LAB 11/27

1. Please write two functions “int GCD(int,int)” and “int LCM(int a,int b)” to compute the GCD and LCM of a and b. In this program, you should prompt the user input continuously until input data is CTRL+D or CTRL+Z and output the LCM of the set of number.

   Example :

   1 2 3 4 5 6 7 8 9 ➔ 2520

2. Please write two functions “bool isBaseB(long long input, int B)” and “long long B2dec(long long num,int B)”. First function should determine if “input” is B based. If “input” is B based, use B2dec to convert “num” from B based to decimal based. If not, print out “input” is not B based. You should prompt the user input continuously until input CTRL+Z or CTRL+D.

   Example :

   (121212121,3) ➔ 12301

   (121212121,2) ➔ 121212121 is not 2 base

3. Please write a function “void parse(int a3,int a2,int a1,int a0)” to find out the rational roots of

$$a_3x^3 + a_2x^2 + a_1x + a_0 = 0$$

   If there is no rational root, output “No rational solution”. You should prompt the user input continuously until input CTRL+Z or CTRL+D.

   - Rational root theorem

   (https://en.wikipedia.org/wiki/Rational_root_theorem)

   The rational root theorem states a constraint on rational solutions of a polynomial equation with integer coefficients.

$$a_n x^n + a_{n-1} x^{n-1} + \cdots + a_1 x + a_0 = 0$$

If a_0 and a_n are nonzero, then each rational solution x, when written as a fraction $x = p/q$ in lowest terms (i.e., the greatest common divisor of p and q is 1), satisfies

- p is an integer factor of the constant term a_0, and
- q is an integer factor of the leading coefficient a_n.

Example :

(2,9,10,3) ➔ -1 -3 -0.5

(3,9,10,3) ➔ No rational solution