## 二分查找

假设一个有序数组A[0], A[1], …, A[N-1]，编写一个函数int find(int A[], int x)，确定一个整数x是否在数组A中，如果在，则返回其位置，否则返回-1。

## Interesting drink

来源：Codeforces 706B

Vasiliy likes to rest after a hard work, so you may often meet him in some bar nearby. As all programmers do, he loves the famous drink "Beecola", which can be bought in n different shops in the city. It's known that the price of one bottle in the shop i is equal to xi coins.

Vasiliy plans to buy his favorite drink for q consecutive days. He knows, that on the i-th day he will be able to spent mi coins. Now, for each of the days he want to know in how many different shops he can buy a bottle of "Beecola".

Input

The first line of the input contains a single integer n (1 ≤ n ≤ 100 000) — the number of shops in the city that sell Vasiliy's favourite drink.

The second line contains n integers xi (1 ≤ xi ≤ 100 000) — prices of the bottles of the drink in the i-th shop.

The third line contains a single integer q (1 ≤ q ≤ 100 000) — the number of days Vasiliy plans to buy the drink.

Then follow q lines each containing one integer mi (1 ≤ mi ≤ 109) — the number of coins Vasiliy can spent on the i-th day.

Output

Print q integers. The i-th of them should be equal to the number of shops where Vasiliy will be able to buy a bottle of the drink on the i-th day.

Example

Input

5

3 10 8 6 11

4

1

10

3

11

Output

0

4

1

5

Note

On the first day, Vasiliy won't be able to buy a drink in any of the shops.

On the second day, Vasiliy can buy a drink in the shops 1, 2, 3 and 4.

On the third day, Vasiliy can buy a drink only in the shop number 1.

Finally, on the last day Vasiliy can buy a drink in any shop.

## Powers of Two

来源：Codeforces 702B

You are given n integers a1, a2, ..., an. Find the number of pairs of indexes i, j (i < j) that ai + aj is a power of 2 (i. e. some integer x exists so that ai + aj = 2x).

Input

The first line contains the single positive integer n (1 ≤ n ≤ 105) — the number of integers.

The second line contains n positive integers a1, a2, ..., an (1 ≤ ai≤ 109).

Output

Print the number of pairs of indexes i, j (i < j) that ai+ aj is a power of 2.

Examples

Input

4

7 3 2 1

Output

2

Input

3

1 1 1

Output

3

Note

In the first example the following pairs of indexes include in answer: (1, 4) and (2, 4).

In the second example all pairs of indexes (i, j) (where i < j) include in answer.

## 最小值

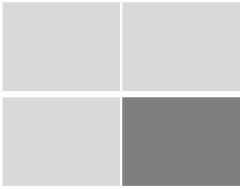
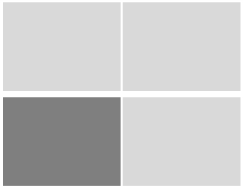
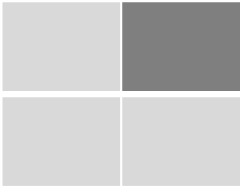
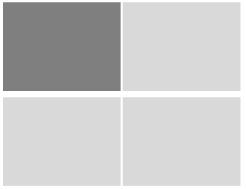
给n个实数，求它们之中的最大值和最小值，要求比较次数尽量小。

## 最大子段和

给定n个整数（可能为负数）组成的序列a[1],a[2],a[3],…,a[n],求该序列如a[i]+a[i+1]+…+a[j]的子段和的最大值。当所给的整数均为负数时定义子段和为0，依此定义，所求的最优值为： Max{0,a[i]+a[i+1]+…+a[j]},1<=i<=j<=n 例如，当（a[1], a[2], a[3], a[4], a[5], a[6]）=(-2,11,-4,13,-5,-2)时，最大子段和为20。

## 残缺棋盘

残缺棋盘是一个有2k×2k(k>=1)个方格的棋盘，其中恰好有一个方格残缺。下图给出了k=1时的各种可能的残缺棋盘，这种棋盘称作三格板。残缺棋盘问题就是要用这4中三格板覆盖更大的残缺棋盘。



