A. (5 points) Modify the Sobel program to do thresholding on the gradient magnitude output to find edge points, and run it on the image face05. Produce three output images: one showing the magnitude of the gradient, one black/white image showing where the magnitude exceeds a liberal (low) threshold so that all the correct edges are in, and the last one a black/white image showing where the magnitude exceeds a restrictive (high) threshold so that only true outline fragments are shown. You can use and modify the code in sobel.c from the web-page. Write your program in a manner such that it only has to run once to produce the three output images.

B. (90 points) Write a program for the following. Implement the Canny edge detector to accept as input a value for sigma. Run it on garb34.pgm. Produce three output images: one showing the magnitude of the gradient (scaled to fit within the range 0 - 255), one black/white image showing where candidates (the peaks) exist, and the final black/white image showing the result of double-thresholding these candidates. Include code that automatically selects the HIGH and LOW thresholds. So, you will input to the program a percentage number that will be used to compute the thresholds. Print to the screen the values the program chooses for these thresholds. Run your program for sigma = 1.0, and show the output.

NOTE-1: All programs and images are available at www.cs.ucf.edu/courses/cap4453
NOTE-2: Be prepared to turn in and demo the programs and output images.
C. (5 points) Go to the Computer Vision Home Page at

www.cs.cmu.edu/~cil/vision.html

Explore the site. Write two or three sentences for each of the following members within each of the following links.
Four research groups; two test images; two hardware; two related links.
Hand in a hardcopy report (about one page, Max two pages).