This report includes the steps performed to carry out feature detection, description and matching.

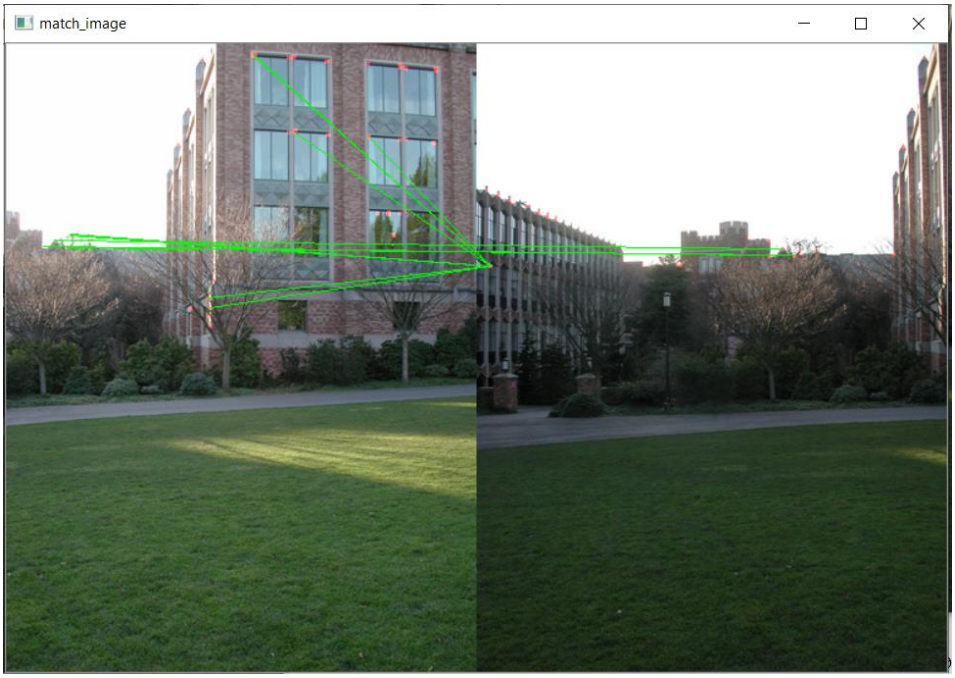
1. **Feature Detection**
    - Here, I applied the Harris corner detection algorithm with a threshold of 0.4 times the maximum corner response for any potential key-point in the image.
    - Then, I selected interest points which were local maximum in a 3x3 neighborhood
    - After that, I selected interest point using adaptive non maximum suppression to ensure uniform spatial spread of the key-points.
    - At this step, dominant orientation for each key-point was calculated and also, those key-points with 80% of the maximum magnitude were considered and added to the list of key-points.
2. **Feature Description**
    - 128 bit SIFT descriptor was calculated here and the descriptor was normalized to ensure contrast invariance.
3. **Feature Matching**
    - A threshold of 1.8 times the smallest distance between two features has been considered.
    - Ratio test was used to further filter better matches.

Extra Credits:

