Practical 3

Aim: Linear Cross Correlation of a 2D matrix, Circular Correlation between two signal and Linear auto correlation of a 2D matrix

A)Linear Cross Correlation

Code:

```
clc;
pramod_x=[3,1;2,4];
pramod_h1=[1,5;2,3];
pramod_h2=pramod_h1(:,$:-1:1);
pramod_h=pramod_h2($:-1:1,:);
pramod_y=conv2(pramod_x,pramod_h);
disp(pramod_y,"linear Cross Correlation result y=")
```

Output:

```
Pramod 248637 linear Cross Correlation result y=

   9.    9.    2.
   21.   24.   9.
   10.   22.   4.
```

Circular Cross Correlation

Code:

```
clc;
pramod_x=[1,5;2,4];
pramod_h=[3,2;4,1];
pramod_h=pramod_h(:,$:-1:1);
pramod_h=pramod_h($:-1:1,:);
pramod_X=fft2(pramod_x);
pramod_H=fft2(pramod_h);
pramod_Y=pramod_X.*pramod_H;
pramod_y=ifft(pramod_Y);
disp(pramod_y,"Pramod 248637 Circular Correlation result y=")
```

Output:

```
Pramod 248637 Circular Correlation result y=

   37.    23.
   35.    25.

-->
```

c)Linear Auto Correlation

Code:

```
clc;
pramod_x1=[1,1;1,1];
pramod_x2=pramod_x1(:,$:-1:1);
pramod_x2=pramod_x2($:-1:1,:);
pramod_x=conv2(pramod_x1,pramod_x2);
disp(pramod_x,"Pramod 248637 linear auto Correlation x=")
```

Output:

```
Pramod 248637 linear auto Correlation x=

   1.    2.    1.
   2.    4.    2.
   1.    2.    1.
```

D)Linear Cross Correlation

Code:

```
clc;
pramod_x=[1,1;1,1];
pramod_h1=[1,2;3,4];
pramod_h2=pramod_h1(:,$:-1:1);
pramod_h=pramod_h2($:-1:1,:);
pramod_y=conv2(pramod_x,pramod_h);
disp(pramod_y,"Pramod 248637 linear Cross Correlation result y=")
```

Output:

```
Pramod 248637 linear Cross Correlation result y=

   4.     7.     3.
   6.     10.    4.
   2.     3.     1.
```