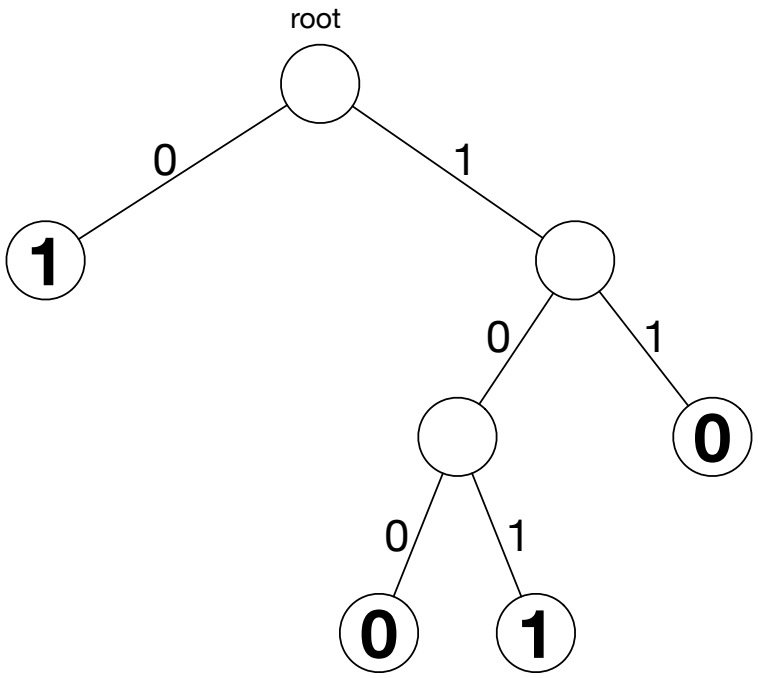
Problem G
Decisions, Decisions
Problem ID: decisions
Time Limit: 2 seconds

Let $x_0, \ldots, x_{n-1}$ denote n boolean variables (i.e., variables taking only values 0 and 1). A *binary decision diagram* (BDD) over these variables is a diagrammatic representation of a boolean function $f(x_0, \ldots, x_{n-1})$ as inputs.

A BDD is a rooted binary tree such that all internal vertices v have precisely two children. The edges connecting an internal vertex v with its children are labelled with a 0 or 1 (exactly one of each). Each leaf vertex is also labelled with a 0 or 1. We note that a BDD may consist of a single vertex, which is considered to be both the root and a leaf vertex.



Given input $(x_0, \ldots, x_{n-1})$, the boolean function represented by the BDD is evaluated as follows.

- **let** v be the root vertex
- **let** $i \leftarrow 0$
- **while** v is not a leaf **do**
  - replace v with the child vertex of v by traversing the edge labelled x_i
  - increase i by 1
- **output** the label of leaf vertex v

Consider the function $f(x_0, x_1, x_2)$ represented by the BDD above. To evaluate $f(1, 0, 1)$, we start from the root, we descend along edges labelled 1, 0, and then 1. We reach a leaf vertex labelled 1, so $f(1, 0, 1) = 1$.

A BDD is *minimal* if there is no way to replace any subtree of an internal vertex of the BDD by a single leaf vertex to get a new BDD defining the same boolean function. The BDD depicted above is minimal. It is a fact that for each boolean function f, there is a unique minimal BDD that represents the boolean function.

In this problem, you are given an n-variable boolean function specified by a list of the 2^n different values the function should take for various inputs. Compute the number of vertices in the minimal BDD representing this function.

Input

The first line of input consists of a single integer $1 \leq n \leq 18$. Then one more line follows that contains 2^n values (either 0 or 1) describing an n-variable boolean function.

We think of these values as being indexed from 0 to $2^n - 1$. The ith such value represents $f(x_0, \ldots, x_{n-1})$ where x_j is the jth least-significant bit of the binary representation of i. In other words, x_j is the coefficient of 2^j in the binary expansion of i.

The third sample input below corresponds to the BDD depicted above.

Output

Output consists of a single integer m that is the number of vertices in the unique minimal BDD representing the boolean function from the input.

Sample Input	Sample Output
2 1 1 0 1	5

Sample Input	Sample Output
2 0 0 0 0	1

Sample Input	Sample Output
3 1 0 1 0 1 1 1 0	7