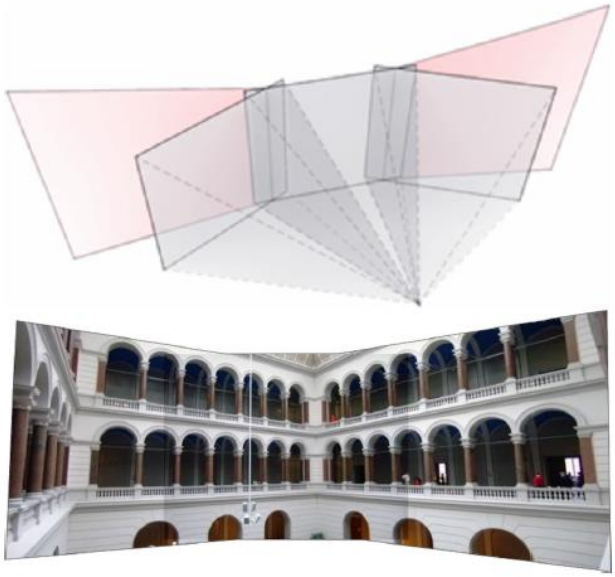
Task – Projective Transformation (Homography)

In this exercise, a fundamental projective transformation should be implemented. The task consists of geo-metrically rectifying images and stitching them together, in order to obtain a panoramic image mosaic.



a) **Image acquisition:** Take three pictures with a digital camera, which have at least 30% overlap in horizontal direction. Make sure to not capture disparities, e.g by turning around the projection centre or choosing a planar object as motif.

b) **Correspondence analysis:** Transfer the three images to your computer, load them (imread) and interactively select (figure, imshow, ginput) at least four corresponding image points x $ x′ between two neighboring images.

c) **Homography computation:** Implement your own function in order to estimate a 2D homography using the singular value decomposition (mean, abs, svd, reshape). Compute the homography matrix H_{12} from the first to the second image.

d) **Projective rectification:** Use the provided auxiliary program geokor.m and the estimated homography to warp the first image to the second one (geokor combines the respective frames to a common mosaic image). Then, compute the homography H_{32} from the third image to the intermediate mosaic
image and stitch them together.

e) **Visualization:** Display the stitched panoramic image on the screen.