Gaussian blur: Gaussian blur is a technique used in image processing to soften an image. It reduces the sharpness of the image, smoothing out the details and making it look fuzzier. This is commonly used to reduce noise in photos or to create a more artistic effect.

Edge detection: Edge detection is like finding the outlines in a picture. It identifies the places in an image where there's a sharp contrast between light and dark areas. This helps us focus on the important shapes and boundaries of objects in the image, rather than all the tiny details.

Histogram equalization: it is a technique used in image processing to improve the contrast of an image. Imagine an image as a collection of brightness levels. Histogram equalization takes those brightness levels and stretches them out more evenly across the whole range. This makes the dark areas darker and the light areas lighter, resulting in a clearer and more contrasted image.

Thresholding: It takes a grayscale image (think black and white photo with shades of gray) and simplifies it into a binary image (just black and white pixels). Here's how it works:

1. You choose a brightness level (the threshold).
2. Pixels lighter than the threshold are turned white (like clean clothes).
3. Pixels darker than the threshold are turned black (like dirty clothes).

This makes it easier to identify objects in the image, especially if they have high contrast with the background. It's a basic but useful technique for image segmentation (separating objects).

Morphological operations: these are a toolbox for image processing that focus on the shapes of objects in an image.

- Dilation: Make objects bigger
- Erosion: Make objects smaller
- Opening: Remove small objects
- Closing: Fill small holes in objects

Image resizing: Image resizing is simply changing the size of an image, like making a photo bigger or smaller. It's like adjusting the zoom on a camera. it's important to note that resizing can affect the image quality. If you make an image too big, it can become blurry or pixelated (look blocky). Conversely, shrinking an image too much can make it lose details.

Image rotation: Image rotation is about digitally turning the entire image around a fixed point. You can specify the angle of rotation, like 90 degrees for a quarter turn.

Image translation: This is like shifting the whole image in one direction or another. You can specify how many pixels to move the image horizontally (left-right) and vertically (up-down).

Image sharpening: Image sharpening focuses on enhancing the clarity and crispness of an image, especially edges and fine details. Sharpening algorithms identify areas in the image with high contrast, like transitions between light and dark areas. These areas are then accentuated, making edges appear more defined and details more prominent.

Color space conversion: Color space conversion is like translating a language for colors in an image. Different devices and applications use various ways to represent colors. For instance, your camera might capture colors in RGB (Red, Green, Blue), while your printer uses CMYK (Cyan, Magenta, Yellow, Black). Conversion allows you to switch between these color spaces to ensure the image displays accurately on different devices. not all colors can be perfectly translated between spaces. Some color spaces have a wider range of colors they can represent than others. This can sometimes lead to slight color shifts during conversion.

Affine transformations: Affine transformations preserve parallelism, meaning parallel lines in the original image will remain parallel after the transformation. it might be squished or stretched, but it's still basically a parallelogram with opposite sides parallel.

Perspective transformation: Perspective transformations can make parallel lines appear to converge or diverge in the resulting image. This can create the illusion of depth or distance in the image.