Embedded Software Engineer Quiz

Please submit answers by creating a public repo on Github or Bitbucket and sharing the url of the repo. Please do not submit answers in any other format. There are two questions in this quiz, please see page 2 for the second question.

Q1) Consider that you have a rectangular piece of paper of arbitrary dimensions N by M (where N and M are positive integers). You also have a pair of scissors which can cut perfectly straight with no loss of paper. You wish to reduce the original piece of paper into a series of perfect squares of paper, making the largest possible squares, and using all of the paper provided. Write a function in C that takes the inputs N, and M, and returns the series of squares that can be made out of that piece of paper. No fractional squares, i.e. no square should be less than 1 in length and width.

Some examples:
Input: N =6 , M = 5
Output: 5x5, 1x1, 1x1, 1x1, 1x1, 1x1

Input: N = 1, M = 1
Output: 1x1

Input: N = 9, M = 9
Output: 9x9

Q2) Below is a link to a spreadsheet with two columns A and B such that:
➤ A is the input
➤ B is the output

Based on the spreadsheet, there exist a function such as f that relates A to B which is:

$$B_i = f(A_i)$$

Where i is the row number of the spreadsheet.
For example:

For row i = 1: $f(15840)$ = cGp
For row i = 2: $f(16465)$ = cmW
For row i = 3: $f(17941)$ = cX3

➕ Embedded Software Engineer Quiz Resource

Q2 a) First task is to find function $f(A_i)$ using these sets of points in the spreadsheet.

Q2 b) Once the $f(A_i)$ is found, what would be the output for the following inputs?
★ $f(30001) = ?$
★ $f(55555) = ?$
★ $f(77788) = ?$

Q2 c) What is the upper limit or maximum range of this function before there will be collisions or overflow?

Q2 d) The first three parts are mostly mathematical and once you find the solution, you realize you need your programming skills to solve these questions completely. Therefore, please share any code that you write in the process of solving the above problems.

Hint 1: One must have a good idea about the domain and the range of the function f.
Hint 2: There are patterns within the spreadsheet that can help you find the function f.