Sheet #2 (Loops)

A. 1 to N

1 second, 256 megabytes

Given a number N. Print numbers from **1** to N in separate lines.

Input
Only one line containing a number $N\,(1 \le N \le 10^3)$.

Output
Print N lines according to the required above.

input
5

output
1 2 3 4 5

B. Even Numbers

1 second, 256 megabytes

Given a number N. Print all **even** numbers between **1** and N inclusive in separate lines.

Input
Only one line containing a number $N\,(1 \le N \le 10^3)$.

Output
Print the answer according to the required above. If there are no **even** numbers print **-1**.

input
10

output
2 4 6 8 10

input
5

output
2 4

C. Even, Odd, Positive and Negative

1 second, 256 megabytes

Given N numbers. **Count** how many of these values are **even, odd, positive** and **negative**.

Input
First line contains one number $N\,(1 \le N \le 10^3)$ number of values.

Second line contains N numbers $(-10^5 \le X_i \le 10^5)$.

Output
Print four lines with the following format:

First Line: "Even: X", where X is the number of **even** numbers in the given input.

Second Line: "Odd: X", where X is the number of **odd** numbers in the given input.

Third Line: "Positive: X", where X is the number of **positive** numbers in the given input.

Fourth Line: "Negative: X", where X is the number of **negative** numbers in the given input.

input
5 -5 0 -3 -4 12

output
Even: 3 Odd: 2 Positive: 1 Negative: 3

First Example :

Even Numbers are : **0, -4 , 12**

Odd Numbers are : **-5 , -3**

Positive Numbers are : **12**

Negative Numbers are : **-5 , -3 , -4**

D. Fixed Password

1 second, 256 megabytes

Given multiple lines each line contains a number X which is a password. Print "**Wrong**" if the password is **incorrect** otherwise, print "**Correct**" and **terminate** the program.

Note: The "**Correct**" password is the number **1999**.

Input
The input contains several passwords.

Each line contains a number $X\,(10^3 \le X \le 10^4 - 1)$.

Output
Print "**Wrong**" if the password is typed **wrong** otherwise, print "**Correct**" if the password is typed **correctly**.

input
2200 1020 1999 1000 9999

output
Wrong Wrong Correct

E. Max

1 second, 256 megabytes

Given a number N, and N numbers, find **maximum** number in these N numbers.

Input
First line contains a number $N\,(1 \le N \le 10^3)$.

Second line contains N numbers $X_i\,(0 \le X_i \le 10^9)$.

Output
Print the **maximum** number.

input
5 1 8 5 7 5
output
8

F. Multiplication table

1 second, 64 megabytes

Given a number N. Print the **maltiplication table** of the number from **1** to **12**

For example: if N = **1**

```
1 * 1 = 1
1 * 2 = 2
1 * 3 = 3
1 * 4 = 4
1 * 5 = 5
1 * 6 = 6
1 * 7 = 7
1 * 8 = 8
1 * 9 = 9
1 * 10 = 10
1 * 11 = 11
1 * 12 = 12
```

Input
Only one line containing a number $N\,(1 \le N \le 50)$.

Output
Print **12** lines according to the required above.

input
1
output
1 * 1 = 1 1 * 2 = 2 1 * 3 = 3 1 * 4 = 4 1 * 5 = 5 1 * 6 = 6 1 * 7 = 7 1 * 8 = 8 1 * 9 = 9 1 * 10 = 10 1 * 11 = 11 1 * 12 = 12

input
2
output
2 * 1 = 2 2 * 2 = 4 2 * 3 = 6 2 * 4 = 8 2 * 5 = 10 2 * 6 = 12 2 * 7 = 14 2 * 8 = 16 2 * 9 = 18 2 * 10 = 20 2 * 11 = 22 2 * 12 = 24

G. Factorial

2 seconds, 64 megabytes

Given a number N. Print the **factorial** of number N.

Input
First line contains a number $T\,(1 \le T \le 15)$ number of test cases.

Next T lines will contain a number $N\,(0 \le N \le 20)$

Output
For each test case print a single line contains the **factorial** of N.

input
2 5 3
output
120 6

Factorial, in mathematics, the product of all positive integers less than or equal to a given positive integer and denoted by that integer and an exclamation point.

Thus, factorial seven is written 7!, meaning **1 * 2 * 3 * 4 * 5 * 6 * 7 = 5040** .

Factorial zero is defined as equal to 1.

In first test case for N = 5 , **5! = 1 * 2 * 3 * 4 * 5 = 120** so the answer is **120**.

