Problem A. Donald Biden

Input file:	`standard input`
Output file:	`standard output`
Time limit:	1 second
Memory limit:	256 megabytes

Donald Biden, a student of Grade 2 in primary school, has recently participated n exams, and scores a_i in the i-th exam. In order to please his parents, he decides to show them an interval of the score list, and the happiness of his parents is evaluated by the average score in that interval.

Please help Donald Biden decide the maximum happiness his parents may have.

Input

The first line contains one integer n $(1 \leq n \leq 3 \times 10^5)$.

The second line contains n integers $a_1, \ldots, a_n$ $(1 \leq a_i \leq 10^6)$.

Output

Print the maximum happiness Biden's parents may have.

Example

standard input	standard output
8 2 5 5 5 3 4 1 5	5

Note

In the example, Biden may choose the interval $[2, 4]$.

Problem B. Joe Trump

Input file:	`standard input`
Output file:	`standard output`
Time limit:	0.25 seconds
Memory limit:	256 megabytes

Joe Trump, a student of Grade 2 in primary school, has recently participated in an exam. The full score of the exam was 15. Trump is a naughty boy and let you guess how many scores he got in the exam.

Input

The first line contains an integer n ($n \in \{0, 15\}$).

Output

If $n = 0$, print 0.

Otherwise, print on a line an integer n, what you guess to be Trump's score in the exam. It is guaranteed that the correct answer is a fixed integer in interval $[0, 15]$.

Example

standard input	standard output
0	12

Note

There is only a test with $n = 0$, and another with $n = 15$.

Problem C. Cross the Desert

Input file:	`standard input`
Output file:	`standard output`
Time limit:	1 second
Memory limit:	256 megabytes

Qiutu is a great adventurer, and has conquered the Taklimakan Desert by driving. His journey lasted seven days. Only his car and a guide car were left of the seven cars in the group in the end.

These days, Qiutu is planning another trip to the Pacific Desert. Fortunately, the Pacific Desert has already been conquered by humans and several resting stations have been built to serve new adventurers. Thus completing this trip becomes no difficulty, and Qiutu has decided to challenge the fastest crossing the Pacific Desert.

To simplify, assume Qiutu can travel 15 hours a day to travel, and must spend the night at one resting station every day. If time does not allow him to go to the next resting station, he can only stop at this resting station and wait for the next day. To be on the safe side, Qiutu will only choose known roads, and because of this, he can plan his daily journey in hours.

You are provided the map of the Pacific Desert with all resting stations and known roads on it, and you are expected to tell Qiutu how many days he needs at least to cross the desert.

Input

The first line contains four integers n, m, s and t ($2 \le n \le 10^5$, $1 \le m \le 2 \times 10^5$, $1 \le s \le n$, $1 \le t \le n$, $s \ne t$), representing the number of resting stations, the number of known roads, the departure resting station and the destination resting station, respectively.

Each of the next m lines contains three integers u, v and k ($1 \le u, v \le n$, $u \ne v$, $1 \le k \le 15$), indicating that there is a road between u and v which takes k hours to pass. All roads are bidirectional and s and t are guaranteed to be connected by these roads. There may be several different roads between two resting stations.

Output

Print the minimum number of days Qiutu need to cross the desert.

Examples

standard input	standard output
3 2 1 3 1 2 14 2 3 13	2
4 4 2 3 2 1 5 4 3 10 2 4 6 1 3 9	1

Problem D. Switch Lights

Input file:	standard input
Output file:	standard output
Time limit:	3 seconds
Memory limit:	256 megabytes

Qiutu has begun his trip across the Pacific Desert. Unfortunately, according to his travel plan, he will stay at the resting station today for 14 hours, so he wants to find something to kill time.

He has found a lot of lights in the rest station, each of which is associated with a switch, enough for him to play before going to bed. The light will turn on when the corresponding switch is pressed, and will turn off when the switch is pressed again. When he arrived at the station, a lights were already turned on, and b lights were off. In addition, there are another c broken lights, meaning that the lights are always off no matter how he presses the corresponding switches. Qiutu wants to keep pressing the switches, one after another, until he goes to sleep. He will press the switches exactly n times before it's time to sleep. He may press a switch multiple times, but he wants to turn off all lights finally, so that he can have a good dream at night.

He wonders how many options he has to press the switches. Two options are considered different if the switch pressed is different at any one time. As the figure may be huge, you only need to output it modulo $10^9 + 7$.

Warning: Please don't press the light switch repeatedly in the real world.

Input

The only line contains four integers n, a, b and c ($0 \le n \le 10^{18}$, $0 \le a \le 5 \times 10^3$, $0 \le b \le 5 \times 10^3$, $0 \le c \le 10^{18}$, $a + b + c > 0$).

Output

Print the number of options modulo $10^9 + 7$.

Examples

standard input	standard output
3 1 1 1	7
8 3 2 2	167328

Note

In example 1, we denote the three lights by A, B and C. The possible 7 options are ACC, CAC, CCA, ABB, BAB, BBA and AAA.