Q. Assume the following matrix presents an image that we want to classiffy.

$$image = \begin{bmatrix} 0 & 1 & -1 & 0 & 1 & 1 \\ 0 & 1 & -1 & 1 & 1 & 1 \\ 1 & 1 & -1 & 0 & 0 & 1 \\ 1 & -1 & 0 & 1 & 1 & 0 \end{bmatrix}$$

1) Assume we have trained a convolutional neural network with the below filter and now we want to apply the convolutional operator on the image using this filter, with zero padding, stride=1, what will be the outcome?

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

2) Apply a ReLU layer on the output of the convolutional layer, write the output.
3) Apply a max pooling layer using the same 2 by 2 filter size and write the output.
4) Draw a fully connected layer at the end of the pooling layer that classifies the image into 3 different class labels, e.g. dogs, cats, birds. (no computation needed for this question just draw the nodes and the connections with the output layer.)