Balance in All Things

Input file:	`standard input`
Output file:	`standard output`
Time limit:	6 seconds
Memory limit:	1024 megabytes

Bobo is participating in a weird tournament with $2n$ players, labeled 1 through $2n$. Initially, all players have a score of zero. The tournament consists of k rounds, and in each round, players are paired for one-on-one matches.

The scoring mechanism is as follows: after each match, the player with the higher score loses 1 point, while the player with the lower score gains 1 point. If two players have the same score, the player with the lower label (i.e., the smaller number) is considered the winner and gains 1 point, while the other player loses 1 point.

To ensure balance and to make the tournament more exciting, the host decided that the absolute value of any player's score must never exceed 3 at any point in the tournament. Given these rules, Bobo wants to determine the number of possible ways to arrange the matches over the k rounds.

As the answer might be too large, you should output the answer modulo P, which is a specified prime number.

Input

The first line of input contains three integers n, k, P ($1 \leq n \leq 400, 1 \leq k \leq 20, 10^8 \leq P \leq 10^9 + 9$), whose meaning is already clear in the statement.

It is guaranteed that P is a prime.

Output

Output an integer in one line, denoting the answer.

Examples

standard input	standard output
3 1 1000000007	15
100 3 1000000007	894710378
6 6 1000000007	103387851
2 6 998244353	729