# Embedded Software Engineer – Quiz

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:

Bi = f(Ai)

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](https://docs.google.com/spreadsheets/d/1MmruzOui-GdlbqTF2s74VERX_5c_eT2VkXhGK5BUDUg/edit?usp=sharing)

Q2 a) First task is to find function f(Ai) using these sets of points in the spreadsheet.  
  
Solution: **f(Ai) = 857.62x + 15119**

To find the f(Ai), the scatter plot can be generated for the given data set. We can use the trendline option to generate the equation y = m\*x + b where y = f(Ai)

Q2 b) Once the f(Ai) is found, what would be the output for the following inputs?

* f(30001) = vC5
* f(55555) = N2z
* f(77788) = nlP

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

To determine the upper limit or maximum range of the function f(Ai) = 857.62\*x + 15119 before there will be collisions or overflow, we need to consider the data type used to represent the variables and the maximum values that can be represented by that data type.

Assuming that x and Ai are represented using a 32-bit signed integer data type, the maximum value that can be represented is 2^31 - 1 = 2,147,483,647.

Substituting this value into the function, we get:

f(Ai) = 857.62 \* 2,147,483,647 + 15,119 = 1.8446744 × 10^12 + 15,119 ≈ 1.8446744 × 10^12

This value is well within the range of a 64-bit floating-point data type, which has a maximum value of approximately 1.8 x 10^308. Therefore, there should not be any collisions or overflow when using this function with 32-bit signed integers

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.