UNIVERSITY OF CALIFORNIA, RIVERSIDE
Department of Electrical Engineering

WINTER 2025

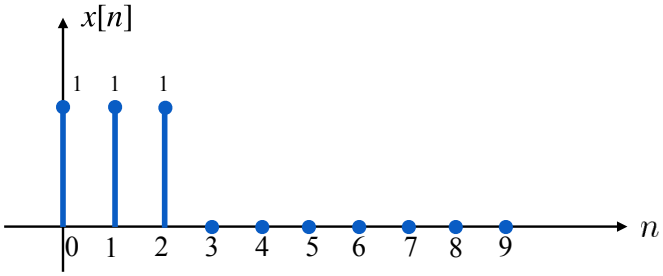
EE110B-SIGNALS AND SYSTEMS

HOMEWORK 4

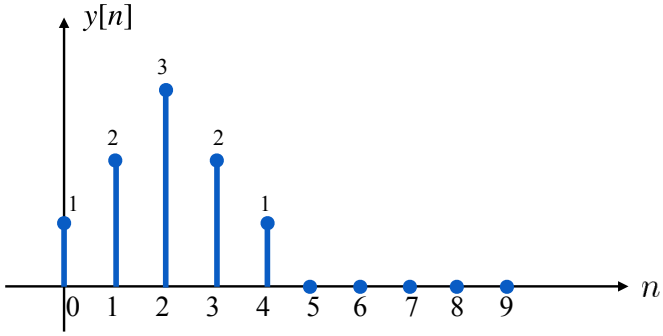
Please turn in by Friday, February 14th, 2025, 11:59pm.

Problem 1:

a) Find the DTFS coefficients a_k of the signal $x[n]$ below. The period is $N = 10$ and only one period is shown.

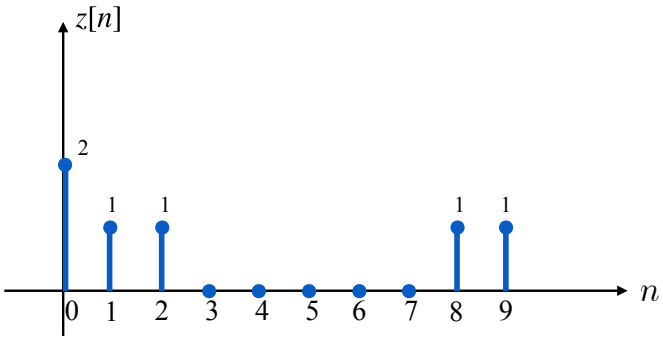


b) Now consider the signal $y[n]$ whose one period is shown below, and find its DTFS coefficients b_k.



Hint: Express $y[n]$ in terms of $x[n]$ and relate b_k to a_k.

c) Finally, let one period of the signal $z[n]$ be given as below. Find the DTFS coefficients c_k.



Hint: Express $z[n]$ in terms of $x[n]$ and $x[-n]$, and relate c_k to a_k.

Problem 2: Find the discrete-time Fourier series expansion of the periodic signal

$$x[n] = \sum_{k=-\infty}^{\infty} \delta[n - 10k] \; .$$