Q1

When you resize a picture, you are effectively modifying its proportions, which might have an impact on the image's visual quality. The technique of guessing pixel values in the scaled image based on the original image is known as interpolation. For picture scaling, many interpolation techniques are utilised, including closest neighbour, bilinear, and bicubic.

1. Nearest Neighbor Interpolation is the simplest and quickest approach.  It works by taking the closest pixel value from the original picture and filling in the new pixel value in the enlarged image. This approach is quick, but it might result in blocky and jagged edges, particularly when downsizing photographs by a significant amount.
2. Bilinear interpolation: This approach fills in the new pixel value in the resized picture by taking a weighted average of the four nearest pixel values in the original image. Although bilinear interpolation yields smoother results than closest neighbour interpolation, it can still generate fuzzy pictures.
3. Bicubic Interpolation: This approach uses a weighted average of 16 pixels in the source picture to take into consideration more surrounding pixel values than bilinear interpolation. This approach yields smoother and more precise results than closest neighbour and bilinear interpolation, making it the preferable method for picture scaling, particularly for high-quality photographs.

Q2

Perspective transformation in computer vision is the technique of changing the perspective of an image to make it look as if it were acquired from a new viewpoint or angle. This transformation is used to rectify camera perspective distortion, which can cause objects in a picture to look warped or skewed.

A transformation matrix is used to transfer points in the original picture to new places in the modified image during perspective transformation. Based on the four corners of a quadrilateral in the original picture and their corresponding locations in the modified image, the transformation matrix may be determined.