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```
%Code written by Soham Roy
```

```
clear;  
close all;  
clc;
```

Read the input image

```
img = imread('lena_color.tiff');  
figure;  
imshow(img); title('Original Image');
```

Original Image



Convert to grayscale

```
if size(img, 3) == 3
    img = rgb2gray(img);
end
```

Convert to double for processing

```
img = im2double(img);
```

Perform single-level 2D Discrete Wavelet Transform (DWT)

```
[LL, LH, HL, HH] = dwt2(img, 'haar'); % Using Haar wavelet
```

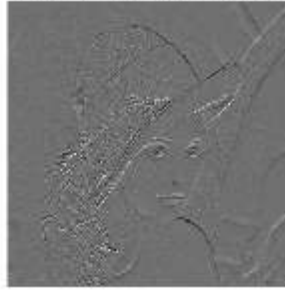
Display the original and decomposed images

```
figure;
subplot(2,2,1); imshow(LL, []); title('Approximation (LL)');
subplot(2,2,2); imshow(LH, []); title('Horizontal Detail (LH)');
subplot(2,2,3); imshow(HL, []); title('Vertical Detail (HL)');
subplot(2,2,4); imshow(HH, []); title('Diagonal Detail (HH)');
```

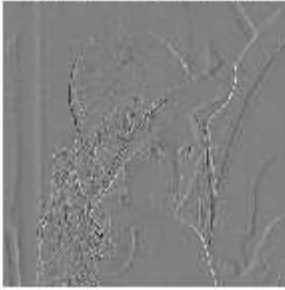
Approximation (LL)



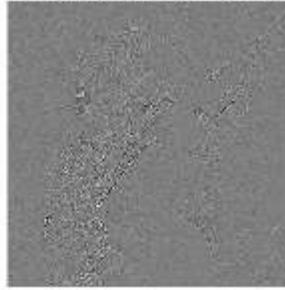
Horizontal Detail (LH)



Vertical Detail (HL)



Diagonal Detail (HH)



Reconstruct the image using inverse DWT

```
reconstructed_img = idwt2(LL, LH, HL, HH, 'haar');
```

Display the reconstructed image

```
figure;  
imshow(reconstructed_img, []); title('Reconstructed Image from DWT');
```

Reconstructed Image from DWT

