

7464 Robots

Write a program to collect data from robots. We are given two sets of robots $X = \{X_1, \dots, X_m\}$, $Y = \{Y_1, \dots, Y_n\}$, and a base B . Each robot has a data and we would like to compute the sum of data from all robots and deliver it to the base. In order to do so a robot can send its data to another robot or the base with the following constraints.

- A robot can only send its data to one destination (a robot or the base) at a time.
- A robot (or the base) can receive data from one robot at a time.
- The base can not send data to anyone.
- A robot in X can complete sending its data in x seconds. A robot in Y can complete sending its data in y seconds.

The robots and the base can perform addition, so we can collect the final sum at the base. That is, we assume that after receiving a data, a robot or the base can perform an addition with zero time. Now let us illustrate this concept by an example. Let us consider a system with one robot X_1 in X and two robots Y_1 and Y_2 in Y . We also assume that x is 1 and y is 10. At the beginning Y_1 can send its data to Y_2 and X_1 can send its data to the base. After 1 second the base will know the data of X_1 . However, only after 10 seconds Y_2 will have the data of Y_1 , add its own data, and send the sum to the base. After 20 seconds the base receives the sum of data from Y_1 and Y_2 , adds the data from X_1 , and has the final sum. The entire summation will take 20 seconds.

Now let us try a different schedule. At beginning Y_1 sends data to the base, and Y_2 sends data to X_1 , and both can complete after 10 seconds. Finally X_1 starts sending the sum of data from Y_2 and itself to the base after 10 seconds, and the entire summation can finish in 11 seconds.

Now given m , n (the numbers of robots in X and Y), x , and y , please determine the minimum number of seconds to finish the summation.

Constraints

- $1 \leq x < y \leq 1000$.
- $0 \leq m < 1200$.
- $0 \leq n < 500$.

Input

The input consists of multiple test cases. First line contains a single integer t indicating the number of test cases to follow. Each of the next t lines contains four integers — x , y , m , n .

Output

For each test case, output on a single line the minimum number of seconds to sum up all numbers from all robots.

Sample Input

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1
1 10 1 2
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Sample Output

11