Embedded Systems has many characteristics. One of them is Complex Algorithms. The operations performed by the microcontroller may be very sophisticated. We want to use the PIC18 to perform a complex task such as multiplying a matrix by a vector or by another matrix.

Suppose that all data are less than 16 and they are distributed into two arrays A and B and one vector. In this homework,

1. You have to store the arrays in the ROM and then copy them into any contiguous memory space, (I mean the array layout is up to your assumptions and must be used for all arrays)
2. Create a subroutine to copy the data from the ROM to SFR
3. Define one subroutine to multiply a matrix by a vector according to the following equations.
   \[ z = A \times y \]
   by using indirect mode to access the array through FSR
4. How many instruction cycles are in your program?
5. What is the total size of your program in Bytes?

\[
A = \begin{bmatrix}
3 & 12 & 6 \\
7 & 9 & 11 \\
13 & 5 & 1
\end{bmatrix}
\]

\[
y = \begin{bmatrix}
9 \\
6 \\
11
\end{bmatrix}
\]