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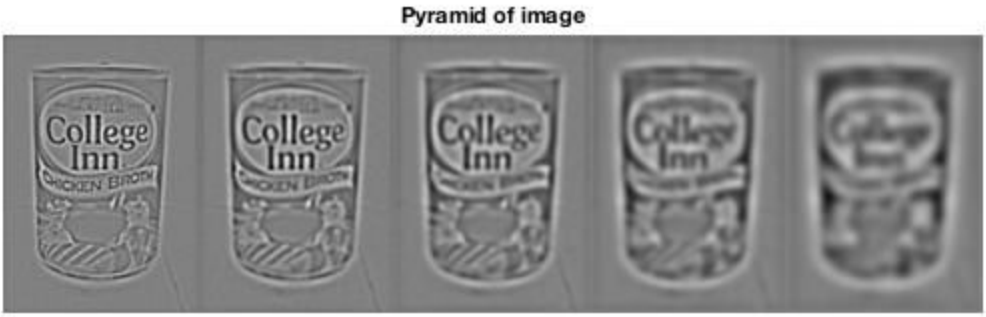
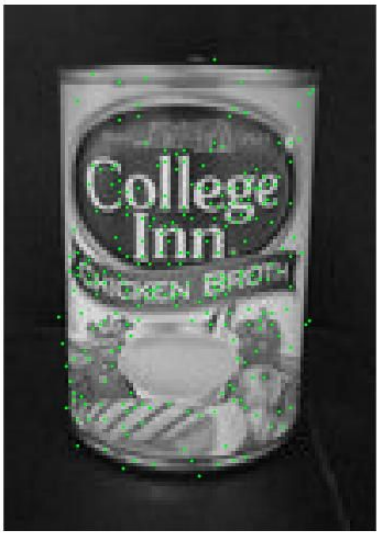
Course #: **16720**

HW2

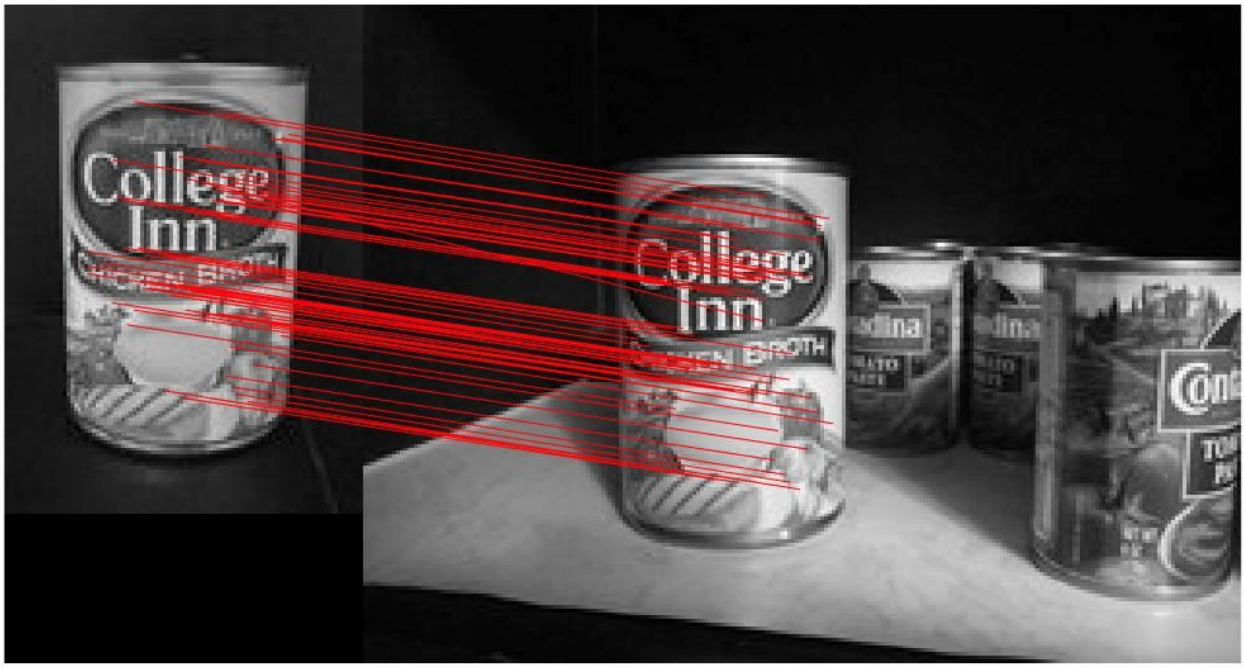
Q1.2:



