Images for this assignment are from the open access resource:

https://wiki.cancerimagingarchive.net/display/Public/LIDC-IDRI

Folder shall be taken according to the roll number mapping mentioned at the last of this document. The folder contains two Chest CT slice images. Apply all the following operations on both images.

The data can be downloaded from here

Part 1: Denoising
Denoise the image using appropriate filter.

Summarize your observations as:

a. What is the prominent noise identified in the image or introduced by yourself in the given image?

b. Type of filter used to denoise

c. Plot the residuals and analyze the performance of filter using the metric, PSNR

Part 2: Contrast enhancement and edge detection
i. Enhance the contrast of the images. Visualize the input and the contrast enhanced image using histograms.

ii. After contrast enhancement, try to detect the edges of the sternum (crop the image such that it encompasses atleast twice the size of the sternum) using various edge detectors and compare the performance of the edge detectors.

Part 3: Observe the application of Hough Transform
1. Use the best contrast enhanced edge detected image from part 2 and apply Hough transform to locate the sternum.

NOTE: Choose an appropriate value of 'm' (the blend parameter) of Lamé curve and thus the parameters space reduces to 2.

References:

- Pattern recognition in medical imaging by means of the Hough transform of curves.
  https://www.dima.unige.it/~perasso/files/Ispa_2013.pdf
- Lamé curve . https://en.wikipedia.org/wiki/Superellipse .

Note: For all parts code in MATLAB or Python and summarize your observations and results in a document and submit the code and summary document as one zip file.

To avoid confusion in the code execution sequence, you can attach a readme file in .txt format, if required.

Submit   the   assignment   on   or   before   28th   September   2021,   11.59   PM.

Roll No.	Image name(.ppm)
AE17B020	1
AE18B024	2
AE19B039	3
AE20D412	4
AM20D010	5
AM20S052	6
AM21D021	7
BE17B011	8
BE17B019	9
BE18B010	10
BE18B012	11
BE18B021	12
CE18B125	13
CE18B136	14
CE19D201	15
CH18B114	16
CL21M011	17
ED17B001	18
ED17B055	19
ED18B002	20
ED18B004	21
ED18B007	22
ED18B009	23
ED18B012	24
ED18B013	25
ED18B017	26
ED18B021	27
ED18B022	28
ED18B024	29
ED18B025	30
ED18B028	31
ED18B031	32
ED18B033	33
ED18B034	34
ED18B035	35
ED18B036	36
ED18B037	37
ED18B039	38
ED18B043	39
ED18B045	40
ED18B047	41
ED18B048	42
ED18B049	43
ED18B052	44
ED18B054	45
ED18B056	46
ED20D402	47
ED20D601	48
ED20S014	49
ED21S001	50

ED21S006	51
ED21S007	52
EE19S046	53
EE20S046	54
EE20S047	55
EE20S049	56
EE20S051	57
EE20S052	58
EE21D023	59
EE21S050	60
EP18B007	61
EP18B021	62
ME17B016	63
ME17B144	64
ME21S032	65
AM21D602	66
ED17B040	67