1. (10 pts) Write Matlab commands to create a $73 \times 73$ matrix that has entries 1 on the main diagonal, 0 off the main diagonal, but which has the $2 \times 2$ matrix

$$\begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix}$$

in its lower right corner.

2. (10 pts) Suppose that a matrix $M$ is $47 \times 3$. Write a Matlab command or commands to plot the last two columns of the matrix as the $y$ axis data on a single plot region, using the first column as the $x$ axis data.

3. (10 pts) Given a number $x_0 \geq 1$ denoted in Python by $x0$, write a sequence of Python commands that computes and prints the smallest integer $k$ for which $2^k$ is greater than or equal to $x_0$. This does not need to be a function.
4. (5 pts) Write Python commands to create a string called \texttt{errstr} that says e.g. “The error is 0.0017”, but where the number 0.0017 is actually the value of a variable called \texttt{myerror}. The display of \texttt{myerror} must always be a floating point number with four digits of precision.

5. (15 pts) Write a Matlab \textit{function} called \texttt{nonnegative} that takes a single array argument, and returns a vector with the same positive entries, but in which all the negative entries are replaced by zero. E.g., if \texttt{vec=[1 -1 4.5]}, and \texttt{newvec=nonnegative(vec)}, then \texttt{newvec=[1 0 4.5]}. 