

CS 532: Homework Assignment 1
Due: September 16, 6:00pm

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Collaboration Policy. Homeworks will be done individually: each student must hand in their own answers. It is acceptable for students to collaborate in understanding the material but not in solving the problems. Use of the Internet is allowed, but should not include searching for previous solutions or answers to the specific questions of the assignment. I will assume that, as participants in a graduate course, you will be taking the responsibility of making sure that you personally understand the solution to any work arising from collaboration.

Late Policy. No late submissions will be allowed without consent from the instructor. If urgent or unusual circumstances prohibit you from submitting a homework assignment in time, please e-mail me explaining the situation.

Submission Format. Electronic submission on Canvas is mandatory. Submit in a zip file, a pdf file:

- source code (excluding libraries),
- points used in the computation,
- resulting images,
- at most one page of text explaining anything that is not obvious.

Also include the code and output images separately.

Problem 1. (60 points) Download the image of the basketball court from the course website. Then, generate a blank 940×500 image and warp the basketball court only from the source image, where it appears distorted, to the new image so that it appears as if the new image was taken from directly above.

Problem 2. (40 points) In the result of Problem 1 you will notice severe artifacts due to the baskets. What is the cause of these artifacts? Can you use part of the input image and multiple homographies to reduce the problem? Submit code for this problem separately than the previous one.

Notes.

- You are allowed to use image reading and writing functions, but not homography estimation or bilinear interpolations functions.
- If you are having trouble with the images in your programming environment, send me an email.
- Matlab, gimp or Irfanview (Windows only) can be used to click on pixels and record their coordinates.