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% DFT Using Direct Method
clear all;
close all;
clc;

N=input('enter the number of samples:');
xn=input('Enter the input sequence:');
L=length(xn);

% Zero padding if needed
if(N<L)
    error('N should be greater than L');
end

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

% DFT calculation
for k=0:1:N-1
    for n = 0:N-1
        xk(k+1) = xk(k+1) + xn(n+1) * exp((-1j * 2 * pi * k * n )/ N);
    end
end

% Show final Y(N) matrix (combined real + imaginary)
disp('Final DFT result (X(k)):' );

```

Final DFT result (X(k)):

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disp(xk);
```

```
25.0000 + 0.0000i -5.0000 + 4.0000i -3.0000 - 0.0000i -5.0000 - 4.0000i
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k = 0:N-1;

subplot(3,1,1);
stem(k,real(xk),'b','LineWidth',1.5);
hold on;
stem(k,imag(xk),'r--','LineWidth',1.5);
xlabel('k');
ylabel(['X(k')]);
title('Fig 1: DFT (Blue=Real , Red=Imag)');
legend('Real','Imag');
grid on;

subplot(3,1,2);
stem(k,abs(xk),'m','LineWidth',1.5);
xlabel('k');
ylabel('magnitude of X(k)');
title('magnitude plot of given sequence');
grid on;

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subplot(3,1,3);
stem(k,angle(xk),'k','LineWidth',1.5);
xlabel('k');
ylabel('Angle of X(k)');
title('phase plot of given sequence x(n)');

```

