

Name: _____

COL7(6)83 Quiz 7

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1. Explain why the unit box function on $[-\frac{1}{2}, \frac{1}{2}]$, i.e. $f(x) = \begin{cases} 1 & -\frac{1}{2} \leq x \leq \frac{1}{2} \\ 0 & \text{otherwise,} \end{cases}$ cannot be used as the scaling function in a wavelet transform. (Hint: Show that $V_0 \not\subset V_1$.)

2. Consider an image where half the pixels have intensity 0, and the other half have intensities uniformly distributed between 1 and 255. Thus, $P(0) = \frac{1}{2}$, $P(1) = P(2) = \dots = P(255) = \frac{1}{510}$. What is the entropy of this distribution? You may approximate $\log_2 \frac{1}{510} \approx \log_2 \frac{1}{512} = -9$.