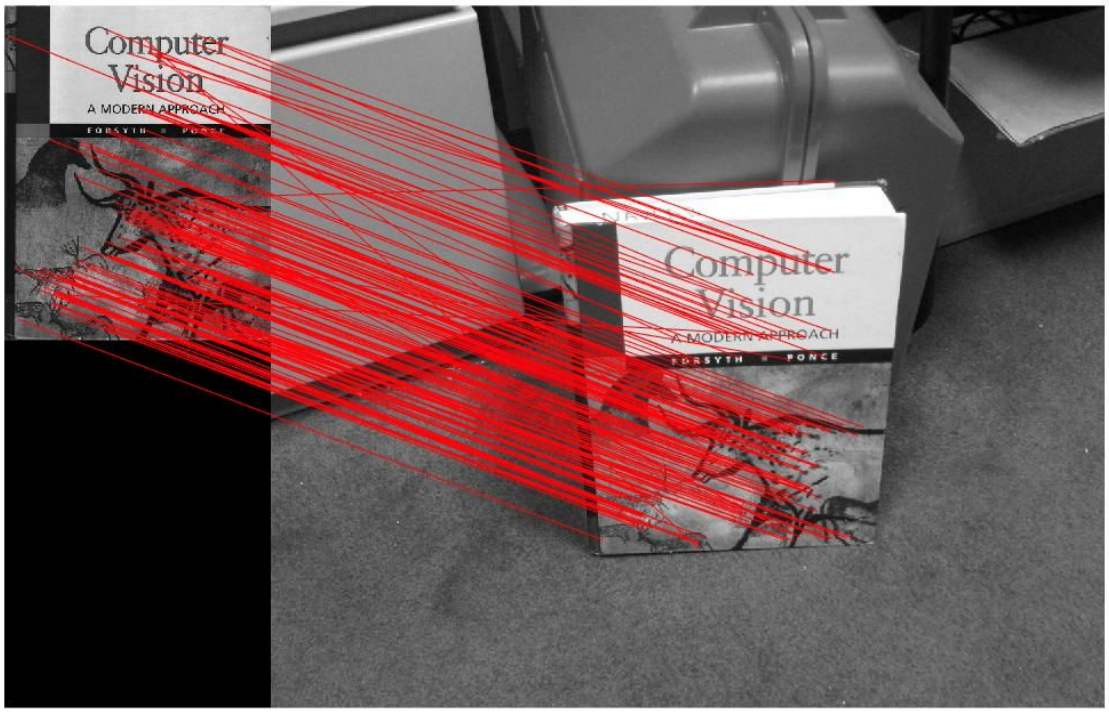
Q1.5:

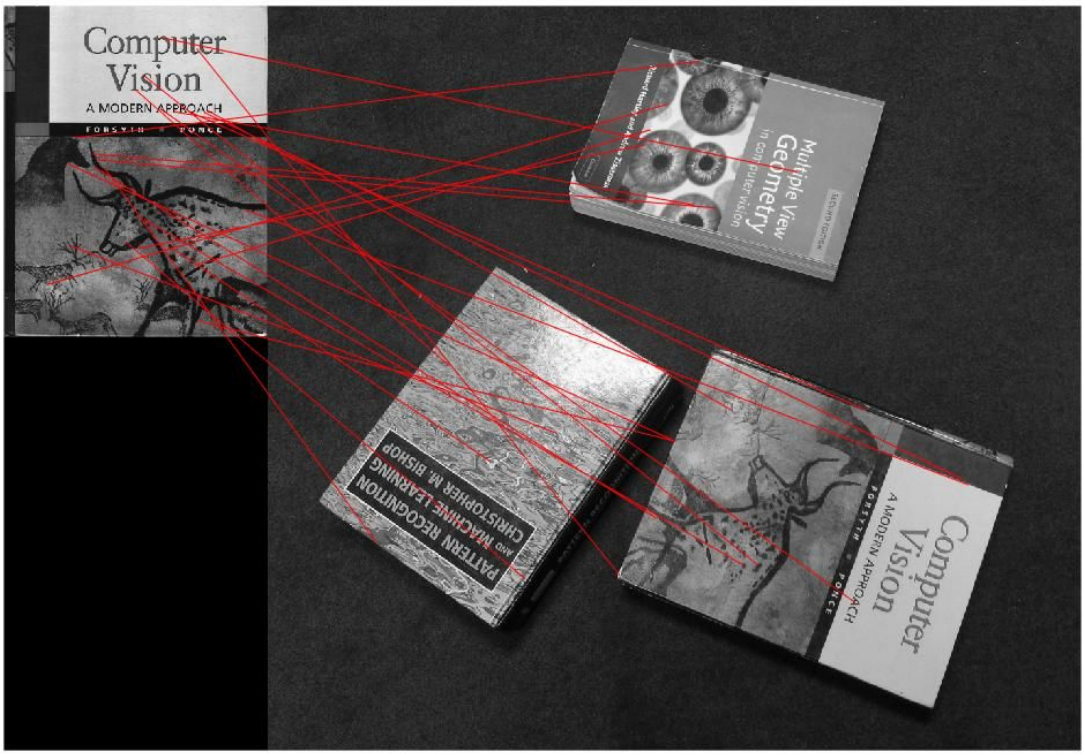


Q2.4: (with ratio = 0.75)



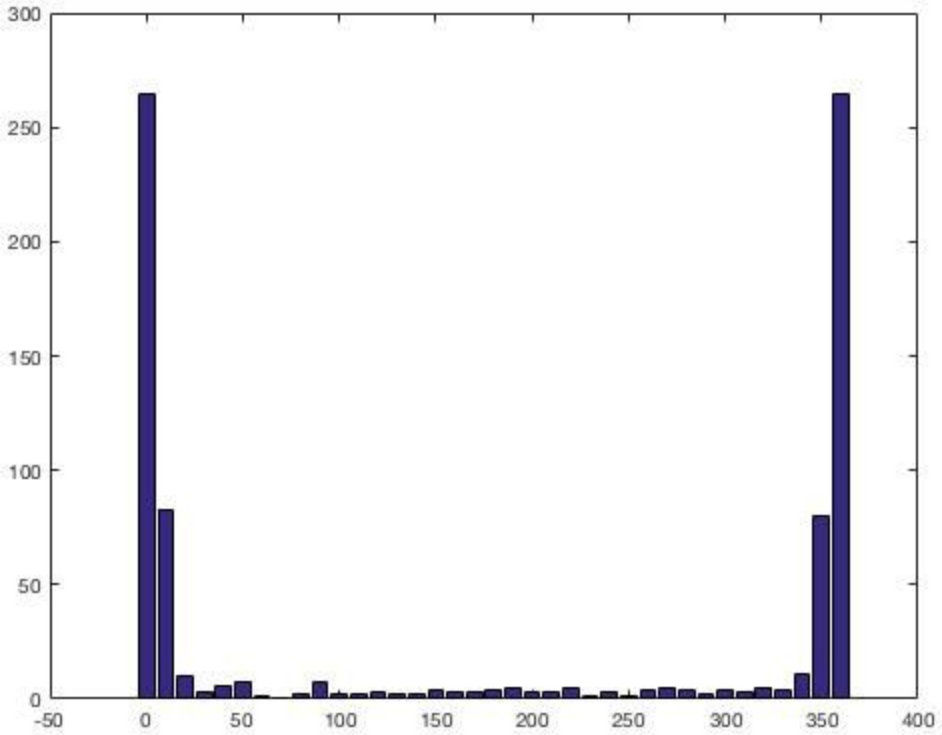
Matches of pf_* images (with ratio = 0.77:





Compared with result 3 and 4, we can see there are more correct matches in result 1 and 2. I think the reason is that: First, the corresponding book in result 1 and 2 have little rotation, which leading to better performance. Second, In result 2, 3, 4, there are other books besides the original one. So there might be some key points occurs in other books. This unrelated key points might behave as noise, thus made the performance worse.

2.5 Rotate:



When the image rotate 0 or 360 degree, which is not rotating at all, we can get the most number of matches. Because it actually the identically image, all the key points in the same location will match