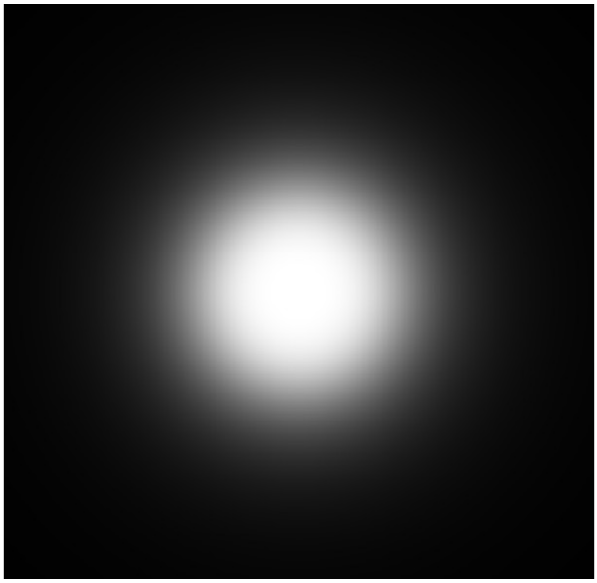
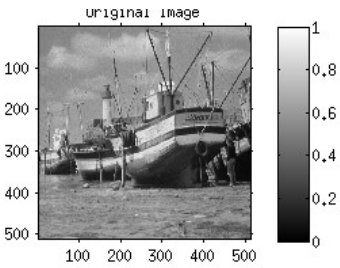
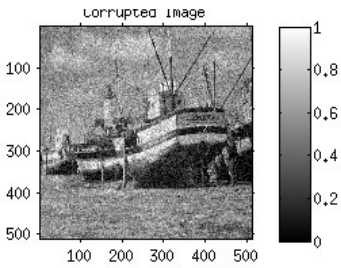
CS663 Assignment3 Question1 Report

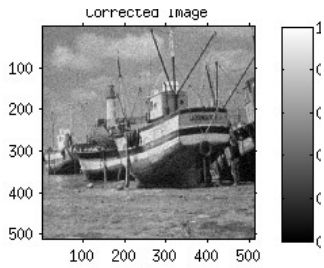
1) The following kernel was used for the denoising in the frequency domain:



2) The result of the denoising is as shown below:







3) Parameters:

No	Frequency parameter value	RMSD
1	99	0.0440
2	94 (=0.95*99)	0.0441
3	104 (=1.05*99)	0.0441

4) Results for the circular filter: The energy distribution was calculated for both the original and noisy images. The results are presented below:

Original Image:

No	Expected energy %	Radius	Energy %
1	88	2	88.53
2	91	6	91.66
3	94	27	94.09
4	97	222	97.00
5	99	3537	98.99

Noisy Image:

No	Expected energy %	Radius	Energy %
1	88	2	88.40
2	91	6	91.73
3	94	27	94.17
4	97	201	97.01
5	99	2886	99.00

The differences are expected since noise has a flat spectrum and thus the noisy image accumulates energy faster than the original image.
In applying the circular masks, the original image is taken since we want to show the RMSD between the image reconstructed from 'low' frequency components. Reconstructed images are shown below.

No	Radius	RMSD
1	2	0.1471
2	6	0.1370
3	27	0.1221
4	222	0.0901
5	3537	0.0569