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Pre Lab 7

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```
clear
```

Implement

```
x = [ 5 ; 10 ; -2 ; 1 ; 3 ] ;  
[ y , inv ] = dft( x ) ;  
disp( 'DFT of x' )  
disp( y )  
disp( 'Inverse DFT' )  
disp( inv )
```

Function

```
function [ y , inv ] = dft( x )  
% Performs a discrete fourier transform of x where x is a column  
% vector  
  
%defining variables for use in the function  
n = length( x ) ;  
w = exp(i*2*pi/n) ;  
  
%Creates the Fn matrix for transforming x  
for ii = 1:n  
    for jj = 1:n  
        Fn(ii,jj) = (1/sqrt(n)) * w^((ii-1)*(jj-1)) ;  
        Fn_i(ii,jj) = (1/sqrt(n)) * w^((ii-1)*(jj-1)) ; %inverse  
transform matrix  
    end  
end  
  
%Using the matrix to transform x  
y = Fn*x ;  
inv = Fn_i*x ;  
end  
  
DFT of x  
    7.6026 + 0.0000i  
    4.3944 + 2.1887i  
   -2.6056 + 3.1160i  
   -2.6056 - 3.1160i
```

$$4.3944 - 2.1887i$$

Inverse DFT

$$7.6026 + 0.0000i$$

$$4.3944 + 2.1887i$$

$$-2.6056 + 3.1160i$$

$$-2.6056 - 3.1160i$$

$$4.3944 - 2.1887i$$

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