2023 Spring VLSI DSP Homework Assignment #3

Due date: 2023/4/11

For a 3-level discrete wavelet transform (DWT) described in HW assignment, please conduct fixed point simulations to determine the DWT word length for the following items. Assume a floating-point version IDWT is used to reconstruct the image (same as the one given in Hw2), the PSNR (peak signal to noise ratio) of the reconstructed image should be no less than 50dB. Please use as small word length as possible to achieve this goal.

- The word length of the filter coefficients, all coefficients should have the same word length
- The word length (integer and fractional) of the filter outputs at each level, i.e., level 1, 2 and 3 of DWT
- Use synthesis tool and 90nm process technology to obtain the area of each multiplier, adder, and register