**Problem: EXPMOD**

**Description**

Given two positive integers a and b. Compute a^b mod (10^9 + 7)

Input

One line contains two integers a and b (1 <= a,b <= 18446744073709551614)

Output

The value a^b mod (10^9+7)

Example

Input

2 3

Output

8

**Problem: Count number of pairs of sequence of distinct integer sum equal to Q**

**Description**

Given a sequence of distinct integers *a*1, *a*2, …, *an* and an integer *Q*. Count number *M* of pairs (*i, j*) such that 1 ≤ *i*< *j* ≤ *n* and *ai*+ *aj*= *Q*

**Input**

•Line 1: contains two integers *n*and *Q* (1 <= n,Q<= 106)

•Line 2: contains *a*1, *a*2, …, *an*

**Ouput**

•Write the value of *M*

**Example**

**Input**

5 8

4 6 5 3 2

**Output**

2

**Problem: TSP**

**Description**

There are n cities 1, 2, ..., n. The travel distance from city i to city j is c(i,j), for i,j = 1, 2, ..., n. A person departs from city 1, visits each city 2, 3, ..., n exactly once and comes back to city 1. Find the itinerary for that person so that the total travel distance is minimal.

**Input**

* Line 1: a positive integer n (1 <= n <= 20)
* Linr i+1 (i = 1, . . ., n): contains the ith row of the distance matrix x (elements are separated by a SPACE character)

**Output**

Write the total travel distance of the optimal itinerary found.

**Example**

**Input**

4

0 1 1 9

1 0 9 3

1 9 0 2

9 3 2 0

**Output**

7

**Problem: Disjoint Segment**

**Description**

Given a set of segments *X* = {(*a*1, *b*1), . . . , (*an*, *bn*)} in which *ai* < *bi* are coordinates of the segment *i* on a line, *i* = 1, …, *n*. Find a subset of *X* having largest cardinality in which no two segments of the subset intersect

**Input**

* Line 1: contains a positive integer n (1 <= n <= 100000)
* Line i+1 (i= 1,...,n): contains ai and bi (0 <= ai <= bi <= 1000000)

**Output**

Number of segments in the solution found.

**Example**

**Input**

6

0 10

3 7

6 14

9 11

12 15

17 19

**Output**

4

**Problem: Multiplication of Big numbers**

**Description**

Cho hai số nguyên dương a và b rất lớn (số chữ số có thể lên tới 10000). Hãy tính và in ra tích của 2 số đó.

**Input**

* Dòng 1: ghi số a
* Dòng 2: ghi số b

**Output**

* Ghi kết quả a\*b

**Example**

**Input**

123

654

**Output**

80442

**Example**

**Input**

100000000000000000

123456789

**Output**

12345678900000000000000000

**Problem: Range Minimum Query**

**Description**

Given a sequence of n integers a0,. . .,an-1. We denote rmq(i,j) the minimum element of the sequence ai, ai+1, . . .,aj. Given m pairs (i1, j1),. . .,(im, jm), compute the sum Q = rmq(i1,j1) + . . . + rmq(im, jm)

**Input**

* Line 1: n (1 <= n <= 106)
* Line 2: a0, . . . ,an-1 ( 1 <= ai <= 106)
* line 3: m (1 <= m <= 106)
* Line k+3 (k=1, . . ., m): ik, jk (0 <= ik < jk < n)

**Output**

* Write the value Q

**Example**

**Input**

16

2 4 6 1 6 8 7 3 3 5 8 9 1 2 6 4

4

1 5

0 9

1 15

6 10

**Output**

6

**Problem: Range Minimum Query**

**Description**

Given a sequence of n integers a0,. . .,an-1. We denote rmq(i,j) the minimum element of the sequence ai, ai+1, . . .,aj. Given m pairs (i1, j1),. . .,(im, jm), compute the sum Q = rmq(i1,j1) + . . . + rmq(im, jm)

