

***Problem Statement 1:**

Write a recursive program to find the GCD of given two numbers.

Constraints:

$1 < t < 100$

$1 < a, b < 100000$

Input:

First line denotes number of test cases.

Next 't' lines indicates values of a and b separated by spaces.

Output:

In each line GCD of respective input should be printed.

Sample Input:

2

6 10

12 18

Sample Output:

2

6

***Problem Statement 2:**

Write a recursive Program to find $F(n)$, where $F(n) = 1 \cdot F(n-1) + 2 \cdot F(n-2) + 3 \cdot F(n-3)$

$$F(0) = 0$$

$$F(1) = 1$$

$$F(2) = 2$$

Constraints:

$$1 < t < 100$$

$$3 \leq n \leq 10000$$

Input:

First Line denotes number of test cases.

Next t lines gives the value n.

Output:

In each line, Value of $F(n)$ for corresponding n

Sample Input:

2

2

3

Sample Output:

2

8

***Problem Statement 3:**

Given a string S you need to reverse up to k suffixes. Let's understand what is 'up to k suffixes' by an example :

S = 'abcdef'

Reversing up to 1 suffix : S_1 = 'abcdef' (S is considered as original string)

Reversing up to 2 suffix : S_2 = 'abcd**fe**' (S_1 is considered as original string)

Reversing up to 3 suffix : S_3 = 'abce**fd**' (S_2 is considered as original string)

Reversing up to 4 suffix : S_4 = 'ab**dfec**' (S_3 is considered as original string)

Reversing up to 5 suffix : S_5 = 'ace**fdb**' (S_4 is considered as original string)

Constraints:

$1 < t < 100$

$1 \leq \text{len}(S) \leq 10000$

$1 \leq k \leq \text{len}(S)$

Input Format :

The first line contains 't', specifying the number of test case. The next 't' lines consists of two lines, the first line contains the string S and the second line contains integer 'k' which denotes the number of times S 'up to which S has to be reversed'.

Output Format

For each test case, output the 'k' times reversed string in new line.

Sample Input :

4

hsjdj

3

kdjsfsk

3

skskshfk

4

hibye

2

Sample Output :

hsdj

kdjsskf

skskhkfs

hibey

***Problem Statement 4:**

Write a C Program that rotates the given 2D Matrix of size $m \times n$ in a clockwise direction.

Constraints:

$1 < t < 100$

$1 < m, n < 60$

Input:

First line denotes number of test cases.

In each test case first line denotes value of m and n separated by spaces.

And followed by $m \times n$ matrix

Output:

Rotate the given matrix clockwise and print it.

Sample Input:

```
1
2 3
1 2 3
6 5 4
```

Sample Output:

```
6 1 2
5 4 3
```

* Problem Statement 5:

Write a C Program to perform the following operations on four strings s1, s2, s3, s4.

Op 1: isPrefix(s1, s2) – check whether s2 is prefix of s1 or not.

Op 2: isSuffix(s3, s4) _ check whether s4 is suffix of s3 or not.

Op 3: encode(s1) - all the charecters of string s1 should be incremented by 1.

Op 4: decode(s2) - all the charecters of string s2 should be decremented by 1.

Input:

First line denotes number of test cases.

In each test case four strings in four lines.

Output:

Output of each operation should be in a new line.

print '1' or '0' for Op1 and Op2, where 1 means true and 0 means False

3rd line – encoded string

4th line – decoded string

Sample Input:

1

Hello World

Hello

World

World

Sample Output:

1

1

Ifmmp Xpsme

Gdkkn

**** Problem Statement 6:**

Write a C Program that generates a magic square of size $n \times n$.

Constraints:

$1 < t < 100$

$1 < n < 100$

Input:

First line denotes number of test cases.

Followed by t lines denotes the value of n .

Output:

a magic square of size $n \times n$.

Sample Input:

2

2

3

Sample Output:

Magic square is not possible

8	1	6
---	---	---

3	5	7
---	---	---

4	9	2
---	---	---

Note: Elements in a row should have tab space.

Problem Statement 7:

There are two kangaroos on an x-axis ready to jump in the positive direction (i.e, toward positive infinity). The first kangaroo starts at location x_1 and moves at a rate of v_1 meters per jump. The second kangaroo starts at location x_2 and moves at a rate of v_2 meters per jump. Given the starting locations and movement rates for each kangaroo, can you determine if they'll ever land *at the same location at the same time*?

Input Format

A single line of four space-separated integers denoting the respective values of x_1, v_1 , x_2 , and v_2 .

Constraints

$$0 \leq x_1 < x_2 \leq 10000$$

$$1 \leq v_1 \leq 10000$$

$$1 \leq v_2 \leq 10000$$

Output Format

Print YES if they can land on the same location at the same time; otherwise, print NO.

Note: The two kangaroos must land at the same location *after making the same number of jumps*.

Sample Input

2

0 3 4 2

3 5 1 4

Sample Output

YES

NO

Problem Statement 8:

Given a string S, you need to delete the consecutive characters in the string till no consecutive characters are left.

Constraints

$$1 \leq t \leq 100$$

$$1 \leq \text{len}(S) \leq 1000000$$

The string S

Input Format

The first line specifies 't', the number of test cases. The next 't' lines specifies the string S.

Output Format

For each test case, print the resultant string after deletion of consecutive characters. If the string reduces to a length of zero characters, print -1.

Sample Input

```
5
jsdhfjsjhs
kdjhkssssjh
aaaaakdjfhsjddddf
hhsdghssshgd
aaaabbbbbbaaaa
```

Sample Output

```
jsdhfjsjhs
kdjhkjh
kdjfhsjf
s
-1
```


Problem 9:[[Bonus](#)]

Given in the document of previous assignment.