1. What does RGBA stand for?

**Ans:-** RGBA stands for Red Green Blue Alpha. It is a color model used to represent colors in digital images and computer graphics. The first three letters, RGB, refers to the three primary colors of light - red, green, blue - that are combined in various ways to create a wide range of colors. The fourth letter , A stands for alpha, which represents the level of transparency or opacity of a color. Together, RGBA is a common way to specify a color in web development and other digital applications.

In python, The values of the RGBA tuple range from 0 to 255. RGBA are commonly used in python graphics libraries such as pillow and pygame, as well as in web development with frameworks like flask and django.

2. From the Pillow module, how do you get the RGBA value of any images?

**Ans:-** We an use the pillow module’s **‘Image.open()’** function to open an image file, and then use the **‘getpixel()’** method to retrieve the RGBA value of any pixel in the image. Example :-

from PIL import Image

# Open image file

image = Image.open("example.png")

# Get RGBA value of pixel at (100, 100)

pixel = image.getpixel((100, 100))

print(pixel)

In the above example, ‘example.png’ is the name of the image file that you want to open, and ‘(100, 100)’ is the (x,y) coordinates of the pixel whose RGBA value you want to retrieve. The ‘getpixel()’ method returns a tuple containing the RGBA value of the specified pixel.

Note that the values returned by ‘getpixel()’ are integers between 0 and 255 for each component.

3. What is a box tuple, and how does it work?

**Ans:-** The box.tuple sub-module provides a read only access for the tuple user data type. It allows for a single tuple , selective retrieval of the field contents, retrieval of information about size, iteration over all the fields, and conversion to a Lua table.

4. Use your image and load in notebook then, How can you find out the width and height of an Image object?

**Ans :-** To find out the width and height of an image object in python, We can use the ‘size’ attribute of an image object. Example :-

from PIL import Image

# Load the image file

image = Image.open("my\_image.jpg")

# Get the size of the image

width, height = image.size

print("Image size: {} x {}".format(width, height))

In this example, we first import the ‘image’ module from the PIL library. We then load the image file”my\_image.jpg” using the “image.open()” function, which returns an ‘Image’ object.

Next, we use the ‘size’ attribute of an ‘Image’ to get the width and height of the image, and assign them to the variables ‘width’ and ‘height’ respectively.

Finally, we use the ‘print()’ function to display the image size, which is formatted as a string using the ‘format()’ method.

5. What method would you call to get Image object for a 100×100 image, excluding the lower-left quarter of it?

**Ans:-** To exclude the lower-left quarter of a 100\*100 image, and get a new ‘Image’ object with the remaining top-right part, you can use the ‘crop()’ method for the PIL(Python imaging library) module in python. Example :-

from PIL import Image

# Load the image file

image = Image.open("image\_file.jpg")

# Get the dimensions of the image

width, height = image.size

# Crop the image to exclude the lower-left quarter

cropped\_image = image.crop((0, 0, width/2, height/2))

# Display the new image

cropped\_image.show()

6. After making changes to an Image object, how could you save it as an image file?

**Ans:-** To save an ‘Image’ object as an image file in python using the PIL module, We can use the ‘save()’ method the ‘Image’ object. Example:-

from PIL import Image

# Load the image file

image = Image.open("original\_image.jpg")

# Make some changes to the image

# ...

# Save the modified image as a new file

image.save("modified\_image.jpg")

Note that the ‘save(0’ method can accept a variety of arguments, including the file format, compression level, and other image specific parameters.

7. What module contains Pillow’s shape-drawing code?

**Ans:-** Pillow is a fork of the python imaging library, which is library that adds support for opening, manipulating and saving many different image file formats.

Pillow’s shape drawing code is contained within the ‘ImageDraw’ module, which provides a set of functions for drawing shapes(line, circles, rectangles, polygons, etc) and text onto ‘image’ objects. Example:-

from PIL import Image, ImageDraw

# Load the image file

image = Image.open("image\_file.jpg")

# Create an ImageDraw object

draw = ImageDraw.Draw(image)

# Draw a rectangle on the image

draw.rectangle([(50, 50), (100, 100)], outline="red", width=2)

# Save the modified image as a new file

image.save("modified\_image.jpg")

8. Image objects do not have drawing methods. What kind of object does? How do you get this kind of object?

**Ans:-** Image objects in Pillow/PIL do not have built-in drawing methods. To draw shapes and text on an image, You need to use the ‘ImageDraw’ module. Which provides a set of functions for drawing various shapes and text onto an ‘image’ object. Example :-

from PIL import Image, ImageDraw

# Load the image file

image = Image.open("image\_file.jpg")

# Create an ImageDraw object

draw = ImageDraw.Draw(image)

# Draw a rectangle on the image

draw.rectangle([(50, 50), (100, 100)], outline="red", width=2)

# Save the modified image as a new file

image.save("modified\_image.jpg")