# Assignment #1

Signals and Systems for Computer Engineering

1- Consider the discrete-time system shown in the figure below where x[n] is the input and y[n] is the output.

a) Express the difference equation that determines the relationship between y[n] and x[n]

b) Find the impulse response (h[n]) of the system.

c) Find the step response of the system and draw it for n=0...9

   (z^{-1} represents the unit delay)
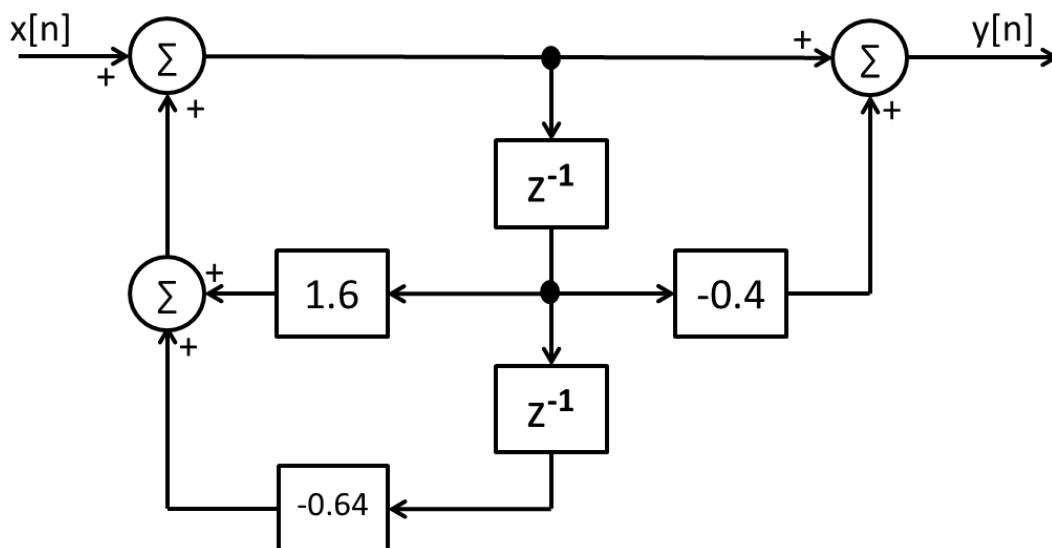
2- An audio record sample (music) is provided in the attached file named as "africa.wav". Sampling rate of this 16bit mono recorded file is 44100Hz. Write a Python code that performs "fade out" function and deletes the remaining part of the record after the fade out duration. Processed audio data will be written into a file named as "africaN.wav" where N will denote your student number. User will choose two instants (as input from the user interface) in terms of seconds in the initial audio file. The first will be starting instant of the fade out. The second will indicate the fading out duration that will also determine the ending instant of the processed file. Fade out function will be linear. User will not be able to select fade out duration that exceeds the end of initial record with respect to chosen fade out start instant.