Name: _____

Score: /13

CSE 5524 Computer Vision for HCI

Homework Assignment #10 (LAST ONE!)

Due: See Carmen for due date

Homography:

1) The file homography.txt contains 15 corresponding 2-D points from two different images, where the first and second columns correspond to the x and y coordinates of the points in the first image and the third and fourth columns correspond to the x and y coordinates of the points in the second image. Load the 2-D point sets and use the **Normalized Direct Linear Transformation algorithm** to compute the final homography H that maps the original points ***from* image 1 to image 2** (i.e., make sure $P_2 = HP_1$). [5 pts]

2) Plot the points from image 2 and the projected points from image 1 on the same plot. Make sure the projected points are converted into inhomogeneous form. [1 pt]

3) Compute the sum-of-squared error (squared Euclidean distance) between the actual points from image 2 and the projected points from image 1. [2 pts]

Stereo/Disparity:

4) Compute a **disparity** map for the images left.png and right.png (having parallel optical axes) using the **basic** stereo matching algorithm. Use the **NCC** function to perform the template matching for each patch in the left image searching in the right image (search only leftward from – and including! – the starting point along each row!), and use a window size of 11x11 pixels. To make things run a bit faster for the grader, when searching leftward, only move up to 50 pixels to the left (instead of going all the way to the edge of the image). Use the following Matlab code (or Python equivalent) to display the disparity map D with a gray colormap and clip the disparity values at 50 pixels, making sure to display the full range of remaining values (e.g., using Matlab's imagesc function): [5 pts]

```
imagesc(D, [0 50]);
axis equal;
colormap gray;
```

5) As usual, submit your material to Carmen.