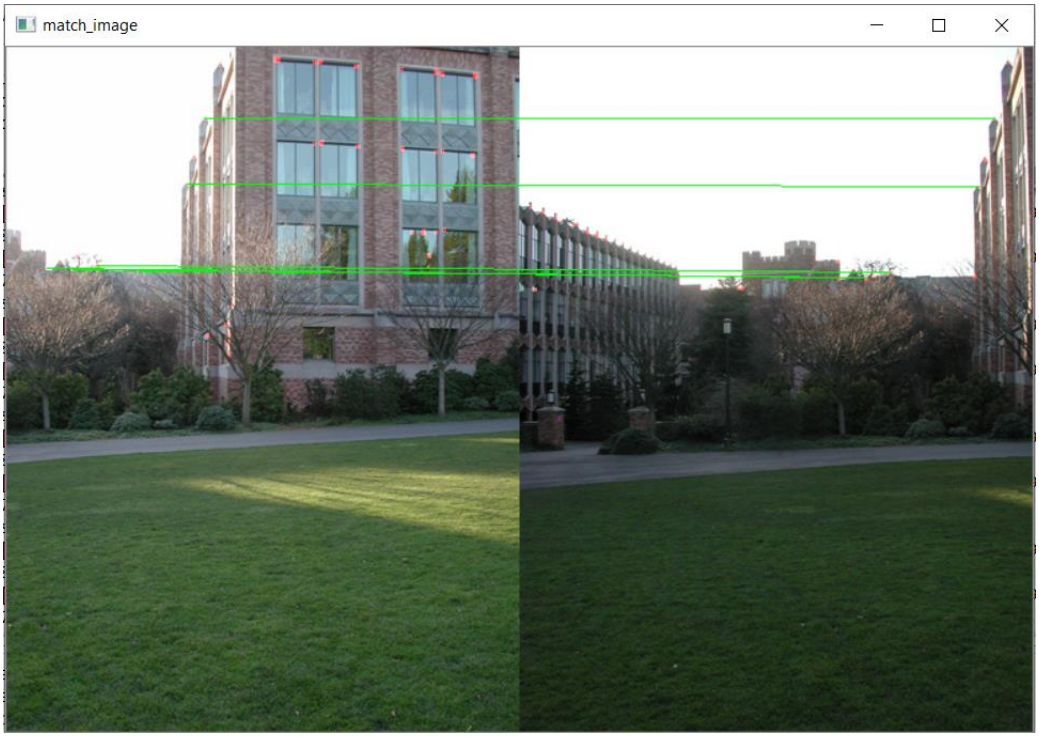
Better feature matching: I calculated matches both ways from the 1st image to the 2nd and vice-versa and selected only those points that appeared to match in both the matches. This resulted in selection of better matches.

RESULTS:

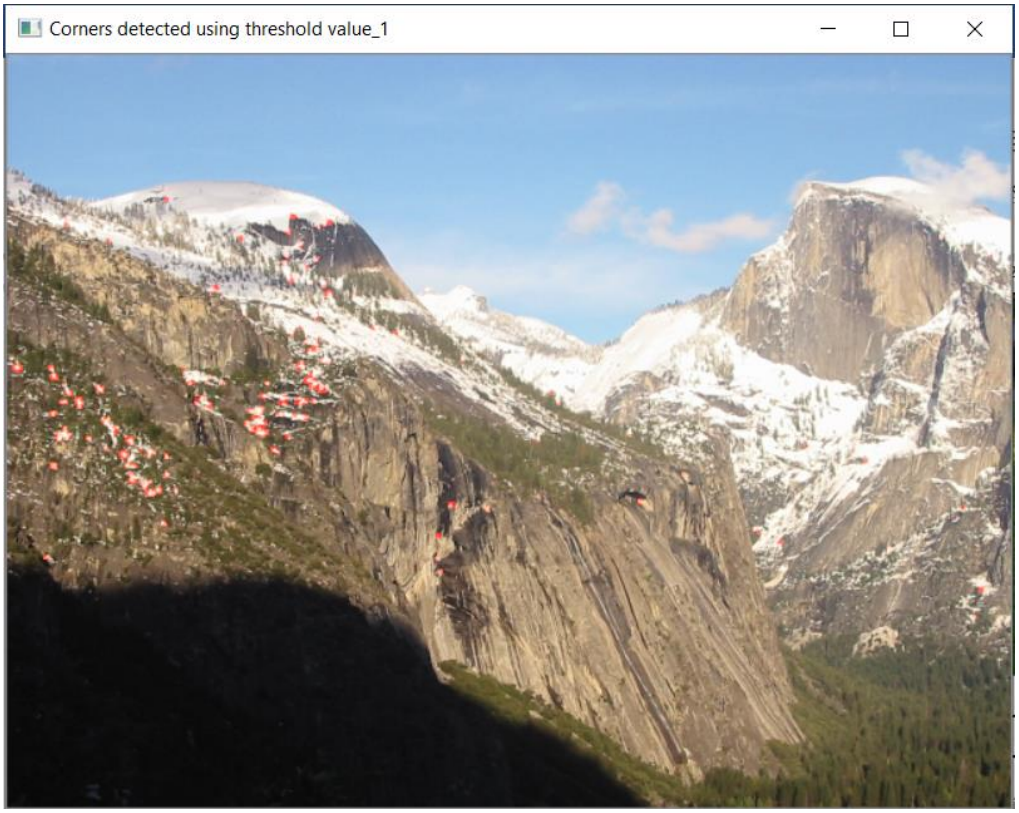
Before adding contrast invariance (matches highlighted in green):



