1.Explain convolutional neural network, and how does it work?

Convolution is **a mathematical operation that allows the merging of two sets of information**. In the case of CNN, convolution is applied to the input data to filter the information and produce a feature map. This filter is also called a kernel, or feature detector, and its dimensions can be, for example, 3x3

2. How does refactoring parts of your neural network definition favor you?

Unlike with traditional code refactoring, DNN refactoring does not guarantee functional equivalence of the two networks, but rather it **aims to preserve the accuracy of the original network while producing a simpler network that is amenable to more efficient property verification**.

3. What does it mean to flatten? Is it necessary to include it in the MNIST CNN? What is the reason for this?

flatten function **flattens the multi-dimensional input tensors into a single dimension**, so you can model your input layer and build your neural network model, then pass those data into every single neuron of the model effectively. You can understand this easily with the fashion MNIST dataset.

4. What exactly does NCHW stand for?

NCHW stands for: **batch N, channels C, depth D, height H, width W**. It is a way to store multidimensional arrays / data frames / matrix into memory, which can be considered as a 1-D array.

5. Why are there 7\*7\*(1168-16) multiplications in the MNIST CNN& third layer?

6.Explain definition of receptive field?

The receptive field encompasses the sensory receptors that feed into sensory neurons and thus includes specific receptors on a neuron as well as collectives of receptors that are capable of activating a neuron via synaptic connections.

7. What is the scale of an activation&#39;s receptive field after two stride-2 convolutions? What is the reason for this?

8. What is the tensor representation of a color image?

The RGB color image is seen as a **3rd-order tensor** to exploit the spatial and interchannel correlation, so that blurring effects are captured more robustly.

9. How does a color input interact with a convolution?

When RGB image is used as input to CNN, **the depth of filter (or kernel) is always equal to depth of image** (so in case of RGB, that is 3). So, If 32x32x3 is the input image, the filter has to be NxNx3 (where N is height and width of filter like 3x3x3). Therefore, the filter has 3 two dimensional matrices.