## 最近点对（一维）

一条直线上有n个点，求这n个点之间距离最短的两个点之间的距离。

输入：

共两行，第一行为一个整数n，表示这上点的个数，以下共n行，每一行为一个整数，分别表示这每一个点的位置。n个元素由小到大排序。

输出：

输出这n个点之间的最短距离。

样例输入输出：

输入：

5

1

3

5

6

8

输出：

1

## Quoit Design(最近点对 二维)

Problem Description

Have you ever played quoit in a playground? Quoit is a game in which flat rings are pitched at some toys, with all the toys encircled awarded.  
In the field of Cyberground, the position of each toy is fixed, and the ring is carefully designed so it can only encircle one toy at a time. On the other hand, to make the game look more attractive, the ring is designed to have the largest radius. Given a configuration of the field, you are supposed to find the radius of such a ring.  
Assume that all the toys are points on a plane. A point is encircled by the ring if the distance between the point and the center of the ring is strictly less than the radius of the ring. If two toys are placed at the same point, the radius of the ring is considered to be 0.

Input

The input consists of several test cases. For each case, the first line contains an integer N (2 <= N <= 100,000), the total number of toys in the field. Then N lines follow, each contains a pair of (x, y) which are the coordinates of a toy. The input is terminated by N = 0.

Output

For each test case, print in one line the radius of the ring required by the Cyberground manager, accurate up to 2 decimal places.

Sample Input

2

0 0

1 1

2

1 1

1 1

3

-1.5 0

0 0

0 1.5

0

Sample Output

0.71

0.00

0.75

## 巨人与鬼

在平面上有n个巨人和n个鬼，没有三者在同一条直线上。每个巨人需要选择一个鬼，向其发送质子流消灭它。每个巨人只能选择一个鬼，不同的巨人必须选择不同的鬼。质子流由巨人发射，沿直线行进，遇到鬼后消失。由于质子流交叉是很危险的，所有质子流经过的线段不能有交点。请设计一种给巨人和鬼配对的方法。

## 快速幂

给出非负整数a和n，求出an的值。

快速幂模

## 矩阵快速幂

与快速幂运算一样，对于矩阵的幂也可以实现快速运算。

例如：求斐波拉契数列的第N项。

## 合并排序

对序列A1, A2, …, An进行合并排序。

## 逆序对数(inverse number)

给一列数a1, a2, . . . , an，求它的逆序对数，即有多少个有序对i, j使得i < j但a[i] > a[j]。提示：归并排序的引申

## 快速排序

在快速排序中，记录的比较和交换是从两端向中间进行的，关键字较大的记录一次就能交换到后面单元，关键字较小的记录一次就能交换到前面单元，记录每次移动的距离较大，因而总的比较和移动次数较少。

## 第k小数

给定n个元素的a[n],找出第k最小的元素。

## 最大值最小化问题

将一个包含n个正整数的序列划分成m个连续的子序列。设第i个序列的各元素之和为S(i)，求所有S(i)的最大值的最小值。

分析：在一次划分中，求一个x，使得x满足：对任意的S(i)，都有S(i)<=x；这个条件保证了x是所有S(i)中的最大值。我们需要求的就是满足该条件的最小的x。

用二分法对x进行枚举+贪心。

## 跳石头

一年一度的“跳石头”比赛又要开始了！

这项比赛将在一条笔直的河道中进行，河道中分布着一些巨大岩石。组委会已经选择好了两块岩石作为比赛起点和终点。在起点和终点之间，有N块岩石（不含起点和终点的岩石）。在比赛过程中，选手们将从起点出发，每一步跳向相邻的岩石，直至到达终点。 为了提高比赛难度，组委会计划移走一些岩石，使得选手们在比赛过程中的最短跳跃距离尽可能长。由于预算限制，组委会至多从起点和终点之间移走M块岩石（不能移走起点和终点的岩石）。

输入：第一行包含三个整数L，N，M，分别表示起点到终点的距离，起点和终点之间的岩石数，以及组委会至多移走的岩石数。

接下来N行，每行一个整数，第i行的整数Di（0 < Di < L）表示第i块岩石与起点的距离。这些岩石按与起点距离从小到大的顺序给出，且不会有两个岩石出现在同一个位置。

输出：只包含一个整数，即最短跳跃距离的最大值。

## 求凸函数的极大值

对于在区间[l, r]上凸函数f(x)（有极大值点），要求其极大值。

例如：在直角坐标系中有一条抛物线y=ax^2+bx+c和一个点P(x,y)，求点P到抛物线的最短距离d。