**Input**

* Line 1: n (1 <= n <= 106)
* Line 2: a0, . . . ,an-1 ( 1 <= ai <= 106)
* line 3: m (1 <= m <= 106)
* Line k+3 (k=1, . . ., m): ik, jk (0 <= ik < jk < n)

**Output**

* Write the value Q

**Example**

**Input**

16

2 4 6 1 6 8 7 3 3 5 8 9 1 2 6 4

4

1 5

0 9

1 15

6 10

**Output**

6

**Problem: Simulation Stack**

**Description**

Perform a sequence of operations over a stack, each element is an integer:

* PUSH v: push a value v into the stack
* POP: remove an element out of the stack and print this element to stdout (print NULL if the stack is empty)

**Input**

Each line contains a command (operration) of type

* PUSH v
* POP

**Output**

* Write the results of POP operations (each result is written in a line)

**Example**

**Input**

PUSH 1

PUSH 2

PUSH 3

POP

POP

PUSH 4

PUSH 5

POP

#

**Output**

3

2

5

**Problem: Simulation Queue**

**Description**

Perform a sequence of operations over a queue, each element is an integer:

* PUSH v: push a value v into the queue
* POP: remove an element out of the queue and print this element to stdout (print NULL if the queue is empty)

**Input**

Each line contains a command (operration) of type

* PUSH v
* POP

**Output**

* Write the results of POP operations (each result is written in a line)

**Example**

**Input**

PUSH 1

PUSH 2

PUSH 3

POP

POP

PUSH 4

PUSH 5

POP

#

**Output**

1

2

3

**Input**

PUSH 1

POP

POP

PUSH 4

POP

#

**Output**

1

NULL

4

**Problem: Maze (BFS)**

**Description**

Một mê cung hình chữ nhật được biểu diễn bởi 0-1 ma trận NxM trong đó A[i,j] = 1 thể hiện ô (i,j) là tường gạch và A[i,j] = 0 thể hiện ô (i,j) là ô trống, có thể di chuyển vào. Từ 1 ô trống, ta có thể di chuyển sang 1 trong 4 ô lân cận (lên trên, xuống dưới, sang trái, sang phải) nếu ô đó là ô trống. Xuất phát từ 1 ô trống trong mê cung, hãy tìm đường ngắn nhất thoát ra khỏi mê cung.

**Input**

* Dòng 1: ghi 4 số nguyên dương n, m, r, c trong đó n và m tương ứng là số hàng và cột của ma trận A (1 <= n,m <= 999) và r, c tương ứng là chỉ số hàng, cột của ô xuất phát.
* Dòng i+1 (i=1,...,n): ghi dòng thứ i của ma trận A

**Output**

Ghi giá số bước cần di chuyển ngắn nhất để thoát ra khỏi mê cung, hoặc ghi giá trị -1 nếu không tìm thấy đường đi nào thoát ra khỏi mê cung.

**Ví dụ**

**Input**

8 12 5 6

1 1 0 0 0 0 1 0 0 0 0 1

1 0 0 0 1 1 0 1 0 0 1 1

0 0 1 0 0 0 0 0 0 0 0 0

1 0 0 0 0 0 1 0 0 1 0 1

1 0 0 1 0 0 0 0 0 1 0 0

1 0 1 0 1 0 0 0 1 0 1 0

0 0 0 0 1 0 1 0 0 0 0 0

1 0 1 1 0 1 1 1 0 1 0 1

**Output**

7

**Problem: Segment Tree Simulation - query Max (SEGMENT\_TREE)**

**Description**

Given a sequence of positive integers *a*1, *a*2, . . ., *an*. Perform a sequence of actions of following types:

* update i v : assign *ai* = v
* get-max i j : return the maximum value of the subsequence *ai*, *ai*+1, . . ., *a*j

