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clc;
clear all;
close all;

rgbImg = imread('IMAGE.jpg');    % Read RGB image
grayImg = rgb2gray(rgbImg);      % Convert RGB to Grayscale

imshow(grayImg);
title('Grayscale Image');

[rows, cols] = size(grayImg);

% ----- Bit Plane Slicing -----

% 0th bit plane
for r = 1:rows
    for c = 1:cols
        bitPlane0(r,c) = bitand(grayImg(r,c), 1);
    end
end

% 1st bit plane
for r = 1:rows
    for c = 1:cols
        bitPlane1(r,c) = bitand(grayImg(r,c), 2);
    end
end

% 2nd bit plane
for r = 1:rows
    for c = 1:cols
        bitPlane2(r,c) = bitand(grayImg(r,c), 4);
    end
end

% 3rd bit plane
for r = 1:rows
    for c = 1:cols
        bitPlane3(r,c) = bitand(grayImg(r,c), 8);
    end
end

% 4th bit plane
for r = 1:rows
    for c = 1:cols
        bitPlane4(r,c) = bitand(grayImg(r,c), 16);
    end
end

% 5th bit plane
for r = 1:rows
    for c = 1:cols
        bitPlane5(r,c) = bitand(grayImg(r,c), 32);
    end
end

% 6th bit plane
for r = 1:rows
    for c = 1:cols
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        bitPlane6(r,c) = bitand(grayImg(r,c), 64);
    end
end

% 7th bit plane
for r = 1:rows
    for c = 1:cols
        bitPlane7(r,c) = bitand(grayImg(r,c), 128);
    end
end

figure;

subplot(2,4,1); imshow(bitPlane0); title('0th Bit Plane');
subplot(2,4,2); imshow(bitPlane1); title('1st Bit Plane');
subplot(2,4,3); imshow(bitPlane2); title('2nd Bit Plane');
subplot(2,4,4); imshow(bitPlane3); title('3rd Bit Plane');

subplot(2,4,5); imshow(bitPlane4); title('4th Bit Plane');
subplot(2,4,6); imshow(bitPlane5); title('5th Bit Plane');
subplot(2,4,7); imshow(bitPlane6); title('6th Bit Plane');
subplot(2,4,8); imshow(bitPlane7); title('7th Bit Plane');

% ----- Bit Plane Removal -----
% Removing 0th, 5th, and 7th bit planes

for r = 1:rows
    for c = 1:cols
        removeBit0(r,c) = bitand(grayImg(r,c), (255 - 2^0));
        removeBit5(r,c) = bitand(grayImg(r,c), (255 - 2^5));
        removeBit7(r,c) = bitand(grayImg(r,c), (255 - 2^7));
    end
end

figure;
subplot(1,3,1); imshow(removeBit0); title('0th Bit Removed');
subplot(1,3,2); imshow(removeBit5); title('5th Bit Removed');
subplot(1,3,3); imshow(removeBit7); title('7th Bit Removed');

```

Grayscale Image



0th Bit Plane



1st Bit Plane



2nd Bit Plane



3rd Bit Plane



4th Bit Plane



5th Bit Plane



6th Bit Plane



7th Bit Plane



0th Bit Removed



5th Bit Removed



7th Bit Removed

