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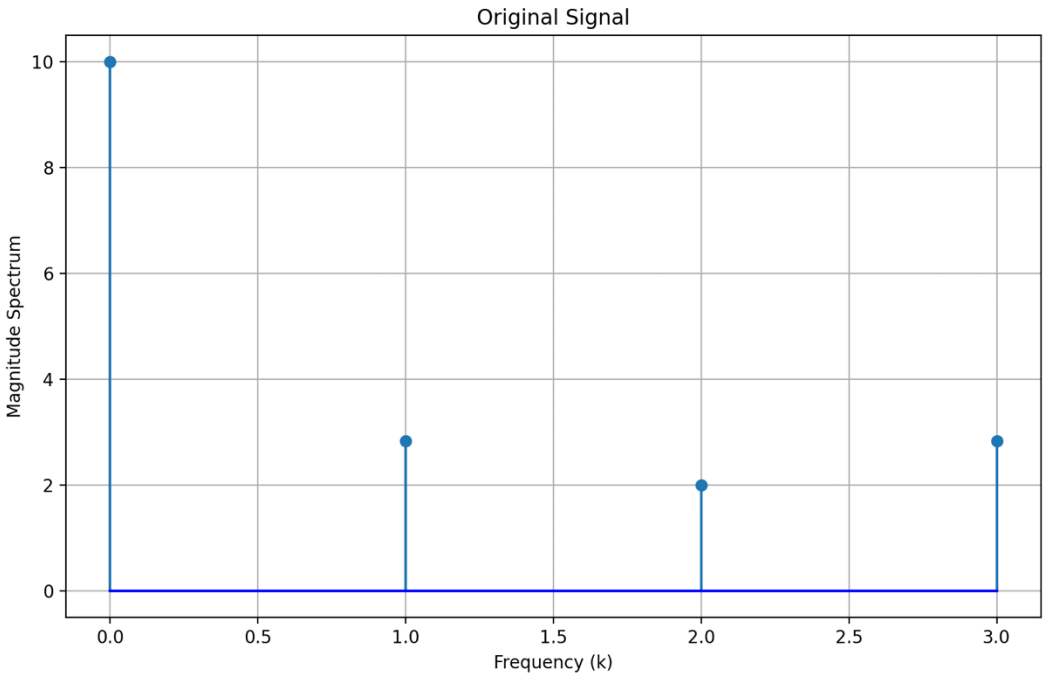
Experiment 3	
AIM:	The aim of this experiment is to study magnitude spectrum of the DT signal.
OBJECTIVE:	1. Develop a function to perform DFT of N point signal 2. Calculate DFT of a DT signal and Plot Spectrum of Signal. 3. Calculate the effect of zero padding on magnitude spectrum
PROBLEM DEFINITION:	(1) Take any four-point sequence x[n]. Find DFT X[k]. Plot Magnitude Spectrum. (2) Append the input signal by four zeros. Find DFT and plot Magnitude Spectrum Give your conclusion. (3) Expand the input signal by inserting alternate zero. Find DFT and plot Magnitude Spectrum Give your conclusion.
INPUT SPECIFICATIONS	**1.** Length of first Signal N 2. DT Signal values

