Introduction to Python Programming
Mini Project

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Problem 1. Your task is to perform various image processing operations on a chosen high-quality image. For each part, copy and paste your code along with the results, including any output and images. Please start each part on a new page and label each part correctly.

- Part (a): Image Loading and Shape
    1. Load an image as a NumPy array in RGB mode.
    2. Print the shape of the loaded image array.
    3. Display the image.
- Part (b): Grayscale Conversion
    1. Convert the image into grayscale.
    2. Load the grayscale image as a NumPy array.
    3. Print the shape of the grayscale image array.
    4. Explain why the shape of the grayscale image array is different from the RGB mode.
    5. Display the grayscale image.
- Part (c): Channel Separation and Concatenation
    1. Separate the Red, Green, and Blue channels of the original RGB image.
    2. Display each channel as a separate image.
    3. Concatenate these channels horizontally and then vertically.
    4. Display the concatenated images.
- Part (d): Image Darkening
    1. Darken the original image by a factor of your choice.
    2. Display the darkened image.
- Part (e): Image Cropping (Top Right)

1. Crop the top right part of the original image.
2. Display the cropped image.

- Part (f): Image Cropping (Bottom Left)
  1. Crop the bottom left part of the original image.
  2. Display the cropped image.
- Part (g): Image Masking
  1. Use a white-black mask image similar to the one shown in class.
  2. Apply this mask to the original image.
  3. Display the masked image.
- Part (h): Image Blending
  1. Choose another image of your interest.
  2. Blend it with the first image.
  3. Display the blended image.