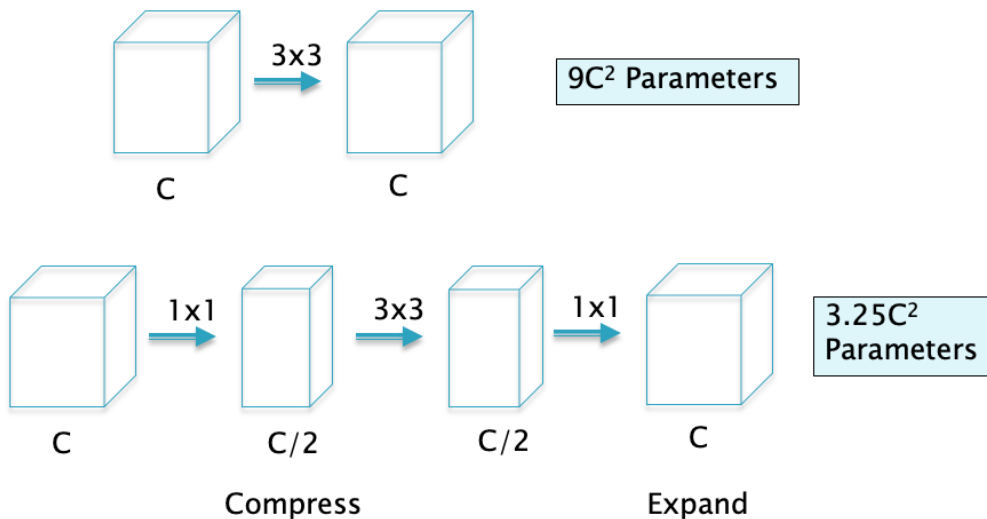


## Deep Learning Assignment 3

1. Consider a ConvNet composed of 3 convolutional layers, each with  $3 \times 3$  Filters. The first layer has 100 Activation Maps, the middle layer has 200 and the last layer has 400 Activation Maps. The input images are RGB images of  $200 \times 300$  pixels.
  - a. What are the total number of parameters in the ConvNet?
  - b. Assuming a stride of 1, compute the size of the Layer 1, 2 and 3 Activation Maps.
  - c. If the Layer 2 and Layer 3 Activation Maps are constrained to be of the same size as that of Layer 1, what is the zero padding  $P$  required (assume stride = 1)?

(10 points)

2.



- a. The figure shows the use of  $1 \times 1$  filters in order to reduce the number of parameters in the model. Verify that the number of parameters reduces to  $3.25C^2$  for this model (you may ignore the bias parameters for this calculation).
- b. Compare the number of computations required in both the figures to check whether smaller filters are also effective in making the models run faster.

(10 Points)

**3. Download the MIT Flowers dataset from: <https://goo.gl/EgJVXZ>.**

- a. Use the procedure describe in Lecture 5, to feed this data into a ConvNet that classifies the images into the various flower types.**
- b. Use Transfer Learning with the MobileNet model (available in Keras) to speed up the training process. Use Method 1 (see page 35 of Lecture 10) to do the Transfer Learning. Freeze all the layers in MobileNet, except for the last (logit) layer.**

**(20 Points)**