A. Broken Vending Machine (Easy Version)

Mark is on his lunch break and wants to get a bag of chips from the vending machine. The bag of chips costs x dollars. Unfortunately the vending machine is broken and only accepts **exactly two bills per purchase**. Mark is rather cheap and does not wish to overpay for his chips so he will pay only the exact amount. Mark's wallet contains n dollar bills. The ***i***-th bill in his wallet is worth a_i dollars. Can he get the bag of chips?

Input

The first line of input contains t $(1 \leq t \leq 10)$, the number of test cases.

The first line of each test case contains n $(2 \leq n \leq 100)$ the number of bills in Mark's wallet and x $(2 \leq x \leq 10^8)$, the cost of the chips.

On the next line there will be ***n*** numbers.
The ***i***-th number contains a_i $(1 \leq a_i \leq 10^8)$, the value of this dollar bill.

Output

Output *YES* if Mark can purchase the chips from the vending machine or *NO* if he is unable to.

Input	Output
3 5 12 1 7 4 3 5 3 10 4 4 10 4 10 1 9 15 15	 YES NO YES

In the first test case Mark can use the $7 and $5 dollar bills to purchase the $12 bag of chips.

In the second test case, Mark is unable to use exactly two bills to pay for the $10 bag of chips.

In the third test case, Mark can only use the $1 and $9 dollar bills.

B. Anthony And Bitcoin Addiction

Anthony is addicted to buying bitcoin. Scared of losing all his money, he decides to never buy bitcoin again when the price is a composite (non-prime) number. Instead of getting him treatment for his addiction his friends James and Sebastian encourage him to buy bitcoin but only when the price is a prime number to guarantee a 300% profit margin.

Input

The first line of input contains t $(1 \leq t \leq 10)$, the number of test cases.
The next ***t*** lines will contain one number n $(1 \leq n \leq 10^{10})$, the current price of bitcoin.
The price of bitcoin.

Output

Output *BUY* if Anthony should buy bitcoin at that price or *WAIT* if he should not.

Input	Output
4 24 43 6 991	 WAIT BUY WAIT BUY

In the first test case Anthony should wait because the current price of bitcoin is composite.
In the second test case Anthony should buy because the price of $43 is prime.

C. Sage And Pizza (Easy Version)

Sarah and Isabel want pizza for a pizza party they are throwing to celebrate Sarah's graduation from RCC and they need at least x pizzas to feed everyone. They have to buy pizza for their party but **Sage the tyrannical pizza man will only sell each of them a number of pizzas that is a factor (or divisor) of the number they can each afford**. Sarah can afford n pizzas and Isabel can afford m pizzas. Since both Sarah and Isabel don't want to flex on each other by buying more pizzas than the other they are only willing to each buy the same amount of pizzas. Can Sarah and Isabel buy enough pizzas from Sage without flexing on each other? For simplicity you will find the most that they can get from Sage.

Input

The first line of input contains t $(1 \leq t \leq 10)$, the number of test cases.

Each test case consists of only one line containing three variables:
x $(1 \leq x \leq 1000)$ the minimum number of pizzas they need
n $(1 \leq n \leq 1000)$ the number of pizzas Sarah can afford
m $(1 \leq m \leq 1000)$ the number of pizzas Isabel can afford

Output

If Sage is willing to sell them enough pizzas for the party then output YES on one line and the maximum they can buy on the line below. If Sarah and Isabel cannot get enough pizza from Sage then just output NO.

Input	Output
3 6 24 15 3 99 1484 27 30 75	YES 6 NO YES 30

1. In the first test case the highest factor that Sarah can get and Isabel can get so as to not flex on each other is 3 pizzas each for a total of 6 pizzas.
2. In the second test case, the highest only factor that Sarah and Isabel can get is 1 pizza from each of them for a total of 2 so they cannot buy enough pizzas for the party.
3. In the third test case Sage will sell each of them at most 15 pizzas for a total of 30 which enough for the party.

D. Broken Vending Machine (Hard Version)

The only difference between this and the easy version is n, the number of bills in Mark's wallet

Mark is on his lunch break and wants to get a bag of chips from the vending machine. The bag of chips costs x dollars. Unfortunately the vending machine is broken and only accepts **exactly two bills per purchase**. Mark is rather cheap and does not wish to overpay for his chips so he will pay only the exact amount. Mark's wallet contains n dollar bills. The ***i***-th bill in his wallet is worth a_i dollars. Can he get the bag of chips?

Input

The first line of input contains t $(1 \le t \le 10)$, the number of test cases.

The first line of each test case contains n $(2 \le n \le 10^5)$ the number of bills in Mark's wallet and x $(2 \le x \le 10^8)$, the cost of the chips.

On the next line there will be ***n*** numbers.
The ***i***-th number contains a_i $(1 \le a_i \le 10^8)$ **,** the value of this dollar bill.

Output

Output *YES* if Mark can purchase the chips from the vending machine or *NO* if he is unable to.

Input	Output
3 5 12 1 7 4 3 5 3 10 4 4 10 4 10 1 9 15 15	 YES NO YES

E. Sage And Pizza (Hard Version)

The only difference between this and the easy version is higher constraints on x, n, and m

Sarah and Isabel want pizza for a pizza party they are throwing to celebrate Sarah's graduation from RCC and they need at least x pizzas to feed everyone. They have to buy pizza for their party but **Sage the tyrannical pizza man will only sell each of them a number of pizzas that is a factor (or divisor) of the number they can each afford**. Sarah can afford n pizzas and Isabel can afford m pizzas. Since both Sarah and Isabel don't want to flex on each other by buying more pizzas than the other they are only willing to each buy the same amount of pizzas. Can Sarah and Isabel buy enough pizzas from Sage without flexing on each other? For simplicity you will find the most that they can get from Sage.

Input

The first line of input contains t $(1 \leq t \leq 10)$, the number of test cases.

Each test case consists of only one line containing three variables:
x $(1 \leq x \leq 10^8)$ the minimum number of pizzas they need
n $(1 \leq n \leq 10^8)$ the number of pizzas Sarah can afford
m $(1 \leq m \leq 10^8)$ the number of pizzas Isabel can afford

Output

If Sage is willing to sell them enough pizzas for the party then output YES on one line and the maximum they can buy on the line below. If Sarah and Isabel cannot get enough pizza from Sage then just output NO.

Input	Output
3 6 24 15 3 99 1484 27 30 75	YES 6 NO YES 30