# Fundamentals

This document lists the basic functions that the OpenCV library offers us.

1. Importing the libraries

   **import cv2** – This command asks Python to use the OpenCV library(also called module). Once we have imported cv2, Python understands that the functions we use are defined in the OpenCV library. Once we have imported this library, we can proceed to use functions from this library as cv2.<function>

   **import numpy** – This command asks Python to use the Numpy library to manipulate matrices. Since the images we use are stored as matrices, we can then use numpy functions as numpy.<function>. Alternately, we can also use the command **import numpy as np** to shorten the name of the module so that we can call the numpy functions as np.<function>

2. Reading Images

   **cv2.imread(filename,[flags] ) → matrix** – This command loads an image as a matrix. If we do not use any flags, then the image is read and returned as an HxWxC matrix, where

H – Height, W – Width, C – Channels

For example, if our image is a 640x480 image(as is the case when we read from the camera), then the dimensions of the matrix are 480x640x3, where 480 is the height, 640 is the width, and 3 refers to the number of channels, i.e. Blue, Green, Red.

If we specify **0** as our flag, then the image is read as a grayscale image, whose matrix has dimensions HeightxWidth, as there is only one channel now.

3. Waiting for user input

   **cv2.waitKey(time)→ key** – This command waits for a time period of *time* milliseconds for the user to press a key, and if the user does press a key, then it returns the ASCII code of the key pressed. In case we pass **0** as our parameter for *time*, then it waits indefinitely till the user presses a key.

4. Exiting the program

   **cv2.destroyAllWindows() –** This command asks python to close all the open windows. This is how we exit the program.