%IDFT

clc;

clear;

close all;

xk = input('Enter the IDFT sequence: ');

N = input('Enter number of points in IDFT: ');

xk = [xk zeros(1, N - length(xk))];

n = 0:N-1;

k = 0:N-1;

wn = exp(1i \* 2 \* pi / N);

xn = (xk \* (wn .^ (k' \* n))) / N;

disp('IDFT:');

disp(xn);

figure;

subplot(3, 2, 1);

stem(k, xk, 'filled');

xlabel('Frequency (k)');

ylabel('Amplitude');

title('IDFT Sequence');

subplot(3, 2, 2);

stem(n, real(xn), 'filled');

xlabel('Time (n)');

ylabel('Amplitude');

title('Real Part of IDFT');

subplot(3, 2, 3);

stem(n, imag(xn), 'filled');

xlabel('Time (n)');

ylabel('Amplitude');

title('Imaginary Part of IDFT');

subplot(3, 2, 4);

stem(n, abs(xn), 'filled');

xlabel('Time (n)');

ylabel('Amplitude');

title('Magnitude Spectrum');

subplot(3, 2, 5);

stem(n, angle(xn), 'filled');

xlabel('Time (n)');

ylabel('Phase (Radians)');

title('Phase Spectrum');