HACETTEPE UNIVERSITY

ENGINEERING FACULTY

DEPARTMENT OF COMPUTER ENGINEERING

BBM 415

ASSIGNMENT 1 REPORT

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PART 1

1. This method achieves dithering using error diffusion. We add the leftover quantization error of a pixel onto its nearby pixels. It scatters the whole according to the distribution. For example we can do error diffusion on pixel[x + 1][y] :

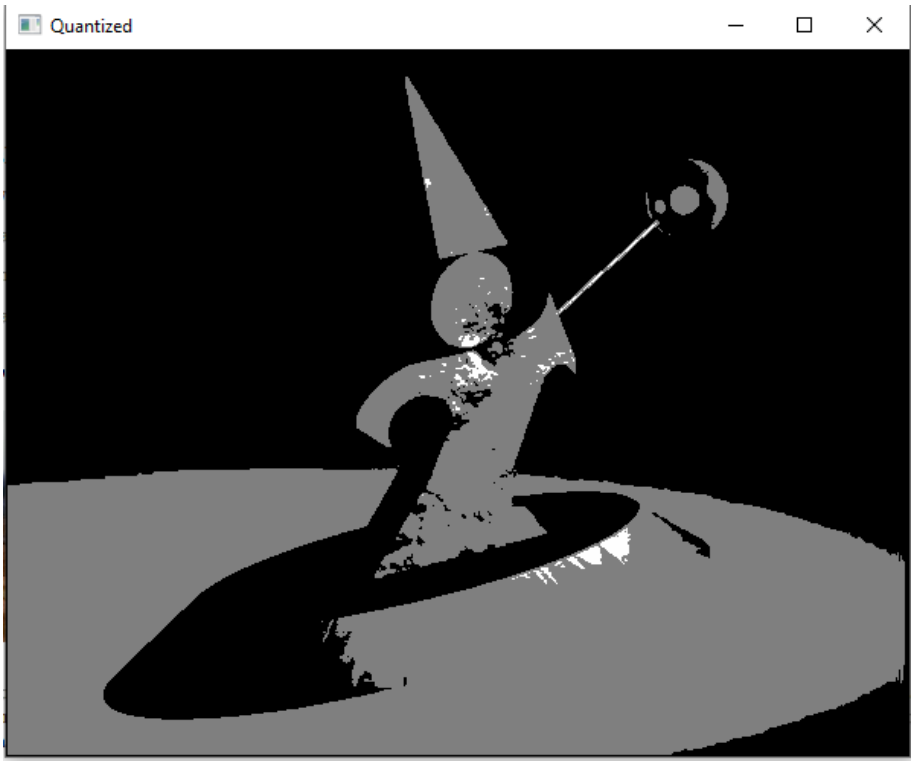
   Find the error by “error = oldpixel – newpixel” and scatter the error value by “ pixel[x + 1][y] := pixel[x + 1][y] + quant error * 7 / 16 ”

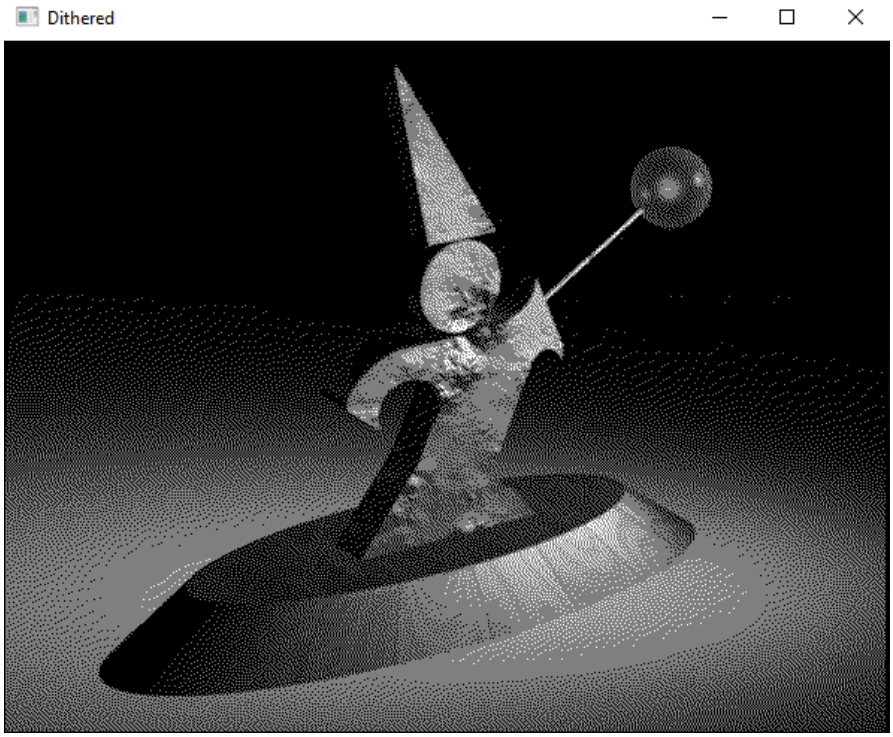
2. For different q values newPixel could change, so quant_error could change. At the end, calculated final pixel values are changed. This means we can see remarkable differences in the output.

