**Experiment 9**

**Aim: To perform correlation of two set of sequences.**

A correlation function is the [correlation](http://en.wikipedia.org/wiki/Correlation) between [random variables](http://en.wikipedia.org/wiki/Random_variable) at two different points in space or time, usually as a function of the spatial or temporal distance between the points. If one considers the correlation function between random variables representing the same quantity measured at two different points then this is often referred to as an [autocorrelation function](http://en.wikipedia.org/wiki/Autocorrelation_function) being made up of [autocorrelations](http://en.wikipedia.org/wiki/Autocorrelation). Correlation functions of different random variables are sometimes calledcross correlation functions to emphasise that different variables are being considered and because they are made up of [cross correlations](http://en.wikipedia.org/wiki/Cross_correlation).

Correlation functions are a useful indicator of dependencies as a function of distance in time or space, and they can be used to assess the distance required between sample points for the values to be effectively uncorrelated. In addition, they can form the basis of rules for interpolating values at points for which there are observations.

Correlation functions used in [astronomy](http://en.wikipedia.org/wiki/Correlation_function_(astronomy)), [financial analysis](http://en.wikipedia.org/wiki/Financial_analysis), and [statistical mechanics](http://en.wikipedia.org/wiki/Statistical_mechanics) differ only in the particular stochastic processes they are applied to. In [quantum field theory](http://en.wikipedia.org/wiki/Quantum_field_theory) there are [correlation functions over quantum distributions](http://en.wikipedia.org/wiki/Correlation_function_(quantum_field_theory)).

For random variables *X*(*s*) and *X*(*t*) at different points *s* and *t* of some space, the correlation function is

C(s,t) = \operatorname{corr} ( X(s), X(t) ),

where \operatorname{corr} is described in the article on [correlation](http://en.wikipedia.org/wiki/Correlation)

clc

clear all

x=input('enter the first sequence')

y=input('enter the second sequence')

m=length(x);

p=length(y);

q=max(m,p);

n=2\*(q-1)+1;

for k=1:q-1

sum=0;

for l=1:k

sum=sum+x(l)\*y(q-(k-l))

end

rxy(k)=sum;

end

k1=k;

for k=1:q

m=1;

sum=0;

for l=k:q

sum=sum+x(l)\*y(m);

m=1;

end

z(k)=sum;

end

k2=k;

rxy(k1+1:n)=z(1:k2);

rxy

**Output**

enter the first sequence [ 0 1 1 1 0 ]

x =

0 1 1 1 0

enter the second sequence [ 1 1 0 1 0 ]

y =

1 1 0 1 0

sum =

0

sum =

0

sum =

0

sum =

0

sum =

1

sum =

1

sum =

0

sum =

0

sum =

1

sum =

1

rxy =

0 0 1 1 3 3 2 1 0