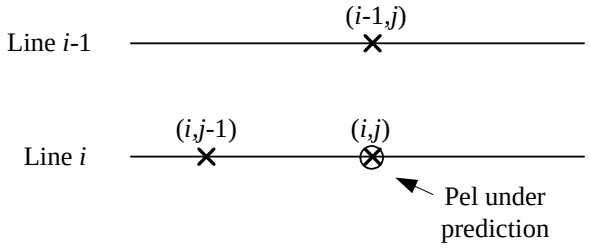
# Project 6 DPCM

1), DPCM-encode the Sinan, Bookshelf1 and Elif images using a two-tap predictor of the form $\hat{x}_{i,j} = a_1 \times x_{i,j-1} + a_2 \times x_{i-1,j}$, see EQ (11.34 & 11.35) in the textbook page 334. You can use the predictor in dpcm_enc.c program.




2), Apply a four-level Max quantizer and a five-level Max quantizer to the result of your DPCM- encoded image. The quantizer used here is a Laplacian Quantizer, because we consider the pixel- to-pixel difference of an image as a Laplacian variable.

For zero mean and unit standard deviation
A 4-level Max quantizer for Laplacian distribution:
the boundary (input) values are -1.1269, 0, 1.1269
the reconstructed (output) values are -1.8340, -0.4198, 0.4198, 1.8340

A 5-level Max quantizer for Laplacian distribution:
the boundary (input) values are -1.5467, -0.4198, 0.4198, 1.5467
the reconstructed (output) values are -2.2538, -0.8395, 0, 0.8395, 2.2538

3) Write the output of the quantizer into a file, and let it be as the input file of huff_enc.c, to implement the Huffman coder. Compute the PSNR in dB and rate (in bits per pixel) for each case. $PSNR = 10\log_{10}\frac{(255)^2}{MSQE}$ for 8 bit PCM.
Show the original, reconstructed and error images.