

Stable Matching

Input

The single line contains the integers n ($1 \leq n \leq 1000$) — the number of men or women. The following $2*n$ lines contain the preference list of each man and women.

Output

Print pairs of the stable matching.

Examples

input

```
2
A:X>Y
B:X>Y
X:A>B
Y:A>B
```

output

```
(A,X)
(B,Y)
```

input

```
3
A:X>Y>Z
B:Y>X>Z
C:X>Y>Z
X:B>A>C
Y:A>B>C
Z:A>B>C
```

output

```
(A,X)
(B,Y)
(C,Z)
```

Ticket Payment

Ann has recently started commuting by subway. We know that a one ride subway ticket costs a CNY. Besides, Ann found out that she can buy a special ticket for m rides (she can buy it several times). It costs b CNY. Ann did the math; she will need to use subway n times. Help Ann, tell her what is the minimum sum of money she will have to spend to make n rides?

Input

The single line contains four space-separated integers n, m, a, b ($1 \leq n, m, a, b \leq 1000$) — the number of rides Ann has planned, the number of rides covered by the m ride ticket, the price of a one ride ticket and the price of an m ride ticket.

Output

Print a single integer — the minimum sum in CNY that Ann will need to spend.

Examples

input

6 2 1 2

output

6

input

5 2 2 3

output

8

Note

In the first sample one of the optimal solutions is: each time buy a one ride ticket. There are other optimal solutions. For example, buy three m ride tickets.

Bank Gift

Jack is a very clever lion, he lives in an unusual city ZooVille. In this city all the animals have their rights and obligations. Moreover, they even have their own bank accounts. The state of a bank account is an integer. The state of a bank account can be a negative number. This means that the owner of the account owes the bank money.

Jack the Lion has recently had a birthday, so he got a lot of gifts. One of them (the gift of the main ZooVille bank) is the opportunity to delete the last digit or the digit before last from the state of his bank account no more than once. For example, if the state of Jack's bank account is -123, then Jack can delete the last digit and get his account balance equal to -12, also he can remove its digit before last and get the account balance equal to -13. Of course, Jack is permitted not to use the opportunity to delete a digit from the balance.

Jack is not very good at math, and that's why he asks you to help him maximize his bank account. Find the maximum state of the bank account that can be obtained using the bank's gift.

Input

The single line contains integer n ($10 \leq |n| \leq 10^9$) — the state of Jack's bank account.

Output

In a single line print an integer — the maximum state of the bank account that Jack can get.

Examples

input

2230

output

2230

input

-10

output

0

input

-100003

output

-10000

Note

In the first test sample Jack doesn't profit from using the present.

In the second test sample you can delete digit 1 and get the state of the account equal to 0.