1. Instructions
   • Implement the following problems in Python or MATLAB.
   • Do not copy code from any source.
   • Submit the Assignment in the Google Classroom within the deadline and also write down the conclusion.
   • The assignments will be evaluated during lab hours.

2. **Problems:**

1. Up-sample and down-sample the image of Figure 1 by scale factor 4. Discuss the effect of changing sampling rate. Also observe the effect of different quantization levels ($L = 2, 4, 8, 16, 32, 64, 128, 256$) for this image. (Figure 1 image : fig1.jpg)

Figure 1

2. Consider Fig.2 and remove the larger object from the image. [Hint: Create a mask and apply arithmetic operation].
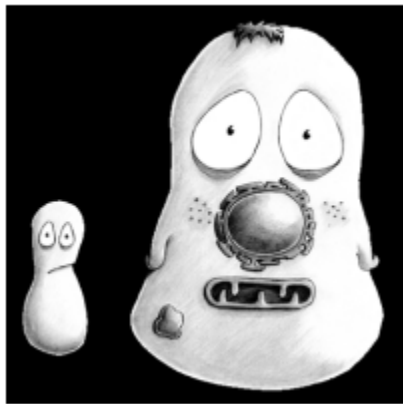

Figure 2

3. Load the image shown in Fig.3. Examine the distinct intensity levels that the image has. Consider each of the intensity levels as a random variable, and compute the probabilities of each of the intensity levels. Plot the computed probabilities with respect to the intensity levels. Now, add constant value 100 with the image of Fig.3, and plot the probabilities with respect to the intensity levels. Observe the difference between two plots. What kind of arithmetic operation on the image would shift the probability distribution towards the left? If you down-sample the given image by a factor 2, and plot the probability distribution – what will happen?

Figure 3