Q2.

There is a specific template for you guys to start coding.
You can add other members in your class, but please follow the rules shown below.

Make sure that your class name is PrimeFactorization.
You should use “vector” to implement this program.

For this problem, you need to calculate the prime factorization of two numbers and GCD(Greatest Common Divisor)

Five specific functions you should implement are:
a. The constructor with two integers as arguments.
b. The function: Get_Prime_Factorization().
c. The function: Print_Prime_Factorization().
d. The function: Print_GCD_Factorization().

You must use the result of Get_Prime_Factorization() to find the GCD.
See the template for details.

Input format

The first line shows the number of test cases.
Each of the following lines contains two integers a, b. ($2 \leq a, b \leq INT\_MAX$)

Output Format

The output format should contain the prime factorization of two numbers and GCD.
See the sample output for the details.
The printed result of the prime factorization must be in order (small to large).
If the two integers are “co-prime”, then just print "1".

Sample Input

```
5
123456  661152
51284  12387
3254  9182
2813291  870090
1043115528  1201746
```

Sample Output

```
num1 = 123456
num2 = 661152
num1_prime_factor: 2^6 * 3 * 643
num2_prime_factor: 2^5 * 3 * 71 * 97
GCD_prime_factor: 2^5 * 3

num1 = 51284
num2 = 12387
num1_prime_factor: 2^2 * 12821
num2_prime_factor: 3 * 4129
GCD_prime_factor: 1
```

num1 = 3254
num2 = 9182
num1_prime_factor: 2 * 1627
num2_prime_factor: 2 * 4591
GCD_prime_factor: 2

num1 = 2813291
num2 = 870090
num1_prime_factor: 13 * 23 * 97^2
num2_prime_factor: 2 * 3 * 5 * 13 * 23 * 97
GCD_prime_factor: 13 * 23 * 97

num1 = 1043115528
num2 = 1201746
num1_prime_factor: 2^3 * 3 * 7^2 * 13 * 31^2 * 71
num2_prime_factor: 2 * 3 * 7 * 13 * 31 * 71
GCD_prime_factor: 2 * 3 * 7 * 13 * 31 * 71