In Second test case for N = 3 , **3! = 1 * 2 * 3 = 6** so the answer is **6**.

H. One Prime

3 seconds, 64 megabytes

Given a number X. Determine if the number is **prime** or **not**

Note:

A **prime** number is a number that is greater than **1** and has only two factors which are **1** and **itself**.

In other words : **prime number divisible only by 1 and itself**.

Be careful that 1 is not prime .

The first few **prime** numbers are

2 3 5 7 11 13 17

19 23 29 31 37 41

43 47 53 59 61 67

71 73 79 83 89 97

Input
Only one line containing a number $X\,(2 \leq X \leq 10^5)$.

Output
print "**YES**" if the number is **prime** and "**NO**" otherwise.

input
7
output
YES

input
15
output
NO

First Example :

7 is prime because it is not divisible by **2,3,4,5,6,** and only divisible by 1 and itself, so the answer is **YES**.

Second Example :

15 not is prime because it is divisible by **3 ,5**, so the answer is **NO**.

I. Palindrome

1 second, 256 megabytes

Given a number N. Print **2** lines that contain the following respectively:

1. Print N in a reversed order and **not leading zeroes**.
2. If N is a **palindrome number** print "**YES**" otherwise, print "**NO**".

Note:

A **palindrome number** is a number that reads the same forward or backward.

For example: 12321, **101** are **palindrome numbers**, while **1201**, **221** are **not**.

A leading zero is any 0 digit that comes before the first nonzero digit in a number for example : numbers **(005 , 01 , 0123 , 02 , 000250)** are leading zeroes but **(5 , 123 , 20 ,2500)** not leading zeroes numbers .

Input
Only one line containing a number $N\,(1 \leq N \leq 10^7)$.

Output
Print the answer required above.

input
12121
output
12121 YES

input
160
output
61 NO

J. Primes from 1 to n

3 seconds, 256 megabytes

Given a number N. Print all **prime** numbers between **1** and N inclusive.

A **prime** number is a number that is greater than **1** and has only two factors which are **1** and **itself**.

In other words : **prime number divisible only by 1 and itself**.

Be careful that 1 is not prime .

The first few **prime** numbers are

2 3 5 7 11 13 17

19 23 29 31 37 41

43 47 53 59 61 67

71 73 79 83 89 97

Input
Only one line containing a number $N\,(2 \leq N \leq 10^3)$.

Output
Print all prime numbers between **1** and N (inclusive) separated by a space.

input
10

output
2 3 5 7

K. Divisors

1 second, 256 megabytes

Given a number N. Print all the **divisors** of N in ascending order.

Input
Only one line containing a number N $(1 \leq N \leq 10^4)$.

Output
Print all **positive divisors** of N, one number per line.

input
6
output
1 2 3 6

input
7
output
1 7

input
4
output
1 2 4

Divisor of Number is A number that divides the integer exactly (no remainder).

In other words the division works perfectly with no fractions or remainders involved.

Examples:

- **3** is a divisor of **12**, because 12 ÷ 3 = 4 exactly
- **4** is a divisor of **12**, because 12 ÷ 4 = 3 exactly.
- **5** is not a divisor of **12**, because 12 ÷ 5 = 2 with a remainder of 2.

a divisor is also a factor of the original integer.

L. GCD

1 second, 256 megabytes

Given two numbers A and B. Print the **greatest common divisor** between (A, B).

Note: The greatest common divisor (**GCD**) of two or more integers, which are not all zeroes, **is the largest positive integer that divides each of the integers**.

For example:

the **GCD** of **8** and **12** is **4**.

because the numbers that divides both **8** and **12** are **(1,2,4)** and **4** is the largest one .

Input
Only one line containing two numbers A and B $(1 \leq A, B \leq 10^3)$.

Output
Print the **GCD** of A and B.

input
12 8
output
4

input
3 7
output
1

input
3 7
output
1

input
5 10
output
5

What is the greatest common divisor of **54 and 24**?

*The number 54 can be expressed as a product of two integers in several different ways:

54 * 1 = 27 * 2 = 18 * 3 = 9 * 6 .....

Thus the **divisors of 54** are: **1,2,3,6,9,18,27,54**

Similarly, the divisors of 24 are: **1,2,3,4,6,8,12,24**

The numbers that these two lists share in common are **the common divisors of 54 and 24**:

1,2,3,6

The greatest of these is 6. That is, the greatest common divisor of 54 and 24. One writes:

gcd(54,24) = 6.

M. Lucky Numbers

1 second, 256 megabytes

Given two numbers A and B. Print all **lucky numbers** between A and B **inclusive**.

