```
%Obtain the world coordinates of the chessboard pattern
%Width and height square size of chessboard pattern as specified in
 assignment
width = 9;
height = 7;
squareSize = 30;

%Get the grid corners from the chessboard pattern from the world
%coordinates system
%We start from the origin(bottom left corner) and move clockwise
world_coordinates = [0,0,1; 0,height*squareSize,1;
 width*squareSize,height*squareSize,1;width*squareSize,0,1];

% To convert from Nx3 into a 3xN matrix
world_coordinates=world_coordinates';
disp(world_coordinates);

%Read the 4 images provided of the grid
img1 = imread("images2.png");
img2 = imread("images9.png");
img3 = imread("images12.png");
img4 = imread("images20.png");

%Manually accept the grid corners from the user
imshow(img1), [x1,y1] = ginput(4);
imshow(img2), [x2,y2] = ginput(4);
imshow(img3), [x3,y3] = ginput(4);
imshow(img4), [x4,y4] = ginput(4);

%Display the grid corners
disp([x1,y1]);
disp([x2,y2]);
disp([x3,y3]);
disp([x4,y4]);

ones = [1,1,1,1];

%Obtain the 3xN form of the image coordinates --> [X,Y,1]
image_coordinates_1 = [x1(:), y1(:), ones(:)]';
image_coordinates_2 = [x2(:), y2(:), ones(:)]';
image_coordinates_3 = [x3(:), y3(:), ones(:)]';
image_coordinates_4 = [x4(:), y4(:), ones(:)]';

%Compute the homography2d(x1, x2) where x1-->x2
H1 = homography2d(world_coordinates, image_coordinates_1);
H2 = homography2d(world_coordinates, image_coordinates_2);
H3 = homography2d(world_coordinates, image_coordinates_3);
H4 = homography2d(world_coordinates, image_coordinates_4);

%Display the computed homographies
disp("Homography of --> images2.png")
disp(H1)
```

```
disp("Homography of --> images9.png")
disp(H2)
disp("Homography of --> images12.png")
disp(H3)
disp("Homography of --> images20.png")
disp(H4)
```

```
     0     0   270   270
     0   210   210     0
     1     1     1     1

   67.7566  412.5354
   90.4115   74.1283
  522.2699   82.6239
  535.0133  419.6150

  132.8894  421.0310
  138.5531   20.3230
  556.2522   76.9602
  568.9956  392.7124

  104.5708  391.2965
  113.0664   89.7035
  510.9425   27.4027
  527.9336  409.7035

  128.6416  275.1903
  178.1991   82.6239
  515.1903   79.7920
  580.3230  269.5265

Homography of --> images2.png
   -0.9666   -0.0794  -37.5740
   -0.0199    0.8775 -228.7690
   -0.0000   -0.0002   -0.5545

Homography of --> images9.png
    1.0856    0.0304   65.5101
    0.1480   -0.9381  207.5543
    0.0005    0.0001    0.4930

Homography of --> images12.png
    0.7131    0.0438   65.5411
   -0.1665   -0.8855  245.2501
   -0.0005    0.0002    0.6268

Homography of --> images20.png
    0.8638    0.2684   65.5960
   -0.0057   -0.3989  140.3230
    0.0000    0.0008    0.5099
```

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