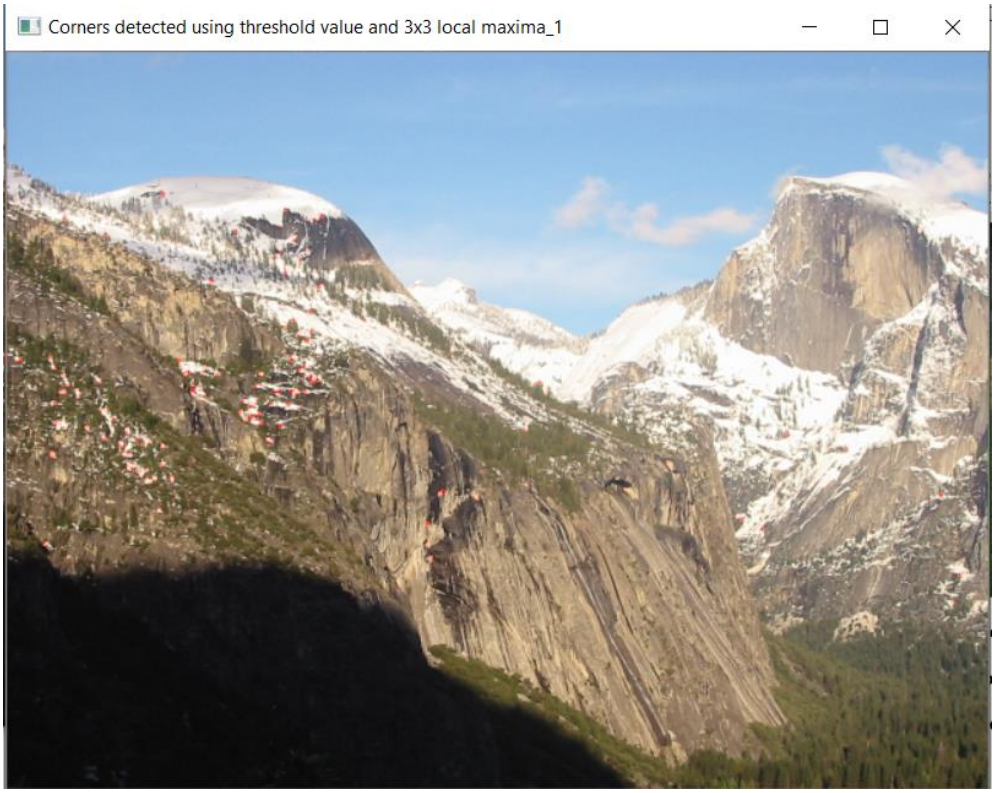
After adding contrast invariance (matches highlighted in green):



