1. In the zip file, cos426\_assignment1.sln did not exist. imageprocessing.sln has been assumed to be the solution file.

2. The imageprocessing.sln is cleaned and build from Microsoft Visual Studio 2019, using the Build options in Menu Bar/

3. The imgpro.cpp is compiled from Command Line using "cl /EHsc imgpro.cpp"

Brightness: The R, G and B of each of the pixels of the image is multiplied with the given factor.

Contrast: The R, G and B of each of the pixels of the image is extrapolated using the formula:

factor \* pixel.colorChannel() + pixel.Luminance() \* (1 - factor)

Blur: Convolution using kernel is done on the image. The kernel size is calculated using ((ceil(3 \* sigma) \* 2 + 1) + 1).

The kernel element at position i,j of the kernel matrix is calculated using the forrlowing expression:

1 / ((sqrt(2 \* 3.14 \* sigma \* sigma))\*exp((((b + k\_UL) \* (b + k\_UL) + (a + k\_UL) \* (a + k\_UL))/(2\*sigma\*sigma)))),

where, (a,b) is the position of the element of the kernel matrix,

k\_UL is half of the kernel size minus 1 (the kernel is iterated from -k\_UL to k\_UL)

Please check the following link to see the formula of the above expression:

https://en.wikipedia.org/wiki/Gaussian\_blur#:~:text=The%20Gaussian%20blur%20is%20a%20type%20of%20image-blurring,of%20a%20Gaussian%20function%20in%20one%20dimension%20is

Sharpen: The image is sharpened by adding up the original image with an the image formed from finding the edges of the image, using the 3\*3 kernel of {{-1,-1,-1},{-1,8,-1},{-1,-1,-1}}.

Edge Detection: The image is convoluted with horizontal and vertical kernels. I noticed after submitting that the vertical kernel has not been muliplied it in the solution.

Since I have already submitted the zip file, I am just mentioning that over here:

Here's the result obtained from using Prewitt Operator: C:\Users\sinha\Music\ImageProcessingChallenge\ImageProcessingChallenge\output