Note:

The **Lucky number** is any positive number that its decimal representation contains only **4** and **7**.

For example: numbers **4, 7, 47** and **744** are **lucky** and numbers **5, 17** and **174** are **not**.

Input
Only one line containing two numbers A and B $(1 \leq A \leq B \leq 10^5)$.

Output
Print all **lucky numbers** between A and B **inclusive** separated by a space. If there is **no lucky number** print **-1**.

input
4 20
output
4 7

input
8 15
output
-1

N. Numbers Histogram

1 second, 256 megabytes

Given **3** lines of input described as follow:

1. First line contains a symbol S.
2. Second line contains a number N.
3. Third line contains N numbers.

For each number X_i in the N numbers print a new line that contains the symbol S repeated X_i time.

Input
The first line contains a symbol S can be $(+, -, *, /)$.

The second line an number N $(1 \leq N \leq 50)$.

The third line contains N numbers $(1 \leq X_i \leq 100)$.

Output
Print the answer required above.

input
+ 5 5 2 4 3 7
output
+++++ ++ ++++ +++ +++++++

Don't print any extra spaces after symbol S.

O. Pyramid

1 second, 256 megabytes

Given a number N. Print a left angled triangle that has N rows.

For more clarification see the example below.

Input
Only one line containing a number $N\,(1 \leq N \leq 99)$.

Output
Print the answer according to the required above.

input
4
output
* ** *** ****

Don't print any extra spaces after symbol " * ".

P. Shape1

1 second, 256 megabytes

Given a number N. Print a face down right angled triangle that has N rows.

For more clarification see the example below.

Input
Only one line containing a number $N\,(1 \leq N \leq 99)$.

Output
Print the answer according to the required above.

input
4
output
**** *** ** *

Don't print any extra spaces after symbol " * ".

Q. Digits

1 second, 256 megabytes

Given a number N. Print the **digits of that number** from right to left separated by space.

Input
First line contains a number $T\,(1 \leq T \leq 10)$ number of test cases.

Next T lines will contain a number $N\,(0 \leq N \leq 10^9)$

Output
For each test case print a single line contains the **digits of the number** separated by space.

input
4 121 39 123456 1200
output
1 2 1 9 3 6 5 4 3 2 1 0 0 2 1

R. Sequence of Numbers and Sum

1 second, 256 megabytes

Given multiple lines each line contains two numbers N and M.

For each line print a single line contains:

- The numbers between N and M inclusive separated by single space.
- The message " sum =".
- The **summation** of all numbers between N and M inclusive.

Note: The program should be $TERMINATED$ as soon as any of these two numbers is less than or equal to zero and don't print any thing.

For more clarification see the examples below.

Input
The input contains multiple line.

Each line contains two numbers N and M $(-100 \le N, M \le 100)$.

It's **guaranteed** that the last line of the input will contain a number that is less than or equal to zero.

Output
For each line print the answer according to the required above in a single line.

input
5 2 5 7 5 -1
output
2 3 4 5 sum =14 5 6 7 sum =18

input
5 2 6 3 5 0
output
2 3 4 5 sum =14 3 4 5 6 sum =18

M may be **greater** than N and **Vice Versa**.

S. Sum of Consecutive Odd Numbers

1 second, 256 megabytes

Given two numbers X and Y. Print the **sum** of all **odd** numbers between them, excluding X and Y.

Input
First line contains a number T $(1 \le T \le 10)$ number of test cases.

Next T lines will contain two numbers X and Y $(0 \le X, Y \le 10^4)$.

Output
Print the **sum** of all **odd** numbers between X and Y (excluding X and Y).

input
3 5 6 10 4 4 9
output
0 21 12

T. Shape2

1 second, 256 megabytes

Given a number N. Print a pyramid that has N rows.

For more clarification see the example below.

Input
Only one line containing a number N $(1 \le N \le 99)$.

Output
Print the answer according to the required above.

input
4
output
<pre>   *   *** ***** *******</pre>

Don't print any extra spaces after symbol " * ".

U. Some Sums

2 seconds, 256 megabytes

Given three numbers N, A, B. Print the **summation** of the numbers between **1** and N whose **sum** of digits is between A and B **inclusive**.

Input
Only one line containing three numbers N, A, B
$(1 \le N \le 10^4, 1 \le A \le B \le 36)$.

Output
Print a single line contains the answer according to the required above.

input
20 2 5
output
84

input
10 1 2
output
13

input
100 4 16
output
4554

In the first simple:

Among the numbers not greater than **20**, the numbers whose sums of digits are between **2** and **5**, are: **2,3,4,5,11,12,13,14** and **20**.

So the answer is: **84**.

V. PUM

1 second, 256 megabytes

Given a number N. Print N lines that describes PUM game.

For more clarification see the examples.

Input

Only one line containing a number N $(1 \le N \le 20)$.

Output
Print the answer according to the required above.

input
7

output
1 2 3 PUM 5 6 7 PUM 9 10 11 PUM 13 14 15 PUM 17 18 19 PUM 21 22 23 PUM 25 26 27 PUM

input
3

output
1 2 3 PUM 5 6 7 PUM 9 10 11 PUM

Don't print any extra spaces.

W. Shape3

1 second, 256 megabytes

Given a number N. Print a diamond that has $2N$ rows.

For more clarification see the example below.

Input
Only one line containing number N $(1 \le N \le 99)$.

Output
Print the answer according to the required above.

input
4

output
<pre>   *   *** ***** ******* ******* *****   ***   *</pre>

Don't print any extra spaces after symbol " * ".

X. Convert To Decimal 2

1 second, 64 megabytes

Given a number N. Print the result of doing the following operation on N:

- Convert N to its **binary** representation.
- Count number of **ones** in the above **binary** representation.
- Print the equivalent **decimal** number that its **binary** representation has only the number of ones that were counted above.

For example: $(10)_{decimal}$ = $(1010)_{binary}$ has **2** ones "11", after converting "11" to decimal number it will become **3**.

Input
First line contains a number T $(1 \le T \le 10)$ number of test cases.

Next T lines will contain a number N $(1 \le N \le 2^{31} - 1)$.

Output
For each test case print a single line contains the answer according to the required above.

input
3 10 7 8

output
3 7 1

To convert decimal number to binary :

A decimal integer can be converted to binary by dividing it by 2.

Take the quotient, and keep dividing it by 2, until you reach zero.

Each time you perform this division, take note of the remainder. Now reverse the remainders list, and you get the number in binary form

Example to convert 29 to binary

Step	Operation	Result	Remainder
Step 1	29 / 2	14	1
Step 2	14 / 2	7	0
Step 3	7 / 2	3	1
Step 4	3 / 2	1	1
Step 5	1 / 2	0	1

for more details visit this https://flaviocopes.com/converting-decimal-to-binary/

To convert from binary to Decimal :

Binary Number – 11101_2

Calculating Decimal Equivalent –

Step	Binary Number	Decimal Number
Step 1	11101_2	$((1 \times 2^4) + (1 \times 2^3) + (1 \times 2^2) + (0 \times 2^1) + (1 \times 2^0))_{10}$
Step 2	11101_2	$(16 + 8 + 4 + 0 + 1)_{10}$
Step 3	11101_2	29_{10}

Second Test Case :

$(7)_{decimal}$ = $(111)_{binary}$ has **3** ones "111", after converting "111" to decimal number it will become **7**.

Third Test Case :

$(8)_{decimal}$ = $(1000)_{binary}$ has **1** one "1", after converting "1" to decimal number it will become **1**.

Y. Easy Fibonacci

1 second, 256 megabytes

Given a number N. Print first N numbers of the **Fibonacci** sequence.

Note: In order to create the **Fibonacci** sequence use the following function:

- fib(1) = 0.
- fib(2) = 1.

- fib(n) = fib(n - 1) + fib(n - 2).

Input
Only one line containing a number $N\,(1 \le N \le 45)$.

Output
Print the first N numbers from the **Fibonacci** Sequence .

input
7
output
0 1 1 2 3 5 8

For more information visit Fibonacci:
https://www.mathsisfun.com/numbers/fibonacci-sequence.html.

Z. Three Numbers

3 seconds, 256 megabytes

Given two numbers K and S. Determine how many **different values** of X, Y and Z such that $(0 \le X, Y, Z \le K)$ and $X + Y + Z = S$.

Input
Only one line containing two numbers K and S
$(0 \le K \le 3000, 0 \le S \le 3K)$.

Output
Print the answer required above.

input
2 1
output
3

input
9 4
output
15

In the first test case all values of X, Y, Z that satisfy the conditions are :

0 0 1

0 1 0

1 0 0

In the second test case all values of X, Y, Z that satisfy the conditions are :

X Y Z	X Y Z	X Y Z	X Y Z
0 0 4 0 1 3 0 2 2 0 3 1	0 4 0 1 0 3 1 1 2 1 2 1	2 0 2 2 1 1 2 2 0 3 0 1	3 1 0 4 0 0 1 3 0