Computer Vision I (CSCI 3240U) **In-class Exercise**

Please hand in this paper to the instructor before the end of the lecture.

Lastname (PRINT):	_____	Firstname:	_____
Student number:	_____	Date:	_____

Q. A homography is a 3×3 matrix with 9 entries but only 8 degrees of freedom. Explain why, and state the minimum number of point correspondences needed to estimate it.

Q. Each correspondence contributes two rows to a system $\mathbf{Ah} = \mathbf{0}$. With four correspondences, what are the dimensions of $\mathbf{A}$? What constraint rules out the trivial solution $\mathbf{h} = \mathbf{0}$, and which singular vector of $\mathbf{A}$ do you take?

Q. You photograph a flat building facade from two positions, walking sideways between shots. Can one homography relate the two images? Now do the same for a deep street scene. Explain the difference in one sentence.

Q. Epipolar geometry constrains a point's match in the second image to lie on a line. State what this buys you computationally, and what the search reduces to once the pair has been *rectified*.