Problem 2.1: The signal $x(t)$ shown in Figure 1 is the input to a system whose output $y(t)$ is a time-transformed version of the input, according to the input-output relationship $y(t) = 2x(1-t)$. Use a straightedge to sketch the output $y(t)$. Label both axes and all important features. Show the origin for context. Answer the following questions to help you arrive at the correct sketch:

(I.) The vertical edge of the input is at $t = 0$. To what value of t does this edge get mapped after the transformation?

(II.) Consider the elbow of the input signal occurring at $t = 1$. To what value of t does this elbow get mapped after the transformation?

(III.) Consider the elbow of the input signal occurring at $t = 2$. To what value of t does this elbow get mapped after the transformation?

Problem 2.2: Consider the periodic signal $g[n]$ shown in Figure 2.

(a) Choose four values of N, two positive and two negative, such that $g[n] = g[n-N]$.

(b) What is the fundamental period of $g[n]$?

(c) What is the fundamental frequency of $g[n]$?

Problem 2.3: Consider the signal $h[n] = \begin{cases} \sin(\pi n/6), & 0 \le n < 6 \\ 0, & \text{else} \end{cases}$. Use a straightedge to make two separate stem plots of the even and odd parts of $h[n]$. Label all axes and all important features. Show the origin for context.

Problem 2.4: Use a straightedge to draw one signal that possesses all of the following four properties: (1) It is discrete. (2) It is odd. (3) It has a total energy of $E_\infty = 4$. (4) It has zero power averaged over all time. Label both axes and all important features. Show the origin for context.

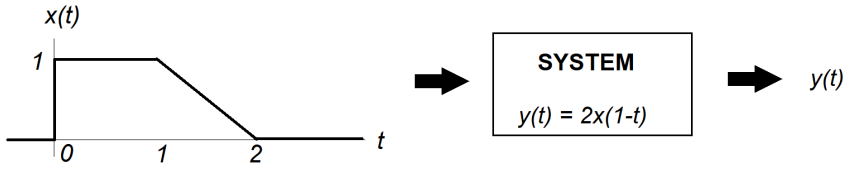

Figure 1

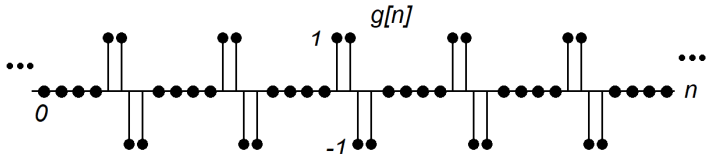

Figure 2

Optional, but Testable, Problems: From the textbook, Problems 1.15, 1.21 (a,b,c,d), 1.22 (a,b,c,d), 1.23, 1.24 .