**Input**

* Line 1: contains a positive integer n (1 <= n <= 100000)
* Line 2: contains *a*1, *a*2, . . ., *an.* (1 <= *ai* <= 10000)
* Line 3: contains a positive integer m (1 <= m <= 100000) which is the number of actions
* Line i + 3 (i = 1, 2, . . ., m): contains an action described above

**Output**

* Write in each line the result of the corresponding action of type get-max

**Example**

**Input**

10

1 10 9 7 1 4 2 4 8 10

5

get-max 5 8

get-max 5 9

get-max 3 8

update 9 20

get-max 4 10

**Ouput**

4

8

9

20

**Problem: Binary sequences generation without consecutive 11 (Back Tracking)**

**Description**

Given an integer n, write a program that generates all binary sequences without consecutive 11 in a lexicographic order.

**Input**

* Line 1: contains an integer n (1 <= n <= 20)

**Output**

Write binary sequences in a lexicographic order, each sequence in a line

**Example**

**Input**

3

**Output**

000

001

010

100

101

**Problem: Balanced Courses Assignments**

**Description**

At the beginning of the semester, the head of a computer science department D have to assign courses to teachers in a balanced way. The department D has m teachers T={1,2,...,m} and n courses C={1,2,...,n}. Each teacher t∈T has a preference list which is a list of courses he/she can teach depending on his/her specialization. We known a list of pairs of conflicting two courses that cannot be assigned to the same teacher as these courses have been already scheduled in the same slot of the timetable. The load of a teacher is the number of courses assigned to her/him. How to assign nn courses to mm teacher such that each course assigned to a teacher is in his/her preference list, no two conflicting courses are assigned to the same teacher, and the maximal load is minimal.

Input

The input consists of following lines

* Line 1: contains two integer m and n (1≤m≤10, 1≤n≤30)
* Line i+1: contains an positive integer k and k positive integers indicating the courses that teacher i can teach (∀i=1,…,m)
* Line m+2: contains an integer k
* Line i+m+2: contains two integer i and j indicating two conflicting courses (∀i=1,…,k)

Output

The output contains a unique number which is the maximal load of the teachers in the solution found and the value -1 if not solution found.

**Example**

**Input**

4 12

5 1 3 5 10 12

5 9 3 4 8 12

6 1 2 3 4 9 7

7 1 2 3 5 6 10 11

25

1 2

1 3

1 5

2 4

2 5

2 6

3 5

3 7

3 10

4 6

4 9

5 6

5 7

5 8

6 8

6 9

7 8

7 10

7 11

8 9

8 11

8 12

9 12

10 11

11 12

**Output**

3

**Problem: Bounding rectangle**

**Description**

Cho một danh sách các hình chữ nhật 1, 2,…, *n*. Hãy tìm diện tích hình chữ nhật nhỏ nhất bao tất cả các hình chữ nhật trong danh sách trên

*Dữ liệu*

· Dòng 1: chứa số nguyên dương n (1 <= n <= 1000)

· Dòng i+1 (i=1,…,n): chứa 4 số nguyên dương x1,y1, x2,y2 trong đó (x1,y1) và (x2,y2) là tọa độ 2 đỉnh đối của hình chữ nhật thứ *i* (1 <= x1, y1, x2, y2 <= 100)

*Kết quả*

· Ghi ra diện tích của hình chữ nhật nhỏ nhất tìm được

Ví dụ

*Dữ liệu*

3

2 4 2 7

3 2 4 7

1 2 5 2

*Kết quả*

20

**Problem: String Matching**

**Description**

Given a string T and a pattern P which is also a string. Find the number of occurrences of P in T.

