**Department of Computer Science and Engineering**

**Semester – IInd**

**Assessment Problems**

**Ques:1**

Hitain is a very naughty boy in CSE Batch. One day he was playing with strings, and randomly shuffled them all. Your task is to help Hitain Sort all the strings (lexicographically) but if a string is present completely as a prefix in another string, then string with longer length should come first. Eg Cat, Catwoman are 2 strings and the string cat is present as a prefix in Catwoman - then sorted order should have - Catwoman, cat.

Constraints

N<1000

Output Format

N lines each containing one string.

Sample Input

3

3

cat

apple

catwoman

Sample Output

apple

catwoman

cat

bat

**Ques:2**

We are given two sorted arrays of same size n. Find the median of an array formed after merging these two sorted arrays.

Input Format

First line contains the input n. Second and Third line contains n space separated integers.

Constraints

**N<1000**

Output Format

Print the median in a single line.

Sample Input

5

1 3 5 7 9

2 4 6 8 10

Sample Output

5

**Ques:3**

Yash found an interesting problem. In this problem you are given two integers, *n* and *k*. You need to find the the maximum value of *x*, such that, *n!* % *kx* = 0.

Input Format

First line contains number of test cases, T. Each test case contains two integers each, *n* and *k*.

Constraints

1<=T<=20 1<=n<=10^8 2<=k<=10^8

Output Format

Print the value of *x* for each test case.

Sample Input

2

5 2

1000 2

Sample Output

3

994

Explanation

In the first test case, n = 5 and k = 2. So, n! = 120. n! % 2^0 = 0, n! % 2^1 = 0, n! % 2^2 = 0, n! % 2^3 = 0, n! % 2^4 = 8, n! % 2^5 = 24, n! % 2^6 = 56, n! % 2^7 = 120. So, the answer should be 3

**Ques:4**

Fibonacci series is well-known series in which in which each number (Fibonacci number) is the sum of the two preceding numbers. The series looks like *1, 1, 2, 3, 5, 8….* and so on. Your task is to find *nth* number.  
Since the number can be large, output the answer modulo (109+7).

Input Format

An integer T, denoting the number of test cases. Each test case contains and integer N.

Constraints

1<=T<=10^5  
1<=N<=10^9

Output Format

Print the *nth* Fibonacci number modulo (109+7).

Sample Input

4

3

4

5

6

Sample Output

2

3

5

8

**Ques:5**

Prerna is learning to calculatenCr. Divya gave her some n and r values to solve for nCr. As the result can be large, she asked him to print (nCr % 1000000007).

Input Format

Single line containing two integers 'n' and 'r'.

Constraints

1<=n, r<=1000000 1<=r<=n

Output Format

Print the required output.

Sample Input

3 2

Sample Output

3

**Ques:6**

Given n friends, each one can remain single or can be paired up with some other friend. Each friend can be paired only once. Find out the total number of ways in which friends can remain single or can be paired up.

Input Format

First line contains an integer t denoting the number of test cases. Next t lines contain an integer n each.

Constraints

1<= n < 30

Output Format

Output t lines each line describing the answer.

Sample Input

1

3

Sample Output

4

Explanation

{1}, {2}, {3} : all single {1}, {2,3} : 2 and 3 paired but 1 is single. {1,2}, {3} : 1 and 2 are paired but 3 is single. {1,3}, {2} : 1 and 3 are paired but 2 is single. Note that {1,2} and {2,1} are considered same.

**Ques:7**

Given a string containing duplicates, print all its distinct permutations such that there are no duplicate permutations and all permutations are printed in a lexicographic order.

Input Format

The first and only line of the test case contains the input string.

Constraints

Length of the string <= 8

Output Format

Print all the distinct permutations in a lexicographic order such that each permutation is in a new line. Note that there should not be any duplicate permutations.

Sample Input

ABA

Sample Output

AAB

ABA

BAA

Explanation

The possible permutations for the given string are { "AAB" , "AAB" , "ABA" , "BAA" } . We skip the repeating "AAB" permutation and only print it in once. Also we print the final output in lexicographical order.

**Ques:8**

Abhishek is a very passionate about sets. Lately, he is busy solving one of the problems on sets. He has to find whether if the sum of any of the non-empty subsets of the set A is zero.

Input Format

The first line contains an integer T, which is the total number of test cases.  
T test cases follow.  
Each test case consists of two lines.  
The first line consists of a single integer N, which is the number of elements present in the set A.  
The second line contains N space separated integers denoting the elements of the set A.

Constraints

1 ≤ T ≤10  
1 ≤ N ≤ 4  
-10^5 ≤ A[i] ≤ 10^5

Output Format

Print the answer for each testcase in a new line.  
If the sum of any of the subset is zero, then print “Yes” (without quotes) else print “No”(without quotes).

Sample Input

1

4

1 3 2 -3

Sample Output

Yes

Explanation

The sum of the subset {3,-3} is zero.

**Ques:9**

Given a floor of size **n x m**. Find the number of ways to tile the floor with tiles of size **1 x m**. A tile can either be placed horizontally or vertically.

Input Format

First line of input contains an integer **T** denoting the number of test cases. Then T test cases follow.  
The first line of each test case contains two integers **N** and **M**.

Constraints

1 <= T<= 1000  
1 <= N,M <= 100000

Output Format

Print answer for every test case in a new line modulo **10^9+7**.

Sample Input

2

2 3

4 4

Sample Output

1

2

**Ques:10**

Yash loves to play number games with his friend Harsh. One day they were playing a game where one of them will speak out a positive number and the other have to tell the sum of its factors. The first one to say it correctly wins. After a while they got bored and wanted to try out a different game. Yash then suggested about trying the reverse. That is, given a positive number 'S' , they have to find a number whose factors add up to 'S'. Realizing that this task is tougher than the original task, Yash came to you for help. Luckily Yash owns a portable programmable device and you have decided to burn a program to this device. Given the value of 'S' as input to the program, it will output a number whose sum of factors equal to 'S' .

Input Format

There are several cases . Each case of input will consist of a positive integer 'S'<= 100000 . The last case is followed by a value of 0 .

Constraints

0 < S <= 10000

Output Format

print the integer whose factors sum is equal to 'S'. Print the largest Integer whose factors sum is 'S' . If no such number exists, output '-1' .

Sample Input

1

102

1000

0

Sample Output

1

101

-1