For each part submit a brief written discussion describing your solution. Include commented source code and snapshots of representative images. Source code must include descriptive comments for full credit! Five images for testing are available in http://www.engineering.uiowa.edu/~bme286/homework/hw2.

1. (20 pts) Write a program to read a binary input image and compute the 2D distance transform described in class. Test your program on images two and three. Display the distance maps as a gray level image.

2. (20 pts) Use your distance transform algorithm to compute the medial axis transform. Test your algorithm on images one, two, and three. Hand in an image showing the object distance map as a gray level image and an image showing the medial axis skeleton points.

3. (40 pts) Write a 2D homotopic thinning algorithm by identifying simple points and final points. Demonstrate your algorithm on images three, four, and five. Hand in images with the skeleton overlaid on top of the original images.

4. (20 pts) Take your homotopic skeleton result for image five and write a program to identify skeleton branchpoints and endpoints. The input to your program should be a skeleton and one user-identified root point. Hand in an image with the branchpoints and endpoints overlaid on top of the skeleton.