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

*7.3 Given a $2^J \times 2^J$ image, does a $J + 1$-level pyramid reduce or expand the amount of data required to represent the image? What is the compression or expansion ratio?

7.15 Compute the first four terms of the wavelet series expansion of the function used in Example 7.7 with starting scale $j_0 = 1$. Write the resulting expansion in terms of the scaling and wavelet functions involved. How does your result compare to the example, where the starting scale was $j_0 = 0$?