Some Practice Questions -

1) Consider an image A of size 100x100. Given spatial locations of its 3 pixels: (7,7), (5, 9) and (25,50). Find new location of pixels after applying following geometric transformations:-

(a) Scaling x-direction by 3 and y-direction by 0.5.
(b) Rotating clockwise by 45 degree.
(c) Shearing in Horizontal direction by 0.45 and vertical direction by 1.5
(d) (a) followed by (b)
(e) (a) followed by (c)
(f) (a) followed by (b) and then (c)

2) Define city-block and chessboard distances between two pixels. What are the shapes formed by equidistant pixels in each of these two cases (assume distance <= 3)?

3) Consider an image I = [100 50
                               70   20]
Scale it by a factor of 1.5 using nearest neighbour and bilinear interpolation method.

4)

Consider the two image subsets, S_1 and S_2, shown in the following figure. For $V = \{1\}$, determine whether these two subsets are (a) 4-adjacent, (b) 8-adjacent, or (c) m-adjacent.

	S_1					S_2			
0	0	0	0	0	0	0	1	1	0
1	0	0	1	0	0	1	0	0	1
1	0	0	1	0	1	1	0	0	0
0	0	1	1	1	0	0	0	0	0
0	0	1	1	1	0	0	1	1	1

5) The resolution can be defined in many ways. In pixel resolution, the term resolution refers to the total number of count of pixels in an digital image. If an image has M rows and N columns, then its pixel resolution can be defined as MxN. If you are given an image with aspect ratio of 6:2 of an image of pixel resolution of 480000 pixels given the image is an grayscale Image. Find the following:

- Resolve pixel resolution to calculate the dimensions of image

- Calculate the size of the image (assuming 8 buts per pixel)

Some Matlab Code related to image scaling;

```
A1=[70 70 100 80;  80 20 30 30; 30 10 60 50; 70 50 20 70];
B1=imresize(A1, [10 10], 'bilinear')
B2=imresize(A1, [10 10], 'nearest')
B3=imresize(A1, [5 5], 'nearest')

A2=uint8( [ 2 3 5; 7 10 15; 100 130 200]);
C1=imresize(A2, [5 5], 'nearest')
C2=imresize(A2, [5 5], 'bilinear')

C3=imresize(A2, [6 6], 'bilinear')

C4=imresize(A2, [9 9], 'bilinear');

C5=imresize(A2, [50 50], 'bilinear');
```