EXPERIMENTATION AND RESULT ANALYSIS

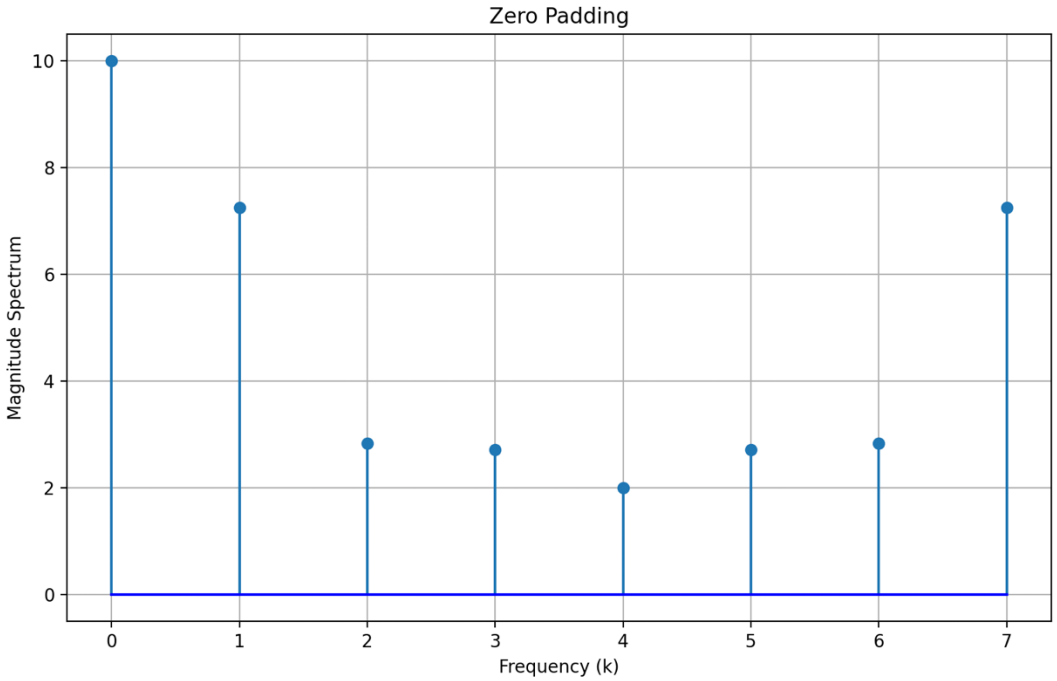
CASE 1: To find DFT of 4 point sequence

Input x[n] = { 6,7,8,10 } Length L= 4



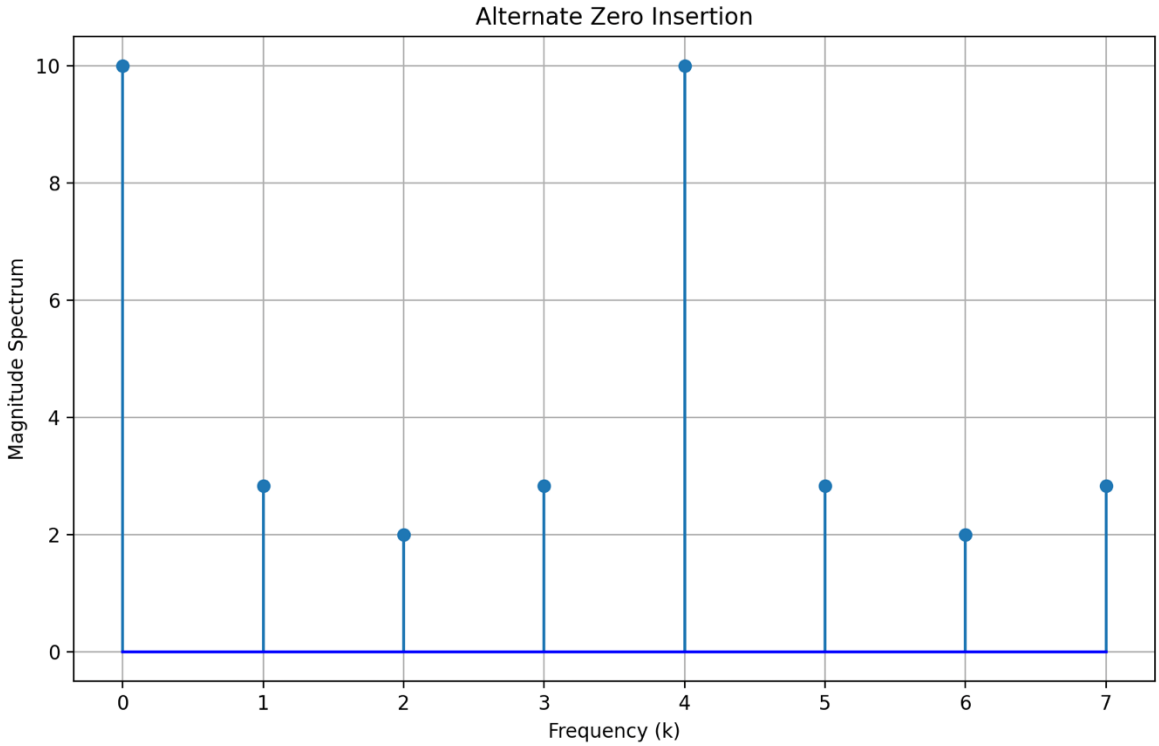
CASE 2: To find DFT of zero padded signal

Input x[n] = { 6,7,8,10 } Length L= 4



CASE 3: To find DFT of expanded signal

Input x[n] = { 5,6,7,8 } Length L= 4



CONCLUSION:

1. DFT converts sequence from Time Domain to Frequency Domain
2. DFT Converts N samples from time domain to N coefficients in frequency domain
3. Frequency domain coefficients are separated by w = 2 π / N
4. When Length of Signal N increases, a) Frequency spacing decreases b) Error in representation of spectrum decreases c) Resolution of the spectrum increases (i.e. Number of points per unit Length) and so the accuracy in representation of the spectrum increases
5. When the signal is expanded in time domain, spectrum is compressed in frequency domain. That means,

Expansion in the time domain by a factor corresponds to the compression of the signal in the Frequency domain by the same factor.