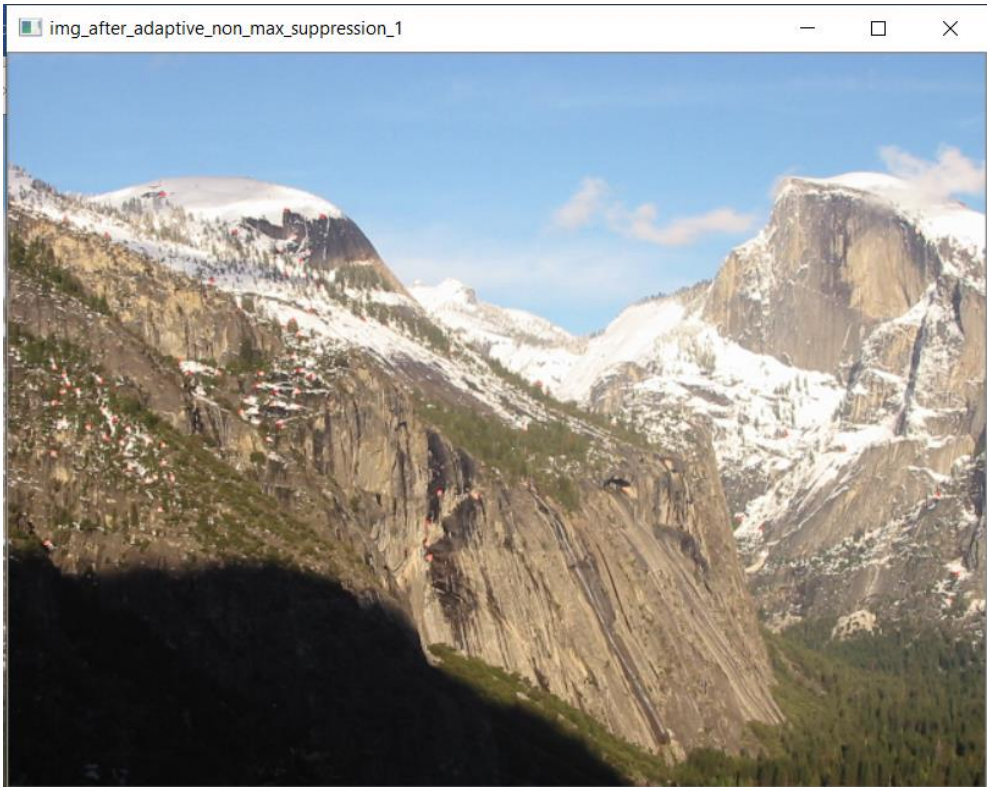
Detecting potential key-points using threshold (key-points are highlighted in red):



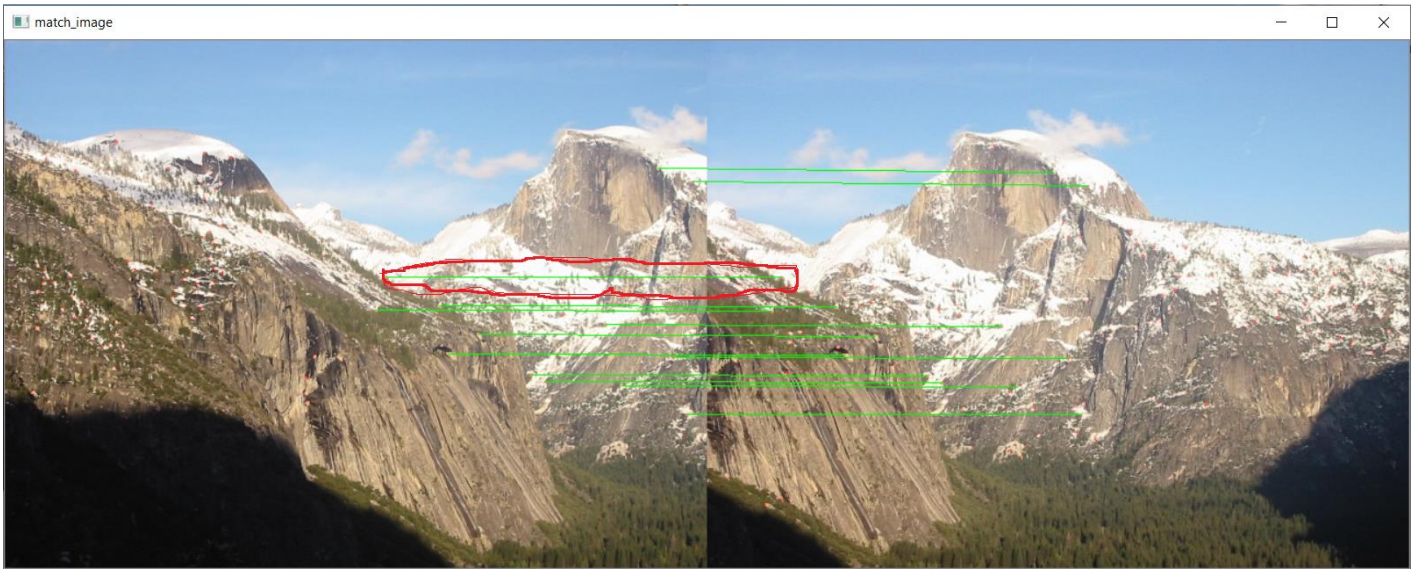
Refining key-points using 3 x 3 neighborhood (key-points are highlighted in red):



