For the following problems you may NOT use any Matlab builtin function (unless it is explicitly stated) or language structure (such as for, if, etc.)

1. Write a one-line Matlab command that yields 1 if a 2D matrix, A, has at least one complex entry (i.e. $x + yi$), and 0 otherwise.

2. Write an anonymous, one-line, Matlab function ($\text{stirling} = @(X)\ldots$) that computes the Stirling’s approximation for factorials. Your function must work for either a scalar or any multidimensional matrix $X$. If the input is a matrix, then your function must approximate the factorial of each of its elements. The Stirling’s approximation to $n!$ is given by

$$n! \approx \sqrt{2\pi n} \left(\frac{n}{e}\right)^n$$

where $e = 2.71828\ldots$

3. The Pascal matrix, $S$, is a $p \times p$ square matrix containing the binomial coefficients as its elements, i.e.

$$S_{ij} = \binom{n}{r} = \frac{n!}{r!(n-r)!}$$

where $n = i + j$ and $r = i$. In other words:

$$S_{ij} = i+j\binom{i+j}{i} = \frac{(i+j)!}{(i)!(j)!}$$

where $i$ and $j$ are the row and column zero-based indexes respectively, e.g., $0 \leq i \leq p - 1$ and $0 \leq j \leq p - 1$.

Write a Matlab function that receives a single, scalar number $p$, and generates the $p \times p$ square Pascal matrix. (Hint: Use your \text{stirling} function to approximate factorials in your computation).