Isomorphic permutations

Let p_1 and p_2 be two permutations of the set $M(n) = \{0,1,2,3, ..., n-1\}$ $(n > 0)$.
We define the **distance from** p_1 **to** p_2 (or equivalently **from** p_2 **to** p_1) to be the value of the sum
$\Sigma_{(k = 0..n-1)} |p_1(k) - p_2(k)|$.

We say that p_1 and p_2 are **isomorphic** if there exists a permutation f of the set $M(n)$ which satisfies the condition $(\forall x \in M(n)) (\forall y \in M(n)) (p_1(x) = y \Leftrightarrow p_2(f(x)) = f(y))$.
We say that a set S of permutations of $M(n)$ is **independent** if no two permutations in S are isomorphic.

The task

Let p be a given permutation of $M(n)$ and let D be a positive integer.
We have to determine maximum possible size of an independent set $S(p, D)$ of permutations which distance from p is equal to D.

Hint
You may wish to investigate the connection between a permutation q and a directed graph $G = (M(n), E)$ which satisfies the condition $(\forall (x, y) \in M(n) \times M(n)) ((x, y) \in E \Leftrightarrow q(x) = y)$.

Input

The first line of input contains single positive integer $n \leq 50$. The second line specifies the permutation p of the set $M(n)$. It contains values $p(0), p(1), p(2), ..., p(n-1)$ in this order separated by single space. The last line contains positive integer $D \leq 50$.

Output

The output consists of one text line with one integer value which represents the maximum size of the set $S(p, D)$ specified in The task paragraph. The output value will not exceed 2000.

Example 1

Input
```
5
1 2 3 4 0
2
```

Output
```
1
```

There are four permutations with distance 2 from the input permutation. They are:
```
p1 = 0 2 3 4 1
p2 = 1 2 4 3 0
p3 = 1 3 2 4 0
p4 = 2 1 3 4 0
```
Any two of these permutations are isomorphic. Therefore, the resulting independent set can contain only one of these permutations. Note that we list the permutations in the same format as the input permutation.

Example 2

Input
```
4
1 0 3 2
6
```

Output
```
3
```

There are nine permutations with distance 6 from the input permutation. They are:
```
p1 = 0 2 1 3
p2 = 0 3 1 2
p3 = 0 3 2 1
p4 = 1 2 0 3
p5 = 1 3 0 2
p6 = 1 3 2 0
p7 = 2 1 0 3
p8 = 3 1 0 2
p9 = 3 1 2 0
```
Any two of the permutations p1, p3, p7, p9 are isomorphic, any two of the permutations p2, p4, p6, p8 are isomorphic, the permutation p5 is not isomorphic to any other permutation in the list. No permutation in the set {p1, p3, p7, p9} is isomorphic any permutation in the set {p2, p4, p6, p8}. Therefore, the resulting independent set can contain at most one of p1, p3, p7, p9 permutations, one of p2, p4, p6, p8 permutations and finally the permutation p5, in total three permutations. Note that we list the permutations in the same format as the input permutation.

Example 3

Input

```
21
2 6 1 16 14 8 20 7 4 5 0 17 3 18 19 13 12 10 11 9 15
10
```

Output

```
340
```

Example 4

Input

```
30
14 17 15 8 25 7 1 16 4 21 24 3 5 19 23 28 6 12 10 9 29 13 2 11 27 22 20 18 0 26
6
```

Output

```
239
```

Example 5

Input

```
48
39 38 31 20 42 25 9 4 32 30 17 16 1 36 19 22 24 23 44 6 35 0 37 46 33 2 43
21 7 29 41 12 28 26 34 15 5 8 40 10 3 18 14 47 13 27 45 11
4
```

Note that the second line of the input is broken into two lines in this example because of the the page width of the document. In the real input the data from the two lines are merged into a single text line.

Output

```
138
```