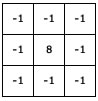
1. What exactly is a feature?

**Ans : A feature is a distinctive trait or a special attraction. Feature can also mean to give special attention to something. The word feature has several other senses as a noun and a verb. A feature is a unique quality or characteristic that something has.**

2. For a top edge detector, write out the convolutional kernel matrix.

**Ans : Only thing is that they have separate components for horizontal and vertical lines. A way to "combine" the results is to merge the convolution kernels. The new image convolution kernel looks like this:**

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3. Describe the mathematical operation that a 3x3 kernel performs on a single pixel in an image.

**Ans : In image processing, a kernel, convolution matrix, or mask is a small matrix used for blurring, sharpening, embossing, edge detection, and more. This is accomplished by doing a convolution between the kernel and an image. we have three filters, again of size 3x3 . So that's 3\*3\*3 = 27 outputs. Multiplying our two inputs by the 27 outputs, we have 54 weights in this layer. Adding three bias terms from the three filters, we have 57 learnable parameters in this layer**

4. What is the significance of a convolutional kernel added to a 3x3 matrix of zeroes?

**Ans : The filter studies successively every pixel of the image. For each of them, which we will call the “initial pixel”, it multiplies the value of this pixel and values of the 8 surrounding pixels by the kernel corresponding value. Then it adds the results, and the initial pixel is set to this final result value.**

5. What exactly is padding?

**Ans : Padding is the space that's inside the element between the element and the border. Padding goes around all four sides of the content and you can target and change the padding for each side (just like a margin).**

6. What is the concept of stride?

**Ans : Stride is a parameter of the neural network's filter that modifies the amount of movement over the image or video. For example, if a neural network's stride is set to 1, the filter will move one pixel, or unit, at a time.**

7. What are the shapes of PyTorch's 2D convolution's input and weight parameters?

**Ans : The ordering of the dimensions in the inputs. channels\_last corresponds to inputs with shape (batch\_size, height, width, channels) while channels\_first corresponds to inputs with shape (batch\_size, channels, height, width) . It defaults to the image\_data\_format value found in your Keras config file at ~/. Conv2d.weight (Tensor) – the learnable weights of the module of shape.**

8. What exactly is a channel?

**Ans : Typically, a "channel" refers to a certain component that defines pixel values in a digital image. A color image, for example is an aggregate of three channels (red, green and blue). The color data of an image is stored in three arrays of values, known as channels.**

9.Explain relationship between matrix multiplication and a convolution?

**Ans : domain, you simply multiply the signal(X)-which is matrix with Signal(Y), which is also a matrix. So, now you will be able to understand that, Yes convolution is same as matrix multiplication (where matrix X and Y matrix of signal) but ONLY IN FREQUENCY DOMAIN**