

Displaying an Image

Name		Date	
Class / Sec		Roll no.	

1 - AIM

To write a Python program that reads an image file using the **OpenCV** library and displays it on the screen.

2 - SOFTWARE AND LIBRARIES USED

TOOL	WHAT IT IS FOR
Python 3	The programming language the program is written in
Jupyter Notebook	The environment used to write and run the code (IDLE or Colab also acceptable)
OpenCV (cv2)	The computer vision library. imread() loads an image; imshow() displays it

3 - THEORY

A computer does not see a picture. It sees a **grid of numbers**. Each cell of that grid is one **pixel**, and for a colour image every pixel holds **three** numbers — one each for blue, green and red.

FUNCTION	WHAT IT DOES	NOTE
cv2.imread()	Reads the image file into an array	Returns None if the file is not found — no error is raised
cv2.imshow()	Opens a window showing the image	Takes a window title and the image array
cv2.waitKey(0)	Waits until a key is pressed	Without it the window closes instantly
cv2.destroyAllWindows()	Closes the image windows	Tidies up when the program ends

OpenCV uses BGR, not RGB: Most software stores colour as **Red, Green, Blue**. OpenCV stores it as **Blue, Green, Red** — the reverse. It is a genuine quirk of the library, and it is a favourite viva question.

4 - PROGRAM

```
import cv2

# Read the image file into an array
img = cv2.imread("sample_image.jpg")

# Check the file was actually found
if img is None:
    print("Image not found. Check the file name and folder.")
else:
    print("Image loaded successfully.")

# Display the image in a window
cv2.imshow("My Image", img)

# Wait for a key press, then close the window
cv2.waitKey(0)
cv2.destroyAllWindows()
```

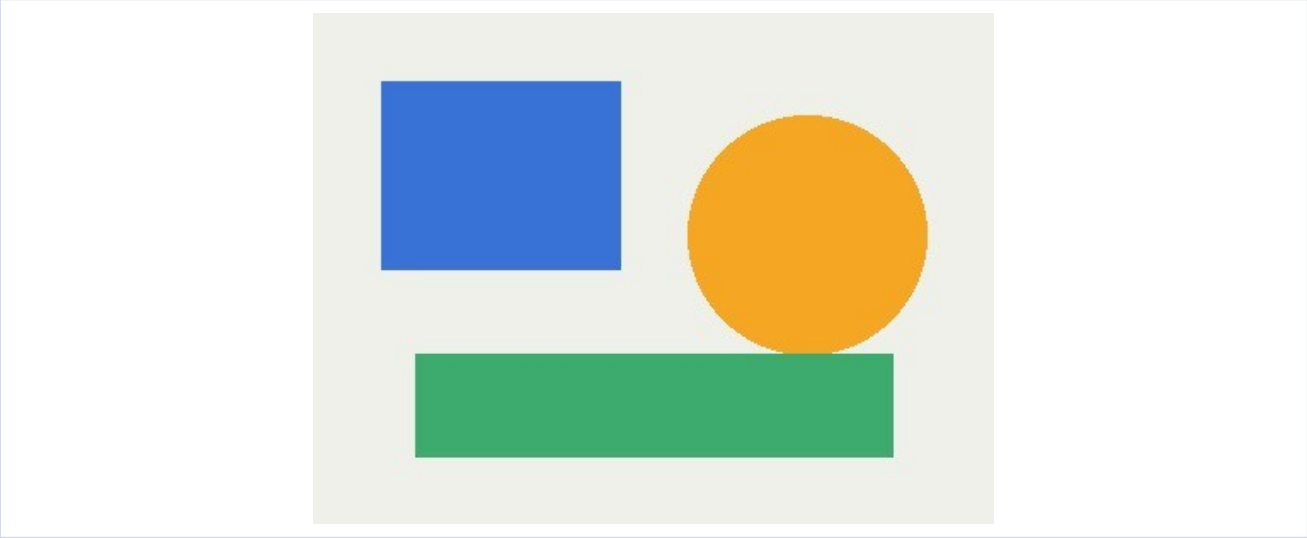
Never leave out waitKey(0): Without it the window opens and closes faster than you can see, and it looks as though nothing happened. This is the single commonest mistake with OpenCV.

5 • EXPECTED OUTPUT

The program prints one line, then opens a window showing the image.

```
Image loaded successfully.
```

A window titled **My Image** appears, containing the picture:



[PASTE SCREENSHOT HERE]

Paste a screenshot showing YOUR image window open, with the code visible if possible

6 • UNDERSTANDING WHAT HAPPENED

The image on screen looks like a picture. Inside the program it is something else entirely.

STEP	WHAT ACTUALLY HAPPENS
imread()	The JPG is decoded into a NumPy array of numbers — not a picture any more
The array	This image becomes a grid of 300 × 400 × 3 values — height, width, colour channels
Each value	A whole number from 0 to 255 , giving the intensity of that colour at that pixel
imshow()	Turns those numbers back into something a human can look at
if img is None	A safety check. OpenCV returns None for a missing file rather than raising an error

7 • OBSERVATION AND RESULT

Two or three sentences in your own words. Say what the program did and what the image really is inside the computer.

Example observation: The program read the image file using `cv2.imread()` and displayed it in a window using `cv2.imshow()`. Although the window shows a picture, inside the program the image is stored as an array of numbers — one value per colour channel for every pixel. The `waitKey(0)` line kept the window open until a key was pressed.

Worth knowing: If your image is very large, the window may open bigger than your screen. That is **not** an error — OpenCV displays at full resolution. Use a smaller image, or resize it with `cv2.resize()` before showing it.

8 · VIVA QUESTIONS FOR THIS PROGRAM

LIKELY QUESTION	SHAPE OF A STRONG ANSWER
What does <code>cv2.imread()</code> return?	A NumPy array of pixel values — not a picture. Or None if the file was not found
Why is <code>waitKey(0)</code> needed?	Without it the window closes immediately. It waits for a key press before continuing
What order does OpenCV store colours in?	BGR — blue, green, red. Most other software uses RGB, so the order is reversed
What range are the pixel values in?	0 to 255 — that is 256 possible values, because each channel uses 8 bits
Your program prints nothing and no window opens. Why?	The file was probably not found, so img is None . Check the file name and the folder

9 · HOW THIS ENTRY IS MARKED

FULL MARKS

The image file **submitted with** the program · the **if img is None** check included · a screenshot showing **your own** image window · an observation explaining the image is stored as **numbers** · you can explain why `waitKey(0)` is needed

LOSES MARKS

No image file submitted, so the code cannot be run · **waitKey(0)** left out, so nothing appears · no screenshot, or someone else's image · an observation that just says the image was displayed · thinks OpenCV uses RGB

Before you submit: Use **your own** image — a photo you took, or your school logo. Save it in the same folder as your program and submit it **with** the file, otherwise the examiner cannot run your code.