3. It is observed that on higher q values, difference between quantized image and dithered image is less. On the contrary, on lower q values we can become aware of the difference between two situations. Additionally, quality of both output image is increasing with increasing q value.

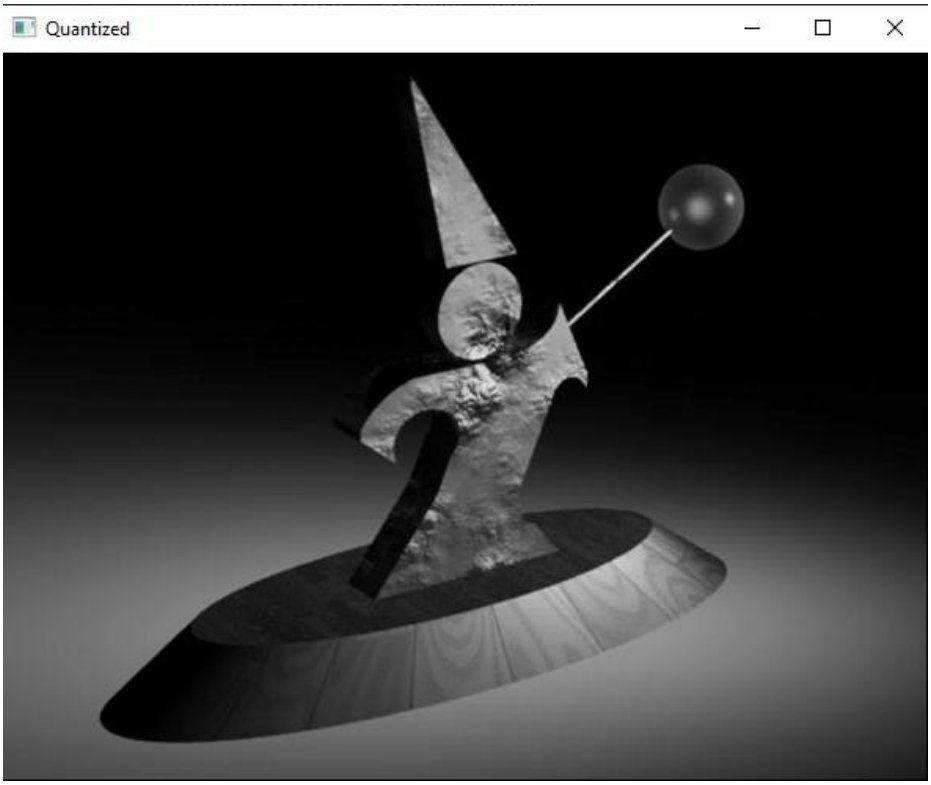
   Comparing several dithered and quantized images:

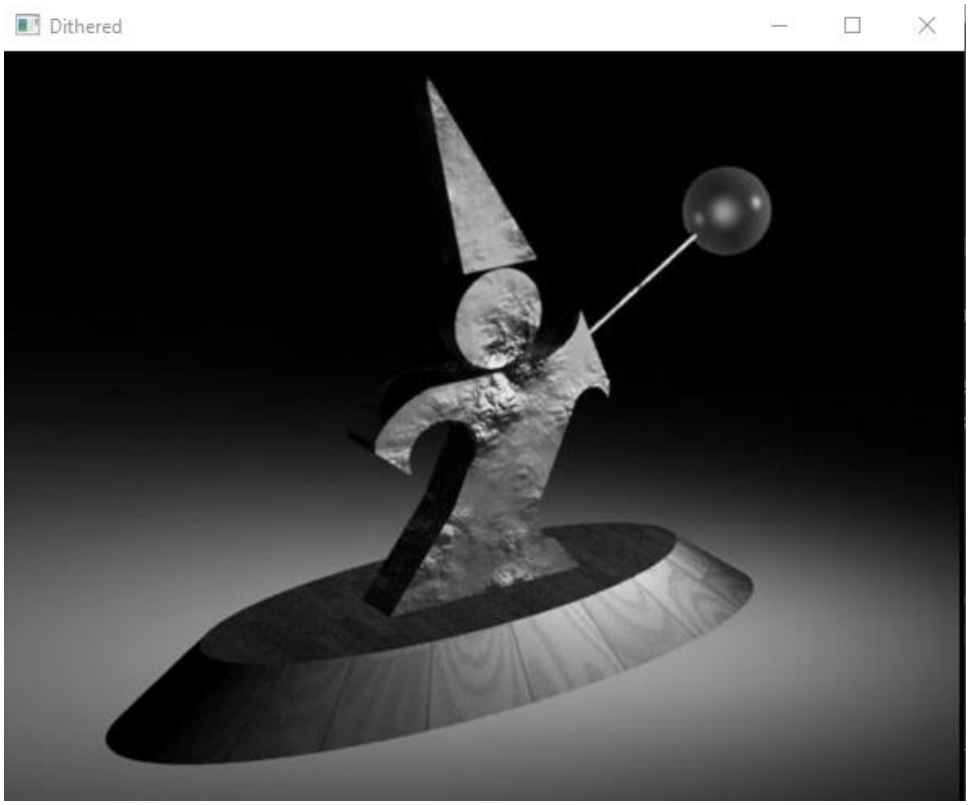
   Q = 2



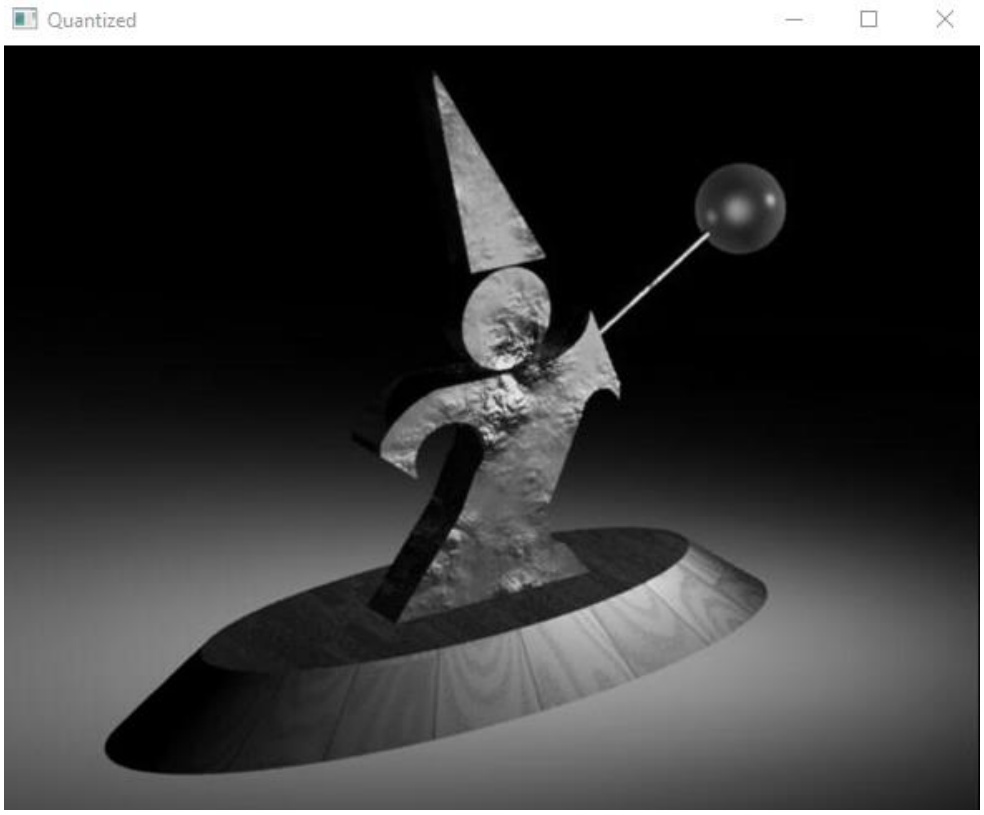

Dithered

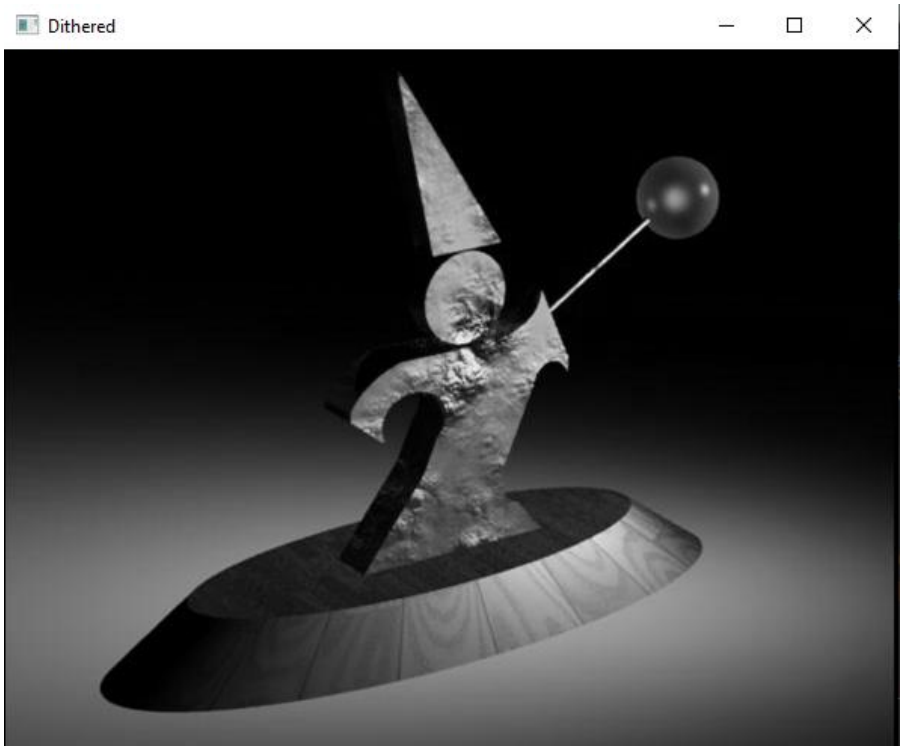
Q = 120



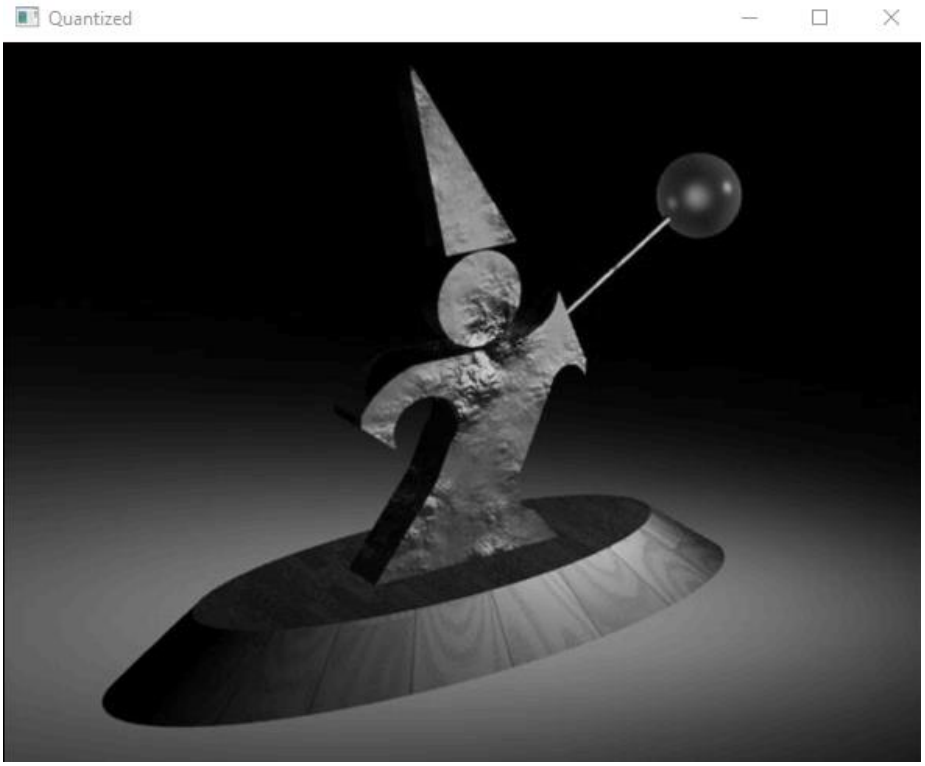


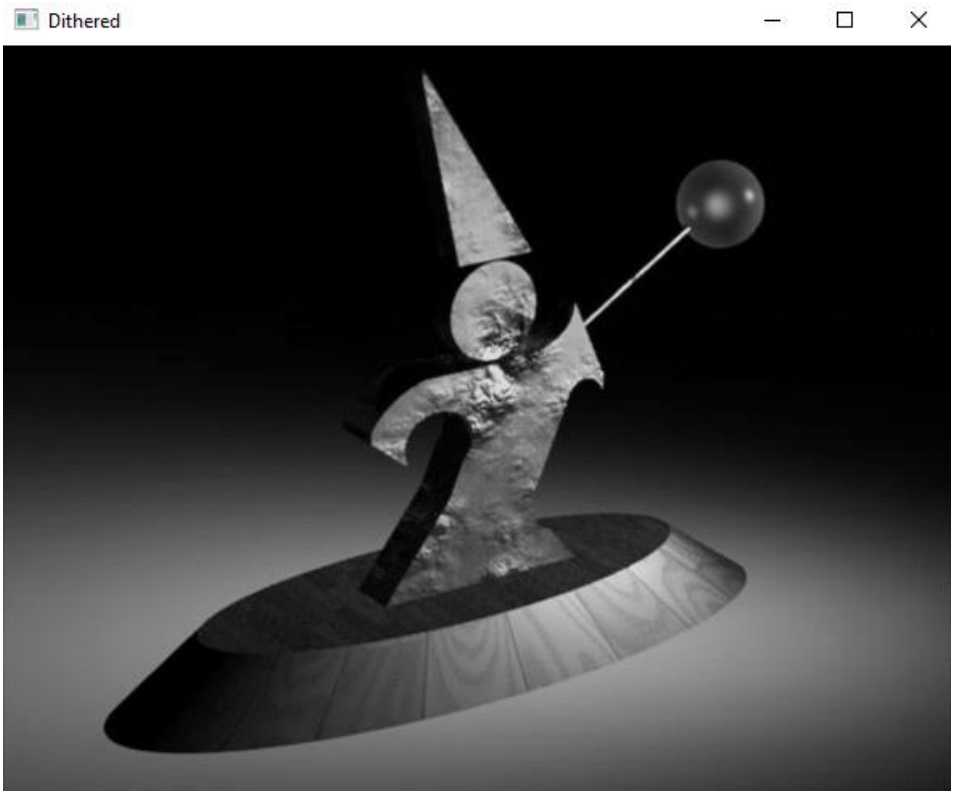
Q=250





Q = 55





4. The first disadvantage is that it is a slow running algorithm. It could work faster if one takes advantage of GPGPU (General Purpose Graphics Processing Unit) It can drastically reduce the execution time.

   Secondly presence of artifacts, which are undesired texture patterns generated by the dithering algorithm, leading to a less appealing visual results.

PART 2

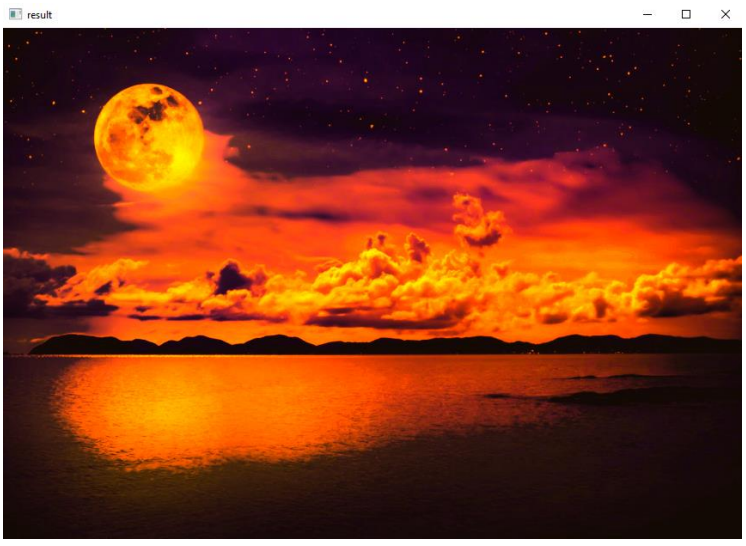
1. LAB uses the three channels representing “L” (lightness), “a” (Red/Green) and “b” (Blue/Yellow). Calculations are made on this fact. LAB is very important when correcting, toning, or altering color.

2. Color Transfer Examples

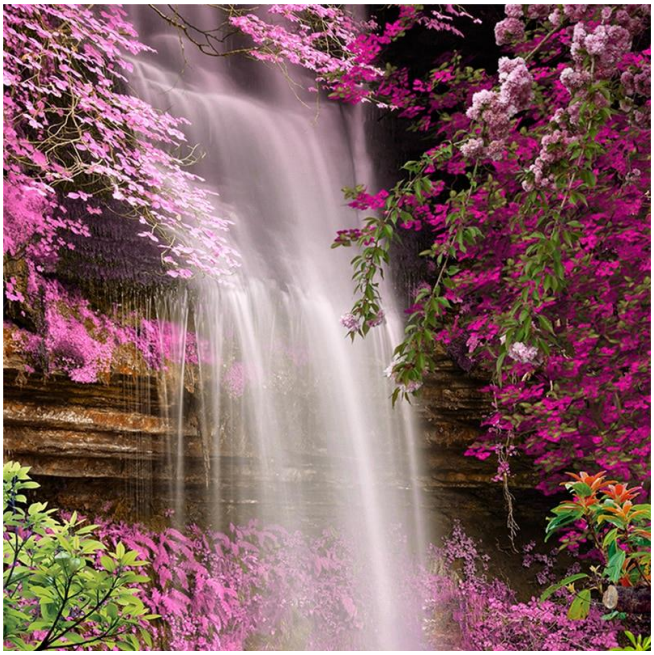
Source image:

Target image:

Result:

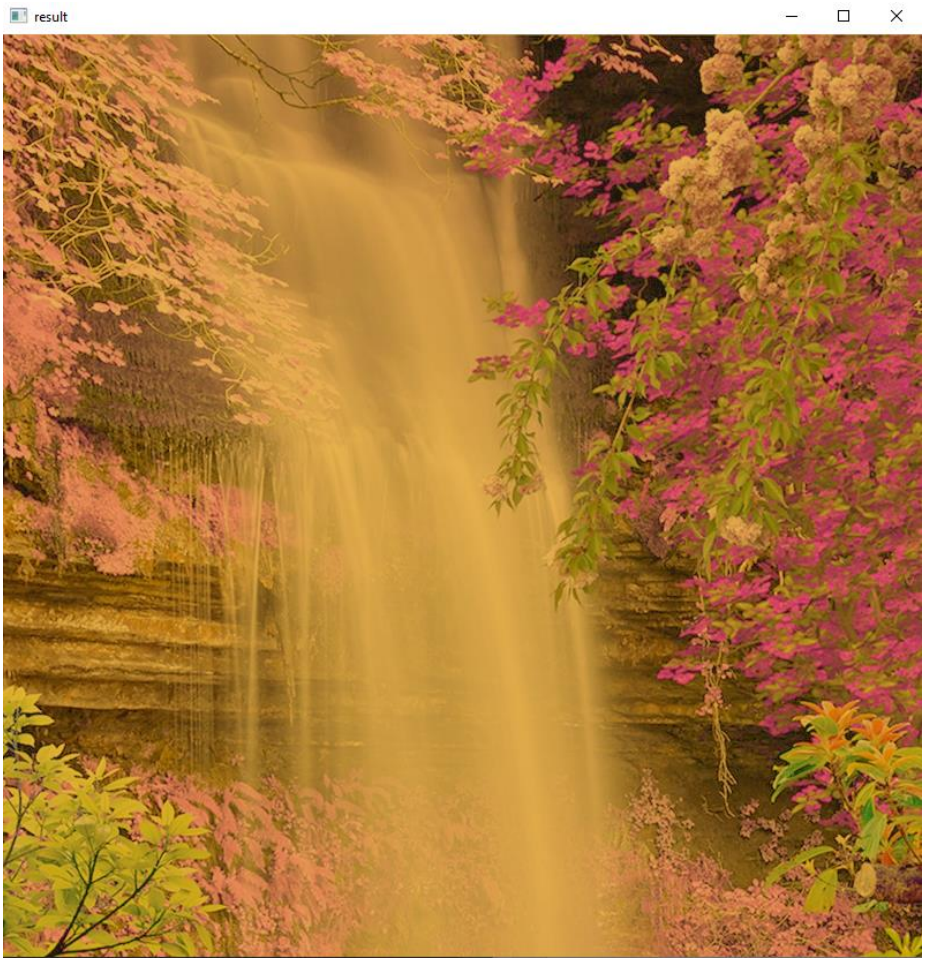


Source:



Target:

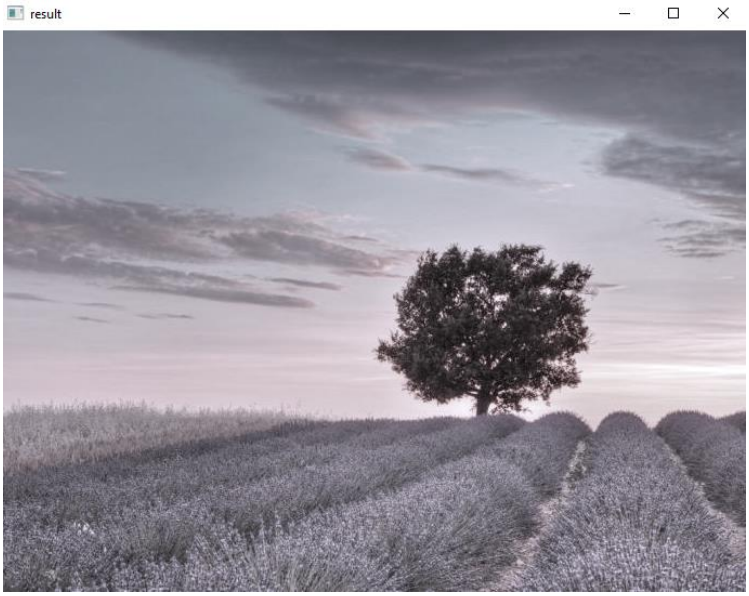
Result:



Source:

Target:

Result:



3. First disadvantage is, if the user gives an unsuitable pair of target and source images, the output image becomes inappropriate. This implies that trial-and-error tests should be carried on finding a potential, proper reference image that can produce correct results.

   Second disadvantage is, rather than being based on facts, this algorithm is based on personal experience. Since there is no absolute verifiable truth when determining the success of the generated image, this process is challenging. It is believed that this approach is inefficient for color transfer because image sequences require additional reference images, which degrades the initial labor-intensive algorithm in single image color transfer.

   Source image:

Target image:

Not a successful result because selection of target and source image is not appropriate:

Source:

Target:

Again, an unsuccessful result because target and source image is not selected properly: