Lecture 5: Image Processing In MATLAB

What is digital image?

the digital image is a representation of a two-dimensional image as a limited set of digital values, called picture elements or pixels.

Pixels:

An image is made of tiny, square-like elements called pixels. Even a small image can contain millions of such pixels of different colors.
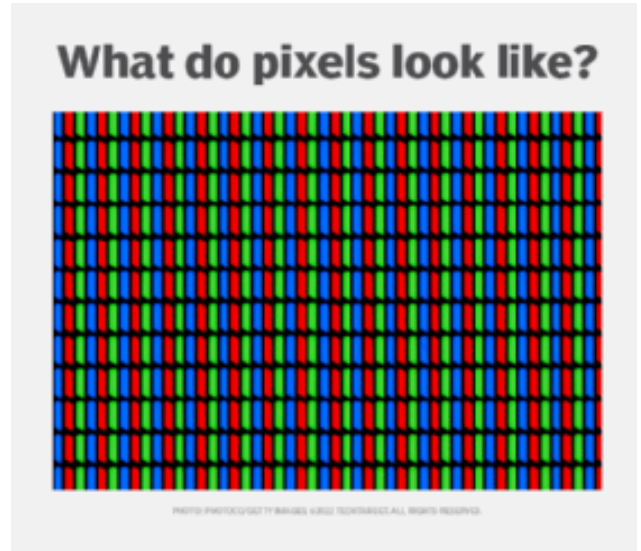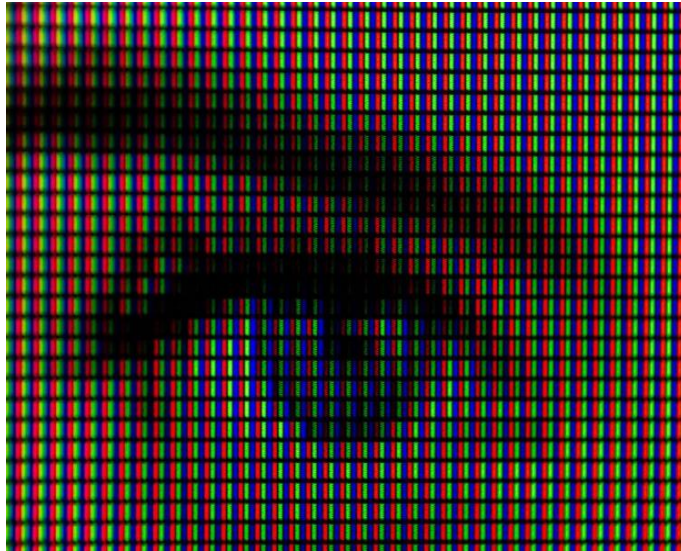
Pixel values typically represent gray levels ,colors, heights, etc.

❖ Remember digitization implies that a digital image is an approximation of a real scene.
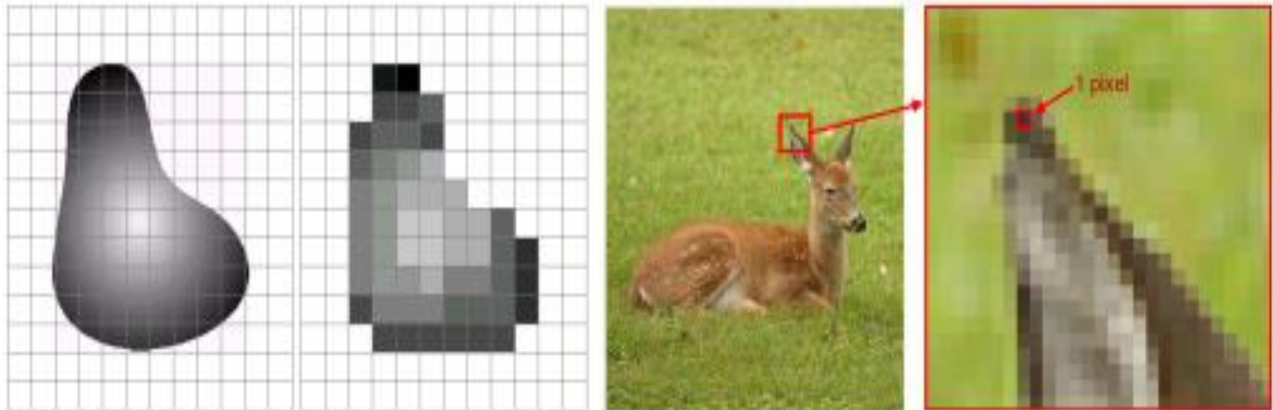
Common image formats include:

### (3) samples per point (Red, Green, and Blue)

RGB (red, green, and blue) refers to a system representing the colors used on a digital display screen. Red, green, and blue can be combined in various proportions to obtain any color in the visible spectrum.

