

Midterm for CSE 577 (Allen Tannenbaum)
Due by email Wednesday, March 22, 2023 by 12 noon.

All parameter values in these problems are suggested. You can and should try your own.

- 1. (a) Take the image heart.jpg and find a threshold to pull out the two heart chambers. Please give me the threshold and results. See the power point medical.imaging.ppt.
(b) Take the image brain.tech.jpg and find a threshold to pull out the tumor. Please give me the threshold and results. See the power point medical.imaging.ppt.**
- 2. Look up the watershed segmentation method, explain it, and apply to the test images heart.jpg and brain.tech.jpg.**
- 3. Apply the Laplacian of Gaussian (LoG) operator to find the edges in heart.jpg and brain.tech.jpg. Try several different values of the variance sigma. For example, sigma=1, 10, 100, 1000.**
- 4. Apply histogram equalization to heart.jpg and brain.tech.jpg, and show results.**
- 5. Let H be a Gaussian smoothing filter. Let F be the image heart.jpg. Consider the filter**

$$F + \alpha (F - F * H) = (1 + \alpha) F - \alpha (F * H) = F * ([1 + \alpha]e - H)$$

What does this filter do? Take $\alpha=.5$, and $\sigma=10$ (in the Gaussian), and apply to heart.jpg. Try a few other values of α and σ , and show the results. The symbol e in the above formula is the delta function.

Each problem is worth 20 points.