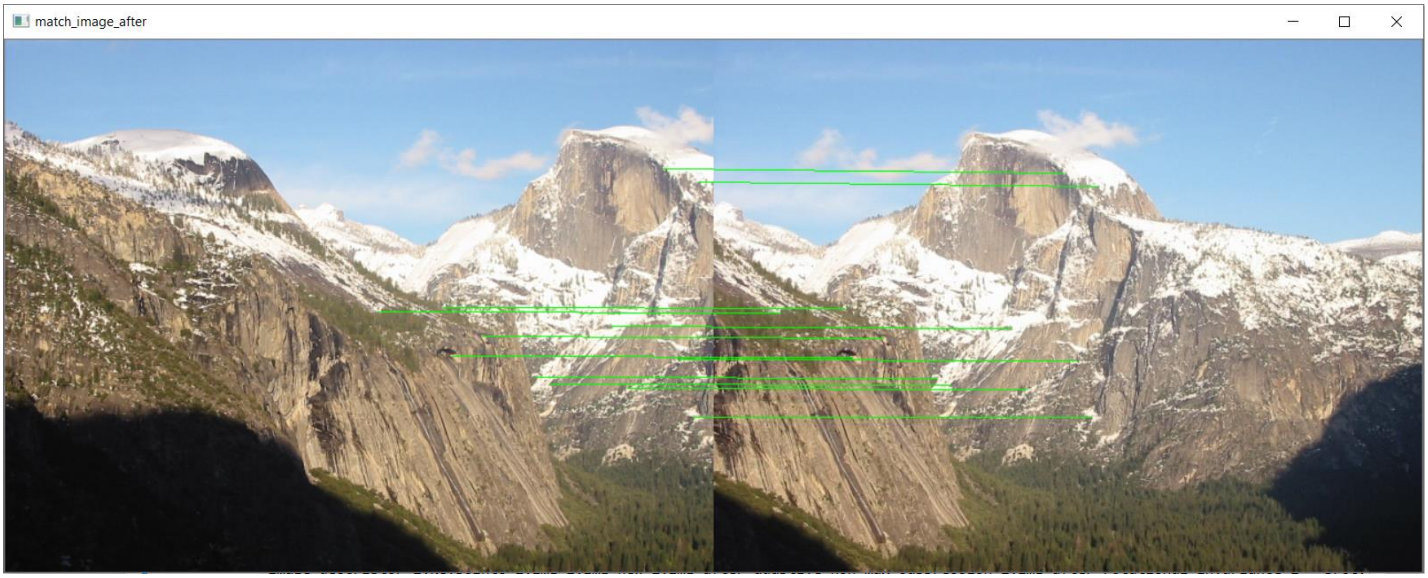
Refining key-points using adaptive non-maximum suppression (key-points are highlighted in red):



Match Image (matches highlighted in green):



Better Match Image (matches highlighted in green):



The match circled in red in ‘Match Image’ was removed while looking for matches from both the images.