

# Alphabet Soup

DiPS CodeJam 22.

---

## Prompt

---

Every string has an “alphabet”, composed of the characters that make it up. For example, the alphabet of *aabbccabcabc* is *a,b,c*. There are two operations you can do with alphabets: getting the alphabet of a string, and seeing if another string has a given alphabet. Given two strings, you must write a program that finds the alphabet of the first string, and returns *true* or *false* based on whether that alphabet makes up the second string.

## Input Format

The first and only line of input contains 2 space-separated strings which you have to evaluate.

## Output Format

The first and only line of your output must contain true or false, depending on the test case.

## Constraints

$10 \leq \text{length of strings} \leq 100$

## Sample Input/Output

Input	Output
wrfhxpmghy nxeywikrmmnfrybggnohfrbhvwmdalbyrx	false

# Classes, Classes!

DiPS CodeJam 22.

## Prompt

It's a long day, and Guru has a lot of activities to attend. He needs to select the maximum number of activities that he can do in a given time frame, assuming that he can only work on a single activity at a time. Each activity has a set start and end time.  
Can you help him figure out how many activities he can attend?

## Input Format

- The first line of the input contains an integer  $n$ , denoting the number of activities.

- The next  $n$  lines of the input each contain the start and end times of an activity, in the format (start,end).
- 

## Output Format

The first and only line of your output must contain a single integer  $m$ , denoting the maximum number of activities he can attend.

---

## Constraints

- $4 \leq n \leq 24$
- Assume that the activities are already sorted based on end times.

## Sample Input/Output

Input	Output
6	
1 2	
3 4	
0 6	4
5 7	
8 9	
5 9	

## Cricket Mania

DiPS CodeJam 22\_\_\_\_\_

## Prompt

A cricket championship of  $n$  teams is taking place, where each team plays all other teams once in a *round-robin* fashion. A team gets 5 points for winning a match, and 0 for loosing. It is assumed that no match will end in a draw or a tie. What is the maximum possible difference of points between the winning team and the second-placed team?

## Input Format

- The first line of input contains a single integer  $t$ , denoting the number of test cases.
- The next  $t$  lines of input contain a single integer  $n$ .

## Output Format

For each test case, output in a single line the maximum difference of points between first and second place.

## Constraints

- $2 \leq n \leq 50$
- $1 \leq t \leq 50$

## Sample Input/Output

Input	Output
5	120
49	105
43	90
36	70
28	30
13	



# Lighting Trouble

DiPS CodeJam 22

---

---

## Prompt

You're organising a code conference for your school this year, and the volunteers have messed up the lighting. Special lamps are used to light the conference. All the stalls are arranged in a square grid of size  $n \times n$ , and a lamp covers an entire square. A lamp will light up all stalls in the same row and column. Your volunteers were not organized enough to realize where to place the remaining lamps. Your job, given the position of the lamps placed so far, is to find out how many stalls have not been lit.

## Input Format

- The first line of input contains a single integer  $n$ , denoting the size of the  $n \times n$  grid.
- The next line contains an integer  $m$ , denoting the number of lamps used.
- The next  $m$  lines of input contain 2 integers, giving the row and column of each lamp in the format  $(x,y)$ .

## Output Format

Your output should contain a single integer, denoting the number of stalls (or grid squares) that are not lit.

## Constraints

- $2 \leq n \leq 100$
- $1 \leq m \leq 5000$

## Sample Input/Output

Input	Output
5	9
2	
1 1	
3 3	

# Maximum Product

DiPS CodeJam 22

---

---

## Prompt

You are given a list of integers  $n_1 \dots n_k$  (not necessarily distinct) where each has a value between 1 and 9. Using each of  $n_1 \dots n_k$  exactly once, you can form concatenations of digits, to achieve a new list of numbers. You then have to output the product of this new list. The goal is to maximize this product by choosing the best concatenations of digits.

For example, we are given the list: 2 3 2 (separated by spaces). We can form the following concatenations:

- 23 2 (product is 46)
- 32 2 (product is 64)
- 22 3 (product is 66)

## Input Format

The first and only line of the input contains  $n_1 \dots n_k$ , space-separated.

## Output Format

The first and only line of your output must contain the maximum product.

## Constraints

- $1 \leq n \leq 9$
- $3 \leq k \leq 100$

## Sample Input/Output

Input	Output
3 5 5 2	2756

## $n$ Sums

DiPS CodeJam 22

---

## Prompt

Given an integer  $n$  and an array of terms that are  $\leq n$ , find the minimum number of numbers from the array that sum up to exactly  $n$ . Print none if an exact sum cannot be obtained.

## Input Format

- The first line of input contains the integer  $n$ .
- The next line of input contains an array of terms that are  $\leq n$ .

