Assignment 2

Q1. **(33 points)** Gabor filters are renowned for their functional equivalence to simple orientation-specific cells in primary visual cortex. I want you to design complex cells that can recognize (a) triangles and (b) squares using a bank of orientation-selective 2D Gabor filters.

Q2. **(33 points)** Once you have complex cells identifying triangles and squares, I want you to simulate the visual search paradigm of Triesman (1980), where the task is to find the odd stimulus in a set of objects. In our case, the objects will be red or blue in color and triangles or squares in shape. Simulating the paradigm means being able to enter the number of objects and experiment type (feature/conjunction) as parameters and obtain image frames containing objects with these features as output.

Q3. **(34 points)** Once this paradigm is ready, I want you to implement a simple version of feature integration theory, viz. assume there is a matrix each for color and shape information, and that responses must be delayed until information from all relevant stores has been retrieved. Can add timers and delays appropriately to simulate neural processing delays. As output, I want graphs of response time versus number of objects in both feature and conjunction search conditions.