**Matrices and Debugging**

During this tutorial, we’ll combine our knowledge of matrices from the Maths module and our understanding of 2D arrays to create a mini-matrix library. We’ll use functions to maximise reusability and I’ll start the session with an introduction to the debugging tools within Visual Studio to help with your code development

**1)** Join me on a Debugging journey using Visual Studio

**2)** Create a new project and create and fully test the following matrix methods using float (or double) data types. Assume 3x3 matrices throughout and use loops whenever there is repetition present.

Use **const** on any parameters whose values don’t get changed within the scope of the function. You may find it useful to perform the operations on paper first to help solidify the mathematical operations required that you will code – always understand the algorithms before coding and writing out some doodles and checks is a good way to aid that process.

* Set Identity
  + takes a single 3x3 matrix and sets it to be the identity matrix (see lecture notes)
  + Use the debugger to check this works
* Display Matrix
  + takes a single 3x3 matrix and displays it to the screen
* Add Matrices
  + takes three 3x3 matrices. The first is the result, the second and third are the matrices to add: first = second + third (see lecture notes for example method signature)
* Subtract Matrices
  + takes three 3x3 matrices. The first is the result, the second and third are the matrices to subtract: first = second – third
* Multiply Matrices
  + takes three 3x3 matrices. The first is the result, the second and third are the matrices to multiply: first = second \* third
* Copy Matrix
  + takes two 3x3 matrices. The first is the result of copying items from the second matrix: first = second

**3)** Using the functions above, write a basic matrix calculator that allows the user to enter matrix data and perform simple calculations. You’ll need some form of menu system to allow the user to choose what operation they want to do and maintain at least three matrices the user can manipulate. You have just covered matrices in maths (OK, those are largely 2x2 matrices, but the maths is the same) so think about what and how the application would be used to allow you to easily check your calculations done by hand.