# Assignment 4: Implementing CNN

## Padding

Padding adds extra border pixels (typically zeros) around the input map before convolution, preventing edge information loss and controlling output size.
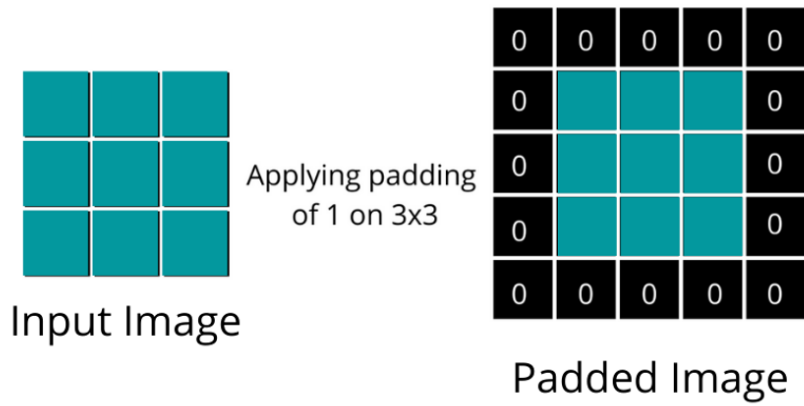


Figure 1: Padding

## Strides

In convolutional neural networks, strides define the step size by which the filter (kernel) moves across the input feature map during convolution.
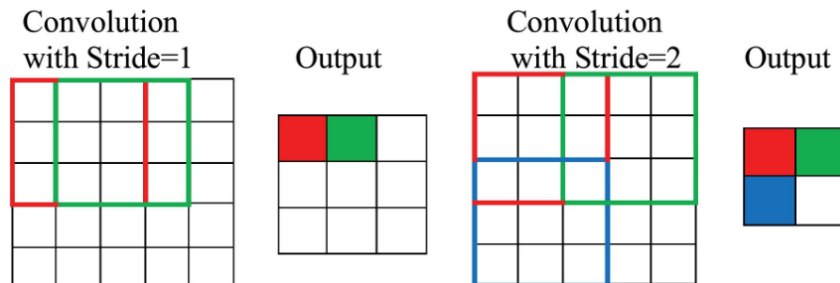


Figure 2: Strides

The following formula lets you map the output to the input with strides and padding.

$$\text{Output Size} = \left\lfloor \frac{\text{Input Size} + 2 \times \text{Padding} - \text{Kernel Size}}{\text{Stride}} \right\rfloor + 1$$

- Input Size: The height or width of the input feature map.

- Padding: The number of zero-padding layers added to the input borders.

- Kernel Size: The height or width of the convolutional filter.

- Stride: The step size by which the filter moves.

- $\lfloor \cdot \rfloor$: The floor function, rounding down to the nearest integer.

Implement the following CNN in Figure 3 using Tensorflow. Make the following assumption:

- Number of the classes at the output layer are 10.

- Assume the activation function is 'ReLu' for all the layers, but 'softmax' for the output layer.

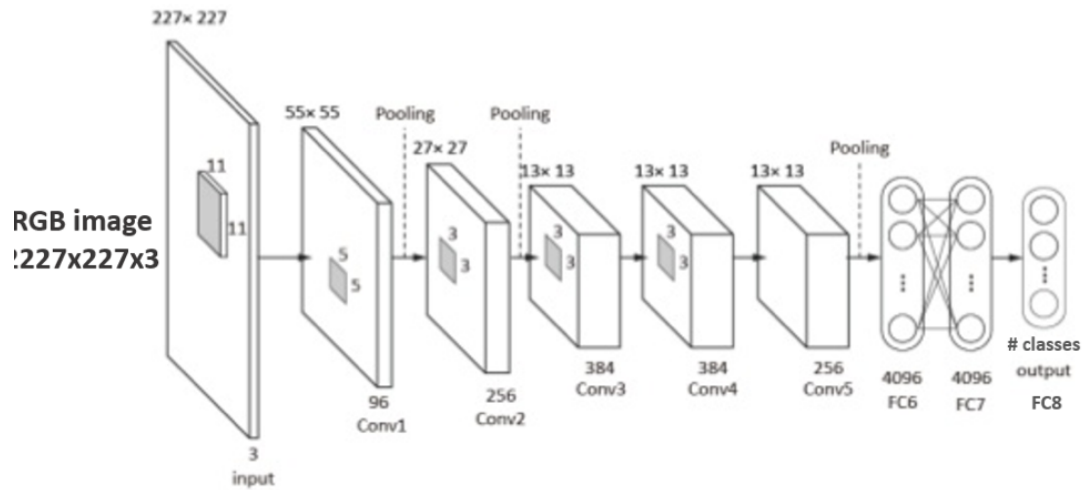- Assume the pooling layers are max pooling with 3x3 layers.



Figure 3: CNN