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% Created on 09/01/25
% Created by Samar Patel, BT22ECE075
% 1st Practical : Image Processing Techniques for Grayscale Conversion and
Color Channel Manipulation

clc;
clear;
close all;

% Load the image from file
image = imread("test_image.jpg");

% Get image dimensions
[rows, cols, channels] = size(image);
disp(['Image dimensions: ', num2str(rows), ' x ', num2str(cols)]);

% Display the intensity of the center pixel
center_row = round(rows / 2);
center_col = round(cols / 2);
disp(['Center pixel value at (', num2str(center_row), ', ',
num2str(center_col), '): ', num2str(image(center_row, center_col))]);

% Convert to grayscale using the red channel only
gray_single_channel = image(:, :, 2);

% Convert to grayscale using average method
red_channel = image(:, :, 1);
green_channel = image(:, :, 2);
blue_channel = image(:, :, 3);
gray_avg = round((red_channel + green_channel + blue_channel) / 3);

% Convert to grayscale using the luminosity method
gray_luminosity = round(0.299 * red_channel + 0.587 * green_channel + 0.114 *
blue_channel);

% Create an image highlighting the red channel
image_red = image;
image_red(:, :, 2) = 0;
image_red(:, :, 3) = 0;

% Create an image highlighting the green channel
image_green = image;
image_green(:, :, 1) = 0;
image_green(:, :, 3) = 0;

% Create an image highlighting the blue channel
image_blue = image;
image_blue(:, :, 1) = 0;
image_blue(:, :, 2) = 0;

% Display original image and grayscale versions
figure(1);
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subplot(2, 2, 1), imshow(image); xlabel("Original Image");
subplot(2, 2, 2), imshow(gray_single_channel); xlabel("Grayscale (Single
Channel)");
subplot(2, 2, 3), imshow(gray_avg); xlabel("Grayscale (Average Method)");
subplot(2, 2, 4), imshow(gray_luminosity); xlabel("Grayscale (Luminosity
Method)");
```

```
% Display original image and color-filtered versions
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```
figure(2);
subplot(2, 2, 1), imshow(image); xlabel("Original Image");
subplot(2, 2, 2), imshow(image_red); xlabel("Red-Filtered Image");
subplot(2, 2, 3), imshow(image_green); xlabel("Green-Filtered Image");
subplot(2, 2, 4), imshow(image_blue); xlabel("Blue-Filtered Image");
```

*Image dimensions: 360 x 946*

*Center pixel value at (180, 473): 98*



Original Image



Grayscale (Single Channel)



Grayscale (Average Method)



Grayscale (Luminosity Method)



Original Image



Red-Filtered Image



Green-Filtered Image



Blue-Filtered Image

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