TD3 - Image Codec - (part 1)

Professor: Marc Antonini (am@i3s.unice.fr)

Lab assistant: Anca Grapa (agrapa@i3s.unice.fr)

The purpose of this lab session is the implementation of first steps towards building an image codec. In that sense, you will use the concepts acquired during the first 2 lab sessions (TD), namely the **scalar quantization** and **Haar wavelet transformation** (or Laplacian Pyramid) to perform the following steps:

- Use Haar wavelet transformation to obtain 2 decomposition levels of "lena.jpg" image (see TD 2).
- Quantize each subband choosing a different quantization step (do not quantize the low frequency image) (see TD 1). Justify your choice.
- Compute the **Shannon entropy** (formula in TD 1) in each subband, and the total entropy (for the quantized and non-quantized decomposition versions) to obtain the total entropy compression ratio between the versions, for each configuration of the quantization step.
- By performing steps 1 and 2, you manage to obtain a compressed image. Recall the synthesis of the input image from Haar wavelet coefficients in order to perform a reconstruction of "lena.jpg"(both quantized and non-quantized versions). Measure the distortion D between these versions using **Peak Signal-to-Noise Ratio (PSNR)**.