Task 1

a)

Sampling is the extraction process used to transform a continuous signal to a discrete one from a subset of point measures.

b)

Quantization can be seen as a type of sampling in the amplitude domain, in digital images, this would mean the discretization of the intensity of the channels.

c)

An image with high contrast has a lot of values on both extremes of the spectrum, that is, the variance of the histogram distribution is high.

d)

In notebook

e)

The dynamic range is compressed, since low intensities are widened and high squeezed. That is, dark pixels become brighter and bright pixels become dimmer.

f)

Task 3

b)

Hyperparameter are network parameters that can not be learned in the training process unlike neurons weights and biases. Examples of them in FCNNs are the learning rate, the number of layers and the size of each one.

c)

Softmax is used because it can be used to normalize neural networks numerical output values, converting them from weighted sum values to probabilities that add up to one. In this way, object classification networks can output the highest probability object and the confidence they have on it as a percentage.