Programing Exercise 2-1

Problem

Given a series of positive integers, please using Java streams to write a program to solve the following questions.

Q1: For each integer N, generate a list of all *factors* of N print out all factors of N in ascending order.

Q2: For each integer *N*, generate a list of all *prime factors* of *N* and print them out in ascending order.

Q3: For each integer *N*, generate a map of all (*key*, *value*) pairs, where *key* and *value* are the prime factor of *N* and its maximal power of *key*, i.e., *N* is dividable to key^{value}. Print out all pairs in the ascending order of *key*s.

Requirement

You can't use external iteration in your program.

Sample Input　　Sample Output

Sample Input	Sample Output
18↲ 80↲ 121↲	1 2 3 6 9 18↲ 2 3↲ (2, 1) (3, 2)↲ 1 2 4 5 8 10 16 20 40 80↲ 2 5↲ (2, 4) (5, 1)↲ 1 11 121↲ 11↲ (11, 2)↲

Programing Exercise 2-2

Problem

Given a list of positive integer pairs (*M*, *N*)'s, please using Java streams to write a program to solve the following questions. You can't use external iteration in your program.

Q1: For each integer pair (*M*, *N*), transform it into a new pair (*GCD*, *LCM*), where *GCD* and LCM are the greatest common divisor and least common multiple of *M* and *N*, respectively. Print out the new list of (*GCD*, *LCM*)'s.

Requirement

You can't use external iteration in your program.

Sample Input Sample Output

72 180↵	36 360↵
100 350↵	50 700↵
13 9↵	1 117↵