5 question

```
import cv2
import numpy as np


def analyze_histogram_and_display(image_path):
    """
    Analyzes and displays the histogram of the given input image based on color levels (RGB channels).
    Also displays the original image alongside the histogram.

    Parameters:
        image_path (str): Path to the input image.

    Returns:
        None: Displays the histograms and original image.
    """
    # Load the image
    image = cv2.imread(image_path)
    if image is None:
        raise ValueError("Image not found or path is incorrect.")

    # Show the original image
    cv2.imshow('Original Image', image)

    # Split the image into its BGR channels
    (blue, green, red) = cv2.split(image)
```

```
    # Calculate histograms for each channel (B, G, R)
    blue_hist = cv2.calcHist([blue], [0], None, [256], [0, 256])
    green_hist = cv2.calcHist([green], [0], None, [256], [0, 256])
    red_hist = cv2.calcHist([red], [0], None, [256], [0, 256])

    # Normalize the histograms to fit in the range of 0 to 255
    blue_hist = cv2.normalize(blue_hist, blue_hist, 0, 255, cv2.NORM_MINMAX)
    green_hist = cv2.normalize(green_hist, green_hist, 0, 255, cv2.NORM_MINMAX)
    red_hist = cv2.normalize(red_hist, red_hist, 0, 255, cv2.NORM_MINMAX)

    # Create blank images for displaying histograms
    hist_image = np.zeros((300, 256, 3), dtype=np.uint8)

    # Draw the histograms for each channel on the blank image
    for x in range(1, 256):
        cv2.line(hist_image, (x - 1, int(300 - blue_hist[x - 1])), (x, int(300 - blue_hist[x])), (255, 0, 0), 2)
        cv2.line(hist_image, (x - 1, int(300 - green_hist[x - 1])), (x, int(300 - green_hist[x])), (0, 255, 0),
2)
        cv2.line(hist_image, (x - 1, int(300 - red_hist[x - 1])), (x, int(300 - red_hist[x])), (0, 0, 255), 2)

    # Show the histogram
    cv2.imshow('Histogram', hist_image)

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

Path to the image

image_path = r'C:\Users\SAIL\Downloads\CV\girll.jpg'