a1 = input('Enter sequence 1: ');  
a2 = input('Enter sequence 2: ');  
y = correlate(a1,a2);  
disp(a1);  
disp(a2);  
disp(y);  
  
function res = correlate(x,y)  
l = length(x);  
m = length(y);  
y = y(m:-1:1);  
x = [x,zeros(1,m-1)];  
res = zeros(1,l+m-1);  
for i = 1:m-1  
    for j = 1:i  
        res(i) = res(i) + y(j)\*x(i-j+1);  
    end  
end  
for i= m:l+m-1  
    for j = 1:m  
        res(i) = res(i) + y(j)\*x(i-j+1);  
    end  
end  
  
  
  
close all  
clear all  
xrect = abs([-20:20])<10;  
result = correlate(xrect,xrect);  
subplot(311),stem(xrect);  
title('Rectangular pulse');  
xlabel('n'),ylabel('x\_{rect}[n]');  
subplot(312), stem(result);  
title('Auto-correlation function of x\_{rect}[n]');  
xlabel('k'),ylabel('R\_{xx}[k]');  
resInbuilt = xcorr(xrect);  
subplot(313), stem(resInbuilt);  
title('Auto-correlation function computed with "xcorr" of x\_{rect}[n]');  
xlabel('k'),ylabel('R\_{xx}[k]');  
%% periodic  
xp = input('Enter a short sequence');  
xp = [xp xp xp xp xp];  
result = correlate(xp,xp);  
figure,  
subplot(311),stem(xp);  
title('An arbitrary periodic pulse');  
xlabel('n'),ylabel('x[n]');  
subplot(312), stem(result);  
title('Auto-correlation function of x[n]');  
xlabel('k'),ylabel('R\_{xx}[k]');  
resInbuilt = xcorr(xp);  
subplot(313), stem(resInbuilt);  
title('Auto-correlation function computed with "xcorr" of x[n]');  
xlabel('k'),ylabel('R\_{xx}[k]');  
  
  
xrect = abs([-20:20])<10;  
result = correlate(xrect,xrect);  
subplot(311),stem(xrect);  
title('Rectangular pulse');  
xlabel('n'),ylabel('x\_{rect}[n]');  
subplot(312), stem(result);  
title('Auto-correlation function of x\_{rect}[n]');  
xlabel('k'),ylabel('R\_{xx}[k]');  
resInbuilt = xcorr(xrect);  
subplot(313), stem(resInbuilt);  
title('Auto-correlation function computed with "xcorr" of x\_{rect}[n]');  
xlabel('k'),ylabel('R\_{xx}[k]');  
%% periodic  
xp = input('Enter a short sequence');  
xp = [xp xp xp xp xp];  
result = correlate(xrect,xrect);  
subplot(311),stem(xrect);  
title('Rectangular pulse');  
xlabel('n'),ylabel('x\_{rect}[n]');  
subplot(312), stem(result);  
title('Auto-correlation function of x\_{rect}[n]');  
xlabel('k'),ylabel('R\_{xx}[k]');  
resInbuilt = xcorr(xrect);  
subplot(313), stem(resInbuilt);  
title('Auto-correlation function computed with "xcorr" of x\_{rect}[n]');  
xlabel('k'),ylabel('R\_{xx}[k]');  
  
close all  
clear all  
  
f = [2;3;5;7];  
x = sum(sin(2\*pi.\*f\*[0:0.02:2]));  
subplot(311),stem(x);  
title('original sequence');  
xlabel('n'),ylabel('x[n]');  
x1 = x(1:3:length(x));  
subplot(312),stem(x1);  
title('down-sampled sequence');  
xlabel('n'),ylabel('x[3n]');  
x2 = x(1);  
for i=2:length(x)  
    x2 = [x2, 0 0 x(i)];  
end  
subplot(313),stem(x2);  
title('up-sampled sequence');  
xlabel('n'),ylabel('x[n/3]');  
  
f = fftshift(fft(x));  
f1 = fftshift(fft(x1));  
f2 = fftshift(fft(x2));  
  
figure  
subplot(231),plot(abs(f));  
title('magnitude spectrum');  
xlabel('-k mod 100'),ylabel('X[k]');  
subplot(234),plot(angle(f));  
title('phase spectrum');  
xlabel('-k mod 100'),ylabel('phase(X[k])');  
  
subplot(232),plot(abs(f1));  
title('magnitude spectrum');  
xlabel('-k mod 100'),ylabel('X\_{1}[k]');  
subplot(235),plot(angle(f1));  
title('phase spectrum');  
xlabel('-k mod 100'),ylabel('phase(X\_{1}[k])');  
  
subplot(233),plot(abs(f2));  
title('magnitude spectrum');  
xlabel('-k mod 100'),ylabel('X\_{2}[k]');  
subplot(236),plot(angle(f2));  
title('phase spectrum');  
xlabel('-k mod 100'),ylabel('phase(X\_{2}[k])');  
  
  
  
f = [2;3;5;7];  
x = sum(sin(2\*pi.\*f\*[0:0.02:2]));  
subplot(311),stem(x);  
title('original sequence');  
xlabel('n'),ylabel('x[n]');  
x1 = x[1:3:length(x)];  
subplot(312),stem(x1);  
title('down-sampled sequence');  
xlabel('n'),ylabel('x[3n]');  
x2 = x(1);  
for i=2:length(x)  
    x2 = [x2, 0 0 x(i)];  
end  
subplot(313),stem(x2);  
title('up-sampled sequence');  
xlabel('n'),ylabel('x[n/3]');  
  
f = fftshift(fft(x));  
f1 = fftshift(fft(x1));  
f2 = fftshift(fft(x2);  
  
figure  
subplot(231),plot(abs(f));  
title('magnitude spectrum');  
xlabel('-k mod 100'),ylabel('X[k]');  
subplot(232),plot(angle(f));  
title('phase spectrum');  
xlabel('-k mod 100'),ylabel('phase(X[k])');  
  
subplot(233),plot(abs(f1));  
title('magnitude spectrum');  
xlabel('-k mod 100'),ylabel('X\_{1}[k]');  
subplot(234),plot(angle(f1));  
title('phase spectrum');  
xlabel('-k mod 100'),ylabel('phase(X\_{1}[k])');  
  
subplot(235),plot(abs(f2));  
title('magnitude spectrum');  
xlabel('-k mod 100'),ylabel('X\_{2}[k]');  
subplot(236),plot(angle(f2));  
title('phase spectrum');  
xlabel('-k mod 100'),ylabel('phase(X[k])');  
  
  
  
Haritha  
t=[0:0.01:10];  
a=sin(2\*pi\*t);  
b=sin(4\*pi\*t);  
f=0;  
k=0;  
x=zeros(length(a)+length(b)-1,1);  
for j=length(a):-1:-length(a)  
     for i=1:length(a)  
         
    if(i+j<length(a))      
        x(length(a)-j+1)=x(length(a)-j+1)+a(i)\*b(i+j);  
          
    end   
      
     end  
       
end  
  
  
Extra  
t=[0:0.1:10];  
k=1;  
a=exp(-2\*t\*k);  
subplot(311),stem(linspace(-pi,pi,length(a))\*10,abs(fftshift(fft(a))));  
k=3;  
a=exp(-2\*t\*k);  
subplot(312),stem(linspace(-pi,pi,length(a))\*10,abs(fftshift(fft(a))));  
k=0.5;  
a=exp(-2\*t\*k);  
subplot(313),stem(linspace(-pi,pi,length(a))\*10,abs(fftshift(fft(a))));  
  
Cross  
  
  
function [Rxx]=crossm(x,y)  
N=length(x);  
Rxx=zeros(1,N);  
for m=1: N+1  
for n=1: N-m+1  
Rxx(m)=Rxx(m)+x(n)\*y(n+m-1);   
end;  
end;  
  
Extrammmm  
  
t=[0:0.01:10];  
k=1;  
a=sin(2\*pi\*t\*k);  
subplot(311),stem(linspace(-pi,pi,length(a))\*50/pi,abs(fftshift(fft(a))));  
k=3;  
a=sin(2\*pi\*t\*k);  
subplot(312),stem(linspace(-pi,pi,length(a))\*50/pi,abs(fftshift(fft(a))));  
k=0.5;  
a=sin(2\*pi\*t\*k);  
subplot(313),stem(linspace(-pi,pi,length(a))\*50/pi,abs(fftshift(fft(a))));