**Input**

* Line 1: contains string P (length is less than or equals to 105)
* Line 2: contains the string T (length is less than or equals to 106)

**Output**

* Write the number of occurrences of P in T

**Exmple**

**Input**

computer

There are so many kinds of computers today including high performance computers, laptop computers. Mobile phones are also computers

**Output**

4

**Problem: Count the number of ways to represent n as the sum of positive integers**

**Description**

Given a positive integer n. Write a program that computes the number Q of ways to represent n as the sum of positive integers

**Input**

* Line 1: a positive integer n (1 <= n <= 50)

**Output**

* Write the value Q mod 109+7

**Example**

**Input**

6

**Output**

11

**Problem: Generate ways to represent n by sum of k non-decreasing positive integers**

**Description**

Given two positive integers k and n. Write a program to generate (x1, x2, ..., xk) such that x1 <= x2 <= . . . <= xk and x1 + x2 + . . . + xk = n.

**Input**

* Line 1 contains: k and n (1 <= k <= n <= 40)

**Output**

* Each line contains: x1, x2, . . ., xk separated by a SPACE character

**Example**

**Input**

3 7

**Output**

1 1 5

1 2 4

1 3 3

2 2 3

**Problem: Sequence of nodes visited by DFS**

**Description**

Given undirected graph G = (V,E) in which V = {1, 2, ..., n} is the set of nodes, and E is the set of m edges.

Write a program that compute the sequence of nodes visited using a DFS algorithm (the nodes are considered in a lexicographic order)

**Input**

* Line 1: contains 2 integers n and m which are number of nodes and number of edges
* Line i+1 (i = 1, ..., m): contains 2 positive integer u and v which are the end points of the ith edge

**Output**

Write the sequence of nodes visited by a DFS procedure (nodes a are separated by a SPACE character)

**Example**

**Input**

6 7

2 4

1 3

3 4

5 6

1 2

3 5

2 3

**Output**

1 2 3 4 5 6

**Problem: Hash Over Strings**

**Description**

Given a string s[1…k] which is a sequence of characters taken from {‘a’, . . ., ‘z’}. Given a positive integer m, the hash code of s is defined by the formula:

H(s) = (s[1]\*256k-1 + s[2]\*256k-2 + . . . + s[k]\*2560 ) mod m (the contant integer m is a parameter)

Given a sequence of strings k1, k2, …, kn, compute the corresponding hash codes

**Input**

Line 1: n and m (1 <= n,m <= 100000)

Line i+1 (i = 1,2,…,n): contains the string ki (the length of each string is less than or equal to 200)

**Output**

Each line contains the corresponding hash code of n given strings

**Example**

**Input**

4 1000

a

ab

abc

abcd

**Output**

97

930

179

924

**Problem: Nurse**

**Description**

The director of a hospital want to schedule a working plan for a nurse in a given period of N consecutive days 1,..., N. Due to the policy of the hospital, each nurse cannot work all the days 1,..., N. Instead, there must be days off in which the nurse need to take a rest. A working plan is a sequence of disjoint working periods. A working period of a nurse is defined to be a sequence of consecutive days on which the nurse must work and the length of the working period is the number of consecutive days of that working period. The hospital imposes two constraints:

* Each nurse can take a rest only one day between two consecutive working periods. it means that if the nurse takes a rest today, then she has to work tomorrow (1)
* The length of each working period must be greater or equal to K1 and less than or equal to K2 (2)

The director of the hospital want to know how many possible working plans satisfying above constraint?

**Input**

* The input consists of one line which contains 3 positive integers N, K1, K2 (2 <= N <= 1000, K1 < K2 <= 400)

**Output**

* The output consists of only one single integer M modulo 109+7 where M is the total working plans satisfying the above constraints.

**Example**

**Input**

6 2 3

**Output**

4

**Problem: Inversion**

**Description**

Given a sequence of integers a1, a2, ..., an. A pair (i, j) is call an inversion if i < j and ai > aj. Compute the number Q of inversions

**Input**

* Line 1: contains a positive integer n (1 <= n <= 106)
* Line 2: contains a1, a2, ..., an (0 <= ai<= 106)

**Output**

Write the value Q modulo 109+7

**Example**

**Input**

6

3 2 4 5 6 1

**Output**

6