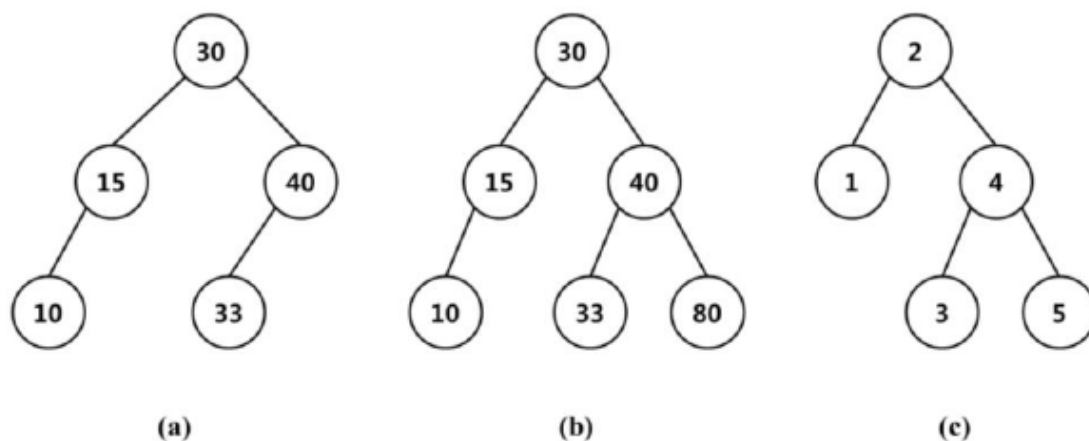


Figure 1. binary search trees

To search for a node with a key k in a binary search tree T , we begin at the root. If T is empty, T contains no keys and the search is unsuccessful. Otherwise, we compare k with the key in root. If k equals root's key, then the search terminates successfully. If k is less than root's key, we search the left subtree of the root. If k is larger than root's key, we search the right subtree of the root. In the same way, we can proceed the search in the left or right subtree of T .

To insert a new key k into a binary search tree T where k is different from those of existing keys in T , we first search the tree T . The search will be unsuccessful, then we insert the key at the point the search terminated. For instance, to insert a key 80 into the Figure 1(a), we first search the tree for 80. This search terminates unsuccessfully, and the last node examined has key 40. We insert a new node containing 80 as the right child of the node. The resulting search tree is shown in Figure 1(b).

In this problem, we consider binary search trees with N keys $1, 2, \dots, N$. For a permutation $a_1 a_2 \dots a_N$ of $\{1, 2, \dots, N\}$, inserting $a_1 a_2 \dots a_N$ successively into an initially empty binary search tree will produce a binary search tree. For instance, the permutation 2 1 4 3 5 will produce the tree in Figure 1(c). Also, 2 4 3 1 5 will produce the same tree. Actually, 8 permutations among all possible permutations of 1, 2, 3, 4, 5 will produce the same tree to the tree in Figure 1(c).

We are interested in finding the number of permutations of $\{1, 2, \dots, N\}$ such that all those permutations produce a binary search tree identical to the tree produced by a given permutation P . Given N and P , you are to write a program that calculates the number of permutations satisfying the above condition.

Input

Your program is to read from standard input. The input consists of T test cases. The number of test cases T is given in the first line. Each test case starts with a line containing an integer N representing the number of keys, $1 \leq N \leq 20$. In the next line, a permutation of length N is given. There is a single space between the integers representing keys in the permutation.

Output

Your program is to write to standard output. Print exactly one line for each test case as follows: Let B be the number of permutations that produce the binary search tree identical to the tree produced by the input permutation. Print $B \bmod 9,999,991$ for each test case. For example, if $B = 20,000,000$, the output should be 18 for that test case.

The following shows sample input and output for three test cases.

Sample Input

```
3
5
2 1 4 3 5
4
2 4 1 3
12
1 2 3 4 5 6 7 8 9 10 11 12
```

Sample Output

```
8
3
1
```