Exercise *Computer Vision (CSCI 4220U)*

Please hand in this paper to the instructor before the end of the lecture.

Name: _____

Student number: _____ Date: _____

Q. Given an input image of size 5×5 and a kernel of size 3×3 with a stride of 1, how large will the output feature map be?

Q. A convolutional layer has 32 filters, each of size 3×3 applied to an input with 3 channels (RGB image). How many trainable parameters are in this layer?

Q. Consider a 1D vector $\mathbf{x}$ that is laid out in memory. The vector has 64 elements. We use the 0-based indexing to index the various elements of this vector, i.e., $\mathbf{x}[8]$ refers to the 7^{th} element. Write a procedure to implement an *unflatten* operation that constructs a 16×4 2D array $\mathbf{x}'$ that can be passed into a CNN. Elements in this array are indexed as $\mathbf{x}'[i][j]$ where $i \in [0, 15]$ and $j \in [0, 3]$.