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Robust Estimation and panorama stitching

Part-1: Homography estimation

- a) The solution follows a typical pipeline for image stitching:
 1. **Feature Extraction:** The code uses the SIFT algorithm for feature extraction and descriptor calculation. It detects key points in images and computes descriptors that represent the appearance of these key points.
 2. **Putative Matching:** Then the code calculates pairwise distances between descriptors to find putative matches. The cdist function from 'scipy.spatial.distance' is used to compute the Euclidean distance between pairs of descriptors.
 3. **RANSAC for Homography estimation:** RANSAC estimates the homography matrix that aligns one image with the other. In each iteration of RANSAC, four random matches are sampled to estimate a candidate homography. Then the no. of inliers is counted by applying the estimated homography to all putative matches and checking if the transformed points lie within a certain threshold distance from their corresponding points in the other image. The homography with the largest number of inliers is chosen as the best estimate.
- b) For the given image the number of inliers and average residual are

Number of inliers: 107

Average residual: 1.4440694

```
1 # Report the number of inliers and the average residual for the inliers
2 print("Number of inliers:", len(inliers))
3 print("Average residual:", residual)
```

Number of inliers: 107

Average residual: 1.4440694

The location of Inlier matches in both images:



- c) Final result of my stitching image.