## Output Format

The first and only line of your output must contain the minimum number of numbers from the array that sum up to exactly  $n$ .

## Constraints

- $2 \leq n \leq 100$

## Sample Input/Output

Input	Output
82 37 46 22 40 8 37 44 43 50 45	2

## Nearest Power of $x$

DiPS CodeJam 22\_\_\_\_\_

## Prompt

Given an integer  $n$ , you must find the power of  $x$  that's nearest to  $n$ . If it's midway between the two nearest powers of  $x$ , round it up.

## Input Format

- The first line of input contains a single integer  $x$ .
- The second line of input contains a single integer  $n$ .

## Output Format

The first and only line of your output must contain a single integer, the power of  $x$  that's nearest to  $n$ .

## Constraints

- $2 \leq x \leq 50$
- $1 \leq n \leq 1000$

Sample Input/Output

Input	Output
36	36
154	

---

---



## Nearest Square

DiPS CodeJam 22\_\_\_\_\_

---

### Prompt

Given an array of  $n$  integers, find the nearest squares of all the integers.

### Input Format

The first and only line of input contains a space-separated array of  $n$  integers.

### Output Format

The first and only line of your output must contain a single a space-separated array of  $n$  integers.

### Constraints

- $2 \leq n \leq 100$
- $1 \leq \text{integer} \leq 1000$

### Sample Input/Output

Input	Output
748 253 142	729 256 144

## Smallest Prime

DiPS CodeJam 22\_\_\_\_\_

### Prompt

Given a  $3 \times 3$  2D array of integers as input, return the smallest prime number in the array. Return none if there is no prime number.

### Input Format

The input contains a  $3 \times 3$  2D array of integers.

### Output Format

Your output should be a single integer. If there are no prime numbers, print none.

## Constraints

- $1 \leq n \leq 100$

## Sample Input/Output

Input	Output
39 14 19 24 51 72 10 15 63	19

## To the Treasure

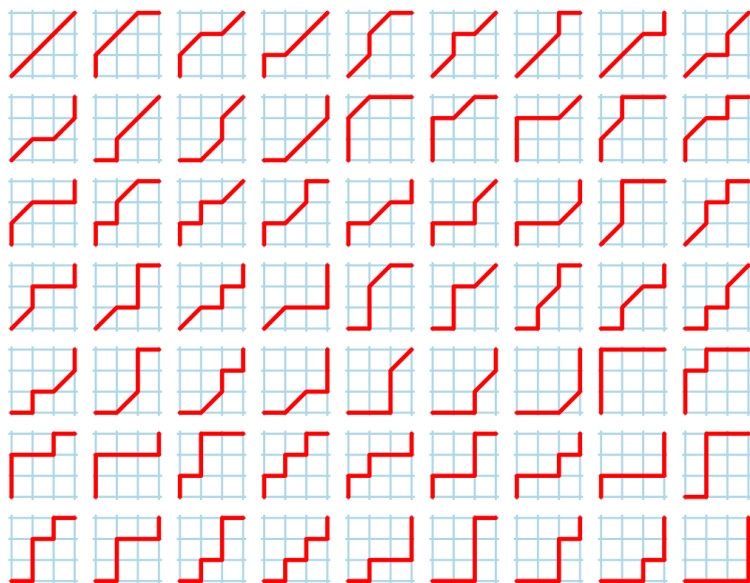
DiPS CodeJam 22\_\_\_\_\_

## Prompt

Pranav and Prithvi are on an adventure. They find themselves at the southwest corner of an  $n \times n$  grid, and they must get to the northeast corner. They can only move in one of these three ways:

- Directly north,
- Directly east, or
- Directly north-east.

For example, if we take  $n = 3$ , there are 63 paths they can take:



Can you tell them how many different paths there are to their destination?

## Input Format

The first and only line of input contains a single integer  $n$ .

## Output Format

The first and only line of your output must contain the number of different paths.

---

### Constraints

$$0 \leq n \leq 100$$

---

## Sample Input/Output

Input	Output
2	63

## Zeckendorf's Game

DiPS CodeJam 22\_\_\_\_\_

---

### Prompt

In a game of *Zeckendorf*, your task is to find the shortest representation of a given integer as a sum of Fibonacci numbers. For example, the *Zeckendorf* representation of 10 is  $10=2+8$ . Numbers cannot be repeated.

Pranav and Prithvi are playing a game of Zeckendorf. Can you help them find the answers as fast as possible?

### Input Format

The first and only line of input will contain an integer  $n$ .

### Output Format

The first and only line of your output must contain a space-separated list of the *Zeckendorf* representation of  $n$ , sorted in ascending order.

### Constraints

$$1 \leq n \leq 10^5$$

## Sample Input/Output

Input	Output
93743	2 5 13 987 17711 75025