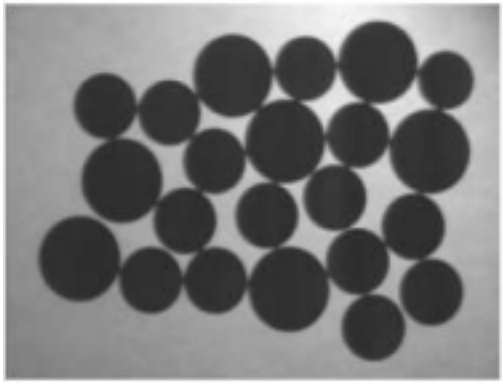
Assignment 4: Hands on FFT, Hough Transform

Q1. **Hough-Transform for line detection**. Implement a second-derivative edge detector on the image north.png and top_view.png (first convert to grayscale) using the Laplacian of Gaussian (LoG) method described on page 724 (G&W book). Plot edges uses zero crossing. Also use a threshold of 4% similar to Fig 10.22 (pg. 728, G&W) to plot a second edge image.

The goal of this step is to outline the lines correctly identify the block structure of top view of IIT Jammu. You will be graded upon the accuracy of structure shown by your lines. You can use built-in functions.

Q2. Perform **Hough-Transform for circle detection** on the image coins.png. You can use build in functions.



Q3. Analysing DFT: Choose a 64x64 image and find the Discrete Fourier Transform for the image. Now Add 64 columns and rows of zeros to the right and bottom side of the original image. Now find the DFT of this new image again. Repeat this process 2 more times each time doubling the
image size and padding the pixels on the right and bottom by zeroes. You will therefore have 4

images – first one 64 x 64 with no zero padding and then 128x128, 256x256 and 512 x 512 after padding. Find the DFTs of all these images. Show all your results in the pdf file and explain the relationship between the four DFTs you get. Justify the relationship you discover.

Q4. Write a program to sharpening the image in frequency domain.