**Experiment 5: Smoothing filter and sharpening filter**

1. **Objective**

(1) To know how to smooth or sharpen images

(2) To be able to implement simple smooth or sharpening filter in Matlab

1. **Experiment Content**
   1. **Smoothing image**
2. Read the images **lib.jpg** .
3. Convert it into grey image.
4. Add some noise on the grey image (name it as **GIMGNoise**). (Using **imnoise** function)
5. Using averaging filter to smooth the image **GIMGNoise**. Use different size of averaging mask to do it and compare the results.
6. Using Gaussian filter to smooth the image **GIMGNoise**. Use different size of mask to do it. After that, compare the results from Gaussian filter.
7. Design one smoothing mask to smooth the image **GIMGNoise** and show its results. Note: the mask depends on your idea, no any restriction.
   1. **Sharpening Images**
8. Read the images **lib.jpg** given in the folder.
9. Convert it into grey image **GIMG**.
10. Use Laplacian mask to get the Laplacian image of **GIMG**. Laplacian mask has four types. Try to use each one to do it.
11. Add the four Laplacian images on the image **GIMG**. Compare the four resulting images.
12. Use Robert operator and Sobel operator to get the gradient image of **GIMG**.
13. Design one sharpening mask to sharpen the image **GIMG** and show its results. Note: the mask depends on your idea, no any restriction.

**3 Requirement of Experiment Report**

In your experiment report, you should

1. Describe the experiment procedure

2. Give the original image and resulted image in your experiment.

3. Give analysis on your interesting results as possible as you can.

4. Give some comparisons as possible as you can.