(Assigned on 3/24, due on 3/31)

7.2 Construct a fully populated approximation pyramid and corresponding prediction residual pyramid for the image.

$$f(x,y) = \begin{bmatrix} 1 & 2 & 3 & 4 \\ 5 & 6 & 7 & 8 \\ 9 & 10 & 11 & 12 \\ 13 & 14 & 15 & 16 \end{bmatrix}$$

Use a 2×2 block neighborhood averaging for the approximation filter in Fig. 7.2(b) and assume the interpolation filter implements pixel replication.

7.6 Compute the coefficients of the Daubechies synthesis filters $g_0(n)$ and $g_1(n)$ for Example 7.2. Using Eq. (7.1-13) with m=0 only, show that the filters are orthonormal.

7.13 Draw wavelet $\psi_{3,3}(x)$ for the Haar wavelet function. Write an expression for $\psi_{3,3}(x)$ in terms of Haar scaling functions.

7.16 The DWT in Eqs.(7.3-5) an d(7.3-6) is a function of starting scale j_0.
(a) Recompute the one-dimensional DWT of function f(n)={1,4,-3,0} for $0 \le n \le 3$ in Example 7.8 with $j_0=1$ (rather than 0).
(b) Use the result from (a) to compute f(1) from the transform values.

7.19 Draw the FWT filter bank required to compute the transform in Problem 7.16. Label all inputs and outputs with the appropriate sequences.