%DFT

clc;

close all;

clear;

xn = input('Enter the input sequence: ');

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

N1 = length(xn);

xn = [xn zeros(1, N - N1)];

n = 0:N-1;

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

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

figure;

subplot(3, 2, 1);

stem(n, xn, 'filled');

xlabel('n (Time)');

ylabel('Amplitude');

title('Input Sequence');

subplot(3, 2, 2);

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

xlabel('k (Frequency)');

ylabel('Amplitude');

title('Real Part of DFT');

subplot(3, 2, 3);

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

xlabel('k (Frequency)');

ylabel('Amplitude');

title('Imaginary Part of DFT');

subplot(3, 2, 4);

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

xlabel('k (Frequency)');

ylabel('Magnitude');

title('Magnitude Spectrum');

subplot(3, 2, 5);

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

xlabel('k (Frequency)');

ylabel('Phase (Radians)');

title('Phase Spectrum');