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Experiment 2	
AIM:	The aim of this experiment is to study mathematical operation Correlation and measure degree of similarity between two signals
OBJECTIVE:	1. Write a function to find Correlation Operation 2. Calculate correlation of a DT signals and verify the results using mathematical formula
PROBLEM DEFINITION:	1. Find auto correlation of input signal and find the significance of value of output signal at n=0. Let y[n] = x[n] O x[n] Classify the resultant signal(Even / Odd). Calculate the energy of the signal . Q. What is the significance of value of y[0]. 2. Find auto correlation of delayed input signal. Let p[n]= x[n-1] O x[n-1]. Compare the resultant signal p[n] with y[n]. Give your conclusion. 3. Find cross correlation of input signal and delayed input signal q[n] = x[n] 0 x[n-1]. Compare the resultant signal q[n] with p[n] and y[n] Give your conclusion. 4. Find cross correlation of input signal and scaled input signal. Let s[n] = x[n] O a x[n-2] where "a" is any constant. Compare the resultant signals. Give your conclusion.
INPUT SPECIFICATIONS	1. Length of first Signal L and signal values. 2. Length of second Signal M and signal values.

EXPERIMENTATION AND RESULT ANALYSIS

CASE 1: To find y[n] = x[n] x[n]

Input x[n] = { 6,7,8,10 } Length L= 4

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Auto-correlation of x[n]: [ 60. 118. 178. 249. 178. 118.  60.]
Significance of y[0]: Even
Energy of the signal: 160417.0
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Result Analysis:

Here, y[n] = y[-n]

That means, autocorrelation output signal y[n] is an even signal.

AT n=0, y[0] is Maximum value

y[0] = $\sum |x(n)|^2$ i.e. Energy of Signal x[n].

CASE 2: To find p[n] = x[n-1] x[n-1]

Input x[n] = { 6,7,8,10 } Length L= 4

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Auto-correlation of p[n]: [  0.  60. 118. 178. 249. 178. 118.  60.   0.]
Conclusion: p[n] is not equal to y[n]
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Result Analysis:

By comparing p[n] with y[n] we get,

p[n] = y[n]

That means auto correlation of x[n-1] is same as auto correlation of x[n]

CASE 3: To find q[n] = x[n] x[n-1]

Input x[n] = { 5,6,7,8 } Length L= 4

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Cross-correlation of q[n]: [ 60. 118. 178. 249. 178. 118.  60.   0.   0.]
Conclusion: q[n] is not equal to p[n] or y[n]
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CASE 4: To find r[n] = x[n] x[n-2]

Input x[n] = { 5,6,7,8 } Length L= 4

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Cross-correlation of s[n]: [ 60. 118. 178. 249. 178. 118.  60.   0.   0.   0.   0.]
Conclusion: s[n] is not equal to y[n]
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CONCLUSION:

1. Autocorrelation signal is an EVEN signal. i.e. y[n] = y[-n]
2. If input signals are delayed ,Then autocorrelation of delayed input signal is same as that of autocorrelation of original signal.
3. Cross-correlation of input signal with delayed signal is same as advanced autocorrelated input signal.