The purpose of this project is to study image filtering in the spatial domain.

1 Spatial Filtering

Write program to perform spatial filtering of an image. You can fix the size of the spatial mask at 3 x 3, but the coefficients need to be variables that can be input into your program. This project is generic, in the sense that it will be used in other projects to follow. Test your program using a blurring filter and the Laplacian.

2 Order Statistics Filters

Implement a 5x5 Median filter. Apply your algorithm on two different images. Plot the image histograms before and after the filter.

3 Unsharp Masking

(a) Use the program developed in the previous section to implement high-boost filtering.
(b) Choose three PGM images and enhance them using the program you developed in (a). Your objective is to choose constant A so that your result are visually better.

4 Anisotropic Diffusion Filter

(a) Derive the diffusion equation for the 2D case.
(b) Implement the 2D anisotropic diffusion algorithm.
(c) Apply your program with three different $K$ values on an image. Compare the results with the ones obtained in part 1 of this project. Comment on your results.