Problem 1:

A screenshot of a computer program

Description automatically generatedA screenshot of a computer

Description automatically generated

Figure 1

1. Log Transformation

The image's dark sections are made lighter by the log transformation, which also expands the low-intensity regions and compresses the high-intensity ones.

1. Inverse Log Transformation

The image is made darker by the inverse log transformation. The inverse of log transformation is accomplished. It distorts the image by enlarging the high-intensity regions and contracting the low-intensity ones.

1. Power Law transformation

Figure 1 displays the two versions of the image: the one before the power law transformation and the one after. The images in the figure have gammas of 0.3 and 3. The graphic shows that when the gamma value is less than 1, it behaves like a log transformation, and when it is more than 1, it behaves like an inverse log transformation.

Problem 2:A screenshot of a computer program

Description automatically generatedA screenshot of a computer program

Description automatically generated

A close-up of a screen

Description automatically generated

Figure 2

Figure 2 shows that the 8-bit place slicing has occurred. We can also see the original image and the reconstructed image with the highest 2-bit and highest 4-bit on the left pane of figure 2. It is observed that the 4-bit image has more detail than the 2-bit image and is more pronounced and darker.

Problem 3:A screenshot of a computer program

Description automatically generatedA screenshot of a computer program

Description automatically generatedA screenshot of a computer program

Description automatically generatedA collage of images and graphs

Description automatically generated

Figure 3

Figure 3 displays many photos both before and after equalisation. Additionally, it displays the histogram that was used to equalise the photos. In comparison to the original photos, the equalised images on the left of the figure are more detailed. This is so that the histogram can spread out the image's lower intensities. We can see that the last image, where gamma is 3, has a very low intensity because it is very dark. The high intensity is spread out by the histogram after equalisation has been applied.

Part 2:A screenshot of a computer program

Description automatically generated A screenshot of a computer program

Description automatically generatedA close up of an apple

Description automatically generatedA close up of an apple

Description automatically generated

Original Image Sheared Image

A red apple with a white square in the middle

Description automatically generated A red apple with a green stem

Description automatically generated

Pad Method = 'fill' Pad Method = 'replicate'

A red apple with a white square in the middle

Description automatically generated A collage of apples

Description automatically generated

Pad Method = 'bound' Pad Method = 'symmetric'

A collage of apples

Description automatically generated

Pad Method = 'circular'

The image was subjected to a straightforward shear transformation in step 1. An affine transformation that shifts a point of the picture away from the axis is known as a simple shear transformation. It becomes more bent the farther it is from the other axis. Maketform uses the simple shear matrix values to create an affine. This can be seen in the photo with the description "sheared image." If we compare it to the original photo, we can see how it was altered.

In step 2, we were instructed to draw lines so that we could observe how the lines were affected by the basic shear transformation and how they had been bent. The sheared image shows this as well.

We examine the various cushioning possibilities in step 3 of the process. The first one is fill, where we merely apply red colour to the image padding. The graphic with the caption "Pad Method = 'fill'" illustrates this. The duplicate padding method is the next padding technique we employ. The replicate padding method duplicates the source image, flips it, and then uses that as the new padding for the image. This is demonstrated in the image "Pad Method ='replicate'"; however, because of the white background of the example image, it is not quite evident. The fill padding technique is quite similar to bound padding. In contrast to the fill method, the bound padding method clearly delineates the borders between the padding and the input image. The graphic shows this as Pad Method = "bound."

In the final phase, we test out two additional padding techniques: symmetric padding and circular padding. Figures "Pad Method = 'circular'" and "Pad Method ='symmetric'" provide illustrations of these. The symmetric padding method uses the input image's mirror to fill the padding instead of using copies of the input image like the circular padding method does.