**Question 5: Grayscale Quantization to 32 Levels**

```matlab
% Load the image
image = imread('Nature.jpeg');
gray_image = rgb2gray(image);

% Resize the image to quantize it to 32 levels
scaled_image = imresize(gray_image, [32 32], 'nearest');
quantized_image = imresize(scaled_image, size(gray_image), 'nearest');
figure, imshow(quantized_image), title('32-Level Grayscale Quantization');
```

32-Level Grayscale Quantization
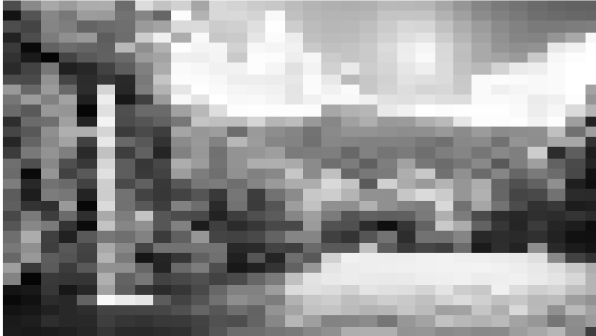
Steps to Quantize an Image to 32 Grayscale Levels using `imresize` in MATLAB

Here's the step-by-step explanation and MATLAB code for **quantizing an image to 32 grayscale levels** using only the `imresize` function.

Steps to Follow:

1. **Load the Image**:

  • Load the input image and convert it to grayscale if it's in RGB.

1. **Normalize the Grayscale Image**:

  • Ensure the pixel values are in the range of [0, 1] by dividing by 255 (if they are in the range of [0, 255]).

1. **Resize the Image to 32x32**:

  • Use the `imresize` function to reduce the dimensions of the image to 32x32. This will effectively reduce the color depth by averaging neighboring pixel values.

1. **Resize Back to Original Size**:

    • Use the `imresize` function again to scale the 32x32 image back to the original dimensions, giving the appearance of quantization.

1. **Adjust Pixel Values Back to [0, 255]**:

    • Multiply the normalized pixel values by 255 to restore them to the standard grayscale range.