Blue component Image Plane

Green component image Plane

Red component image Plane
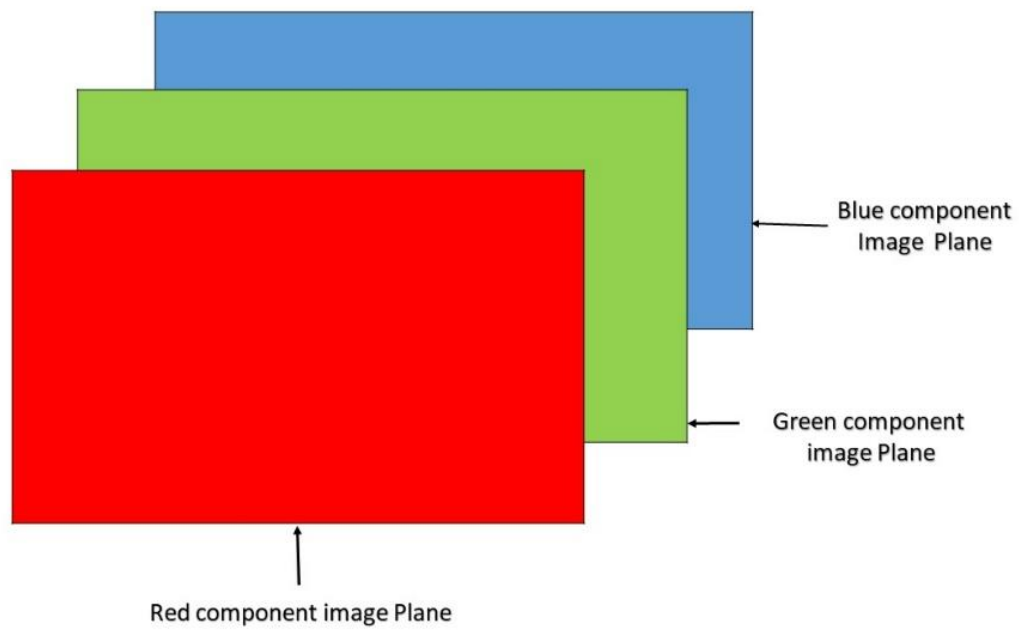
[RGB image is a three layered image]

An RGB image can be thought of as three different layers (red, green, and blue) stacked on top of each other that, when fed into the red, green, and blue inputs of a color display, create a color image on the screen.

Pixel of an RGB image are formed from the corresponding pixel of the three component images
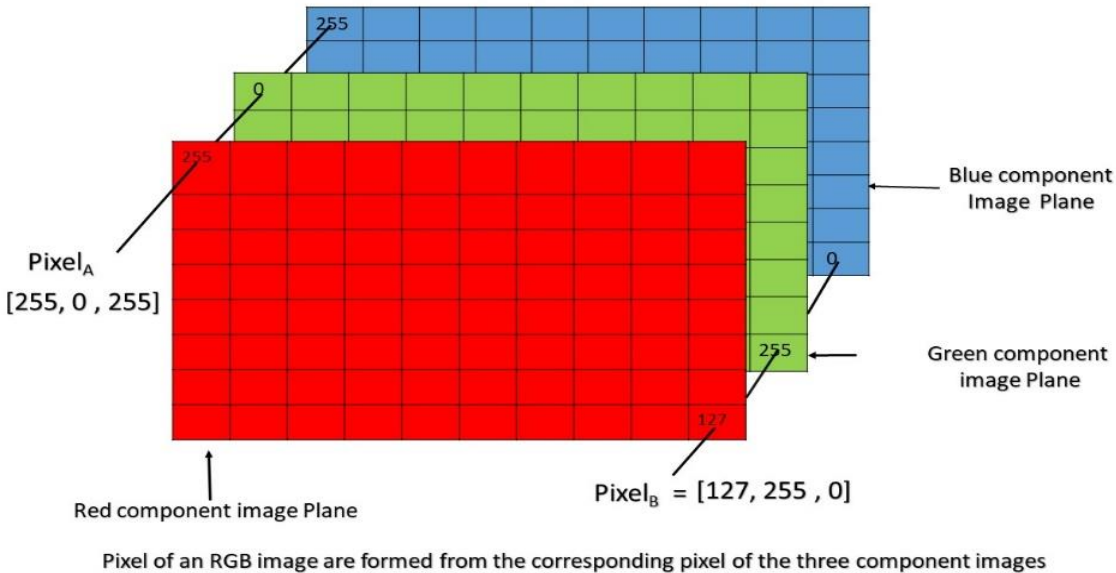
As can be seen from the image above, pixel (A) has the value (255, 0, 255) and is determined by the combination of the intensities stored in the red color layer, green color layer, and blue color layer, respectively.

Similarly, pixel (B) has the value (127, 255, 0) and is specified in the same way as pixel (A).

1sample per point (B&W or Grayscale)

1- Black and white image

The black and white images only contain the two colors of black and white.
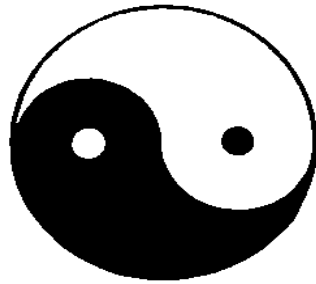
2- Grayscale image

Grayscale is a range of shades without any visible color. On the screen, each pixel in a grayscale display carries an amount of light, ranging from the weakest amount of light, or black, to the strongest amount of light, or white. Grayscale contains only brightness information, not color.

On a computer screen, images are made up of pixels consisting of a red dot, green dot, and blue dot. Each of these points has its own brightness level as well, and thus can be converted to grayscale. A grayscale image is one from which all color information has been removed.

Examples: Image Enhancement in Medicine