Grind 7

14 May 2025 17:34

A. Again Twenty Five!

time limit per test: 0.5 seconds
memory limit per test: 64 megabytes

The HR manager was disappointed again. The last applicant failed the interview the same way as 24 previous ones. "Do I give such a hard task?" — the HR manager thought. "Just raise number 5 to the power of n and get last two digits of the number. Yes, of course, n can be rather big, and one cannot find the power using a calculator, but we need people who are able to think, not just follow the instructions."

Could you pass the interview in the machine vision company in IT City?

Input
The only line of the input contains a single integer n ($2 \le n \le 2 \cdot 10^{18}$) — the power in which you need to raise number 5.

Output
Output the last two digits of 5^n without spaces between them.

Examples

input	Copy
2	

output	Copy
25	

$5^n \rightarrow$ 1, 2, 3, 4

$5^2 = 25$
$5^3 = 125$
$5^4 = 625$

25 × 5 = 125 → 2

if n==1, print (5)
else print(25)

Question → input 5^n → 05

sout(25)

B. Boy or Girl

time limit per test: 1 second
memory limit per test: 256 megabytes

These days, many boys use beautiful girls' photos as avatars in forums. So it is pretty hard to tell the gender of a user at the first glance. Last year, our hero went to a forum and had a nice chat with a beauty (she thought so). After that they talked very often and eventually they became a couple in the network.

But yesterday, he came to see "her" in the real world and found out "she" is actually a very strong man! Our hero is very sad and he is too tired to love again now. So he came up with a way to recognize users' genders by their user names.

This is his method: if the number of distinct characters in one's user name is odd, then he is a male, otherwise she is a female. You are given the string that denotes the user name, please help our hero to determine the gender of this user by his method.

Input
The first line contains a non-empty string, that contains only lowercase English letters — the user name. This string contains at most 100 letters.

Output
If it is a female by our hero's method, print "CHAT WITH HER!" (without the quotes), otherwise, print "IGNORE HIM!" (without the quotes).

Output
If it is a female by our hero's method, print "CHAT WITH HER!" (without the quotes), otherwise, print "IGNORE HIM!" (without the quotes).

Examples

input	Copy
wjmzbmr	

output	Copy
CHAT WITH HER!	

input	Copy
xiaodao	

output	Copy
IGNORE HIM!	

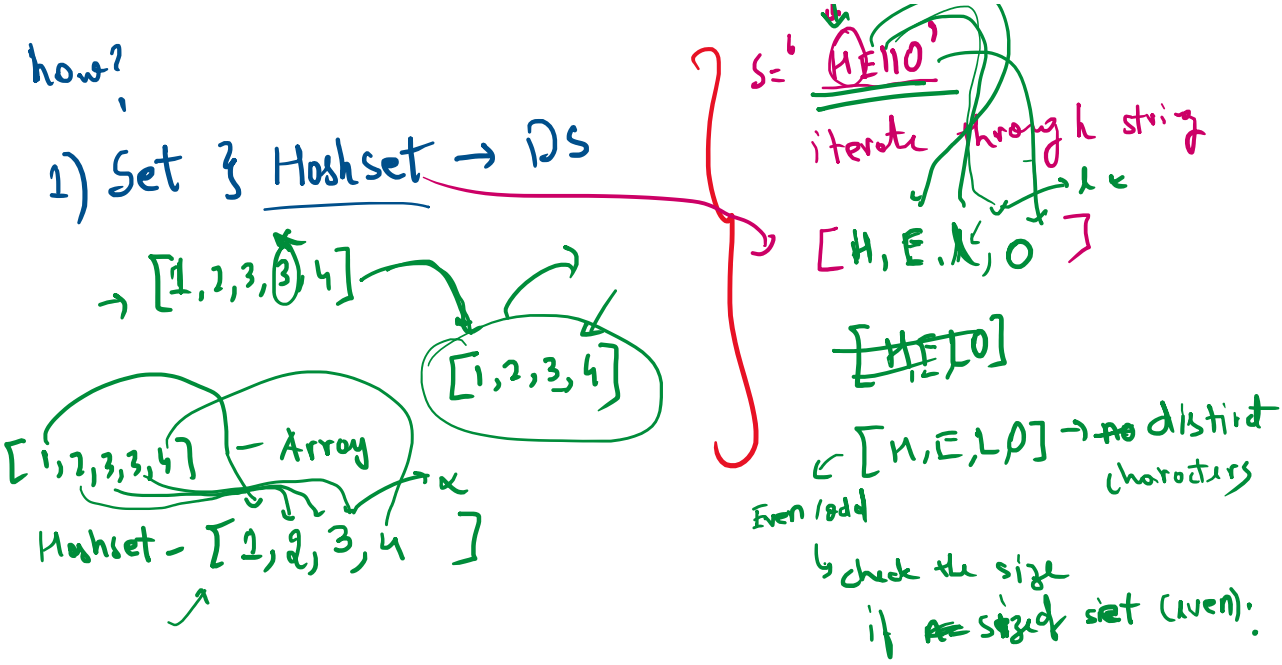
input	Copy
sevenkplus	

output	Copy
CHAT WITH HER!	

Note
For the first example. There are 6 distinct characters in "wjmzbmr". These characters are: "w", "j", "m", "z", "b", "r". So wjmzbmr is a female and you should print "CHAT WITH HER!".

1 line
input → String
Task → to find if he is Le ~~he~~ she
if count of dis ch are odd → male
if not → its female
output → if female → "Chat with her"
if not → IGNORE HIM

ABCD → A, B, C, D → 4 distinct characters
ABBCD → 4 dis
→ to count no of distinct characters
how?
? s = 'HELLO'



C. Puzzles

time limit per test: 1 second
memory limit per test: 256 megabytes

The end of the school year is near and Ms. Manana, the teacher, will soon have to say goodbye to a yet another class. She decided to prepare a goodbye present for her n students and give each of them a jigsaw puzzle (which, as wikipedia states, is a tiling puzzle that requires the assembly of numerous small, often oddly shaped, interlocking and tessellating pieces).

The shop assistant told the teacher that there are m puzzles in the shop, but they might differ in difficulty and size. Specifically, the first jigsaw puzzle consists of f_1 pieces, the second one consists of f_2 pieces and so on.

Ms. Manana doesn't want to upset the children, so she decided that the difference between the numbers of pieces in her presents must be as small as possible. Let A be the number of pieces in the largest puzzle that the teacher buys and B be the number of pieces in the smallest such puzzle. She wants to choose such n puzzles that $A - B$ is minimum possible. Help the teacher and find the least possible value of $A - B$.

Input

The first line contains space-separated integers n and m ($2 \le n \le m \le 50$). The second line contains m space-separated integers $f_1, f_2, \ldots, f_m$ ($4 \le f_i \le 1000$) — the quantities of pieces in the puzzles sold in the shop.

Output

Print a single integer — the least possible difference the teacher can obtain.

Input

The first line contains space-separated integers n and m ($2 \le n \le m \le 50$). The second line contains m space-separated integers $f_1, f_2, \ldots, f_m$ ($4 \le f_i \le 1000$) — the quantities of pieces in the puzzles sold in the shop.

Output

Print a single integer — the least possible difference the teacher can obtain.

Examples

input	Copy
4 6 10 12 10 7 5 22	

output	Copy
5	

Note

Sample 1. The class has 4 students. The shop sells 6 puzzles. If Ms. Manana buys the first four puzzles consisting of 10, 12, 10 and 7 pieces correspondingly, then the difference between the sizes of the largest and the smallest puzzle will be equal to 5. It is impossible to obtain a smaller difference. Note that the teacher can also buy puzzles 1, 3, 4 and 5 to obtain the difference 5.

n students, m puzzles

f_i pieces

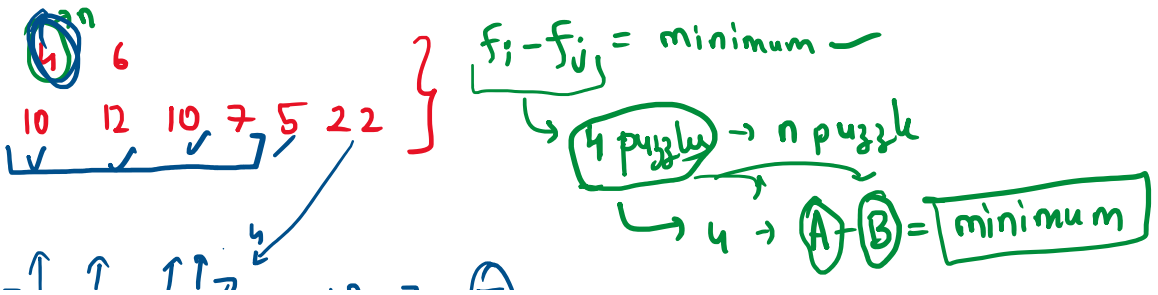
$f_1, f_2, f_3 \ldots f_m$

A - B → minimum

input → n, m → 1st

$f_1, f_2, f_3, f \ldots f_m$

$f_i - f_j$ = minimum



[10, 12, 10, 7] → 12-7 = 5

↳ 4 → A-B = minimum

[10, 12, 10, 22] → 22-10 ⇒ 12 → minimum → No A-B = min

A-B = maximum → [1, 3, 4, 5, 7] 4 → 1

1 → 7-1 = 6

mini: 4 5 ×, 3 4 ×, 3 5 × max

A-B → minimized

2 minimum values.

[10, 12, 10, 7, 5, 22] 2 more

sort

[5, 7, 10, 10, 12, 22] 2 max

[5 7 10 10] → 10-5 → ✓

miniminum greater than all other values but smaller than the left over ones.

5

[5, 7, 10, 10, 12, 22]

5 12 → Ans → 5

0 1 5

→ [4, 5, 10, 12]

1 2

2 → Student

A-B = minimum

1 ✓ → sort → pointer1 → 0, pointer2 → m-1] m

while (pointer2 → n) {

mini = min(mini, arr[pointer1] - arr[pointer2])

pointer1++;

pointer1 ++;
pointer2 ++;
}
sort (mini)

D)

D. We Need the Zero

time limit per test: 1 second
memory limit per test: 256 megabytes

There is an array a consisting of non-negative integers. You can choose an integer x and denote $b_i = a_i \oplus x$ for all $1 \le i \le n$ where $\oplus$ denotes the bitwise XOR operation. Is it possible to choose such a number x that the value of the expression $b_1 \oplus b_2 \oplus \ldots \oplus b_n$ equals 0?

It can be shown that if a valid number x exists, then there also exists x such that $(0 \le x < 2^8)$.

Input
Each test contains multiple test cases. The first line contains the number of test cases t $(1 \le t \le 1000)$. The description of the test cases follows.

The first line of the test case contains one integer n $(1 \le n \le 10^3)$ — the length of the array a.

The second line of the test case contains n integers — array a $(0 \le a_i < 2^8)$.

It is guaranteed that the sum of n over all test cases does not exceed 10^3.

Output
For each set test case, print the integer x $(0 \le x < 2^8)$ if it exists, or -1 otherwise.

Output
For each set test case, print the integer x $(0 \le x < 2^8)$ if it exists, or -1 otherwise.

Example

input	Copy
5 3 1 2 5 3 1 2 3 4 0 1 2 3 4 1 2 2 3 1 1	

output	Copy
6 0 3 -1 1	

Note
In the first test case, after applying the operation with the number 6 the array b becomes $[7, 4, 3]$, $7 \oplus 4 \oplus 3 = 0$.

There are other answers in the third test case, such as the number 0.

All positive
x
$b_i = a \oplus x$

$b_i \wedge b_2 \wedge b_3 \wedge b_4 \ldots = 0$

x → give value
-1

XOR → AND, OR, XOR

2 → 10
3 → 11
AND
10 → 2

2 → 10
3 → 11
OR
11 → 3

XOR →

2 → 10
3 → 11
XOR
01 → 1

1 ^ 0 → 1
1 ^ 1 → 0
0 ^ 1 → 1
0 ^ 0 → 0

XOR → 2 ^ 3 = 1

[1, 2, 5] → [a1, a2, a3] $b_i \Rightarrow a_1 \wedge x_1$

[

$b_1 \wedge b_2 \wedge b_3 == 0$, (x)

$a_1 \wedge (x) \wedge a_2 \wedge (x) \wedge a_3 \wedge (x)$ = Value to be zero

5 ^ 5 → 101 xor 101 → 000

$x \wedge x = 0$ → keep this in mind

$x \wedge x = 0$

$a \wedge b = b \wedge a$

$a \wedge b \wedge c = c \wedge b \wedge a,\ b \wedge a \wedge c,\ a \wedge c \wedge b$ → order doesn't matter

[1, 2, 5]

a+b = b+a

$a_1 \wedge x \wedge a_2 \wedge x \wedge a_3 \wedge x$

$1 \wedge x \wedge 2 \wedge x \wedge 5 \wedge x$

$1 \wedge 2 \wedge 5 \wedge x \wedge x \wedge x = 0$

$1 \wedge 2 \wedge 5 \wedge x = 0$

001
010
011
101
110 → 7

$7 \wedge (x) = 0$ ✓ → $7 \wedge (x) = 0$ ✓

$x \wedge x = 0$

$7 \wedge 7 = 0$ ✓

$x = 7$

arr

$1 \wedge 2 \wedge 5 \wedge x \wedge x \wedge (x)$ →

$1 \wedge 2 \wedge 5 \wedge x = 0$ → $7 \wedge x = 0$

$1 \wedge 2 \wedge 3 \wedge x = 0 \rightarrow 7 \wedge x = 0$

$x = 7$

[1, 2, 3, 4] $b_1 = a_1 \wedge x \rightarrow b_1 \wedge b_2 \cdots b_n = 0$

$b_1 \wedge b_2 \wedge b_3 \wedge b_4 = 0$

$x \wedge x = 0$

$1 \wedge x \wedge 2 \wedge x \wedge 3 \wedge x \wedge 4 \wedge x = 0$

$1 \wedge 2 \wedge 3 \wedge 4 \wedge x \wedge x \wedge x \wedge x$

$1 \wedge 2 \wedge 3 \wedge 4 = 0$ → No x → Ans is independent of x

if value ≠ 0 → -1

if value = 0 → x = 0

$x \wedge 0 = x$, $5 \wedge 0 = 5$ ✓

→ Find XOR of all elements → Ans in case of odd

→ Even → check if xor of all elements is 0 → yes → 0, else → -1

XOR → learn it

E)

E. Noldbach problem

time limit per test: 1 s

memory limit per test: 64 megabytes

Nick is interested in prime numbers. Once he read about Goldbach problem. It states that every even integer greater than 2 can be expressed as the sum of two primes. That got Nick's attention and he decided to invent a problem of his own and call it Noldbach problem. Since Nick is interested only in prime numbers, Noldbach problem states that at least k prime numbers from 2 to n inclusively can be expressed as the sum of three integer numbers: two neighboring prime numbers and 1. For example, $19 = 7 + 11 + 1$, or $13 = 5 + 7 + 1$.

Two prime numbers are called neighboring if there are no other prime numbers between them.

You are to help Nick, and find out if he is right or wrong.

Input

The first line of the input contains two integers n ($2 \le n \le 1000$) and k ($0 \le k \le 1000$).

Output

Output YES if at least k prime numbers from 2 to n inclusively can be expressed as it was described above. Otherwise output NO.

Examples

input	output
27 2	YES

Output

Output YES if at least k prime numbers from 2 to n inclusively can be expressed as it was described above. Otherwise output NO.

Examples

input	output
27 2	YES
45 7	NO

Note

In the first sample the answer is YES since at least two numbers can be expressed as it was described (for example, 13 and 19). In the second sample the answer is NO since it is impossible to express 7 prime numbers from 2 to 45 in the desired form.

Noldbach problem

19

2 to n → Range

→ K → no of numbers that satisfies that condition

2 ≤ 3

19 → [2, 3, 5, 7, 11, 13, 17]

1 + some prime + next prime

⇒ 1 + 7 + 11 ⇒ 19

$1 + x_i + x_j = 19$

$x_i + x_j = 18$

Question

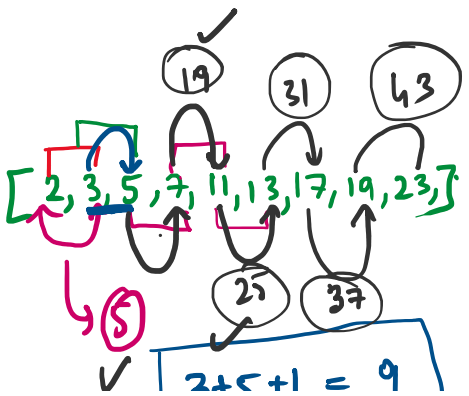
task → pairs of consecutive primes with sum upto (n-1)

27 , 2 → No satisfies

n

All the prime till 27

2 → n , 2 to 27



2 → n , 2 to 27

4(5) ✓

3+5+1 = 9

2 → 1 + x1 + x2 →

9 = 1 + x1 + x2

x1 + x2 = 8

n → 27 2 to 27

(2, 27) k=3

5+7+1 ⇒ 13

1+sum

i) 2 = 1 + x1 + x2

x1 + x2 = 1 ✗

ii) 3 = 1 + x1 + x2

k = 2

2 = x1 + x2 ✗

iii) 4 = 1 + x1 + x2

3 = x1 + x2 ✗

iv) 5 = 1 + x1 + x2

4 = x1 + x2 ✗

v) 6 = 1 + x1 + x2

5 = x1 + x2 ✓

Array+1

[2, 3, 5, 7, ...]

a1 > n ✗

n →

7 → n 2 ≤ n

k++

k ≥ threshold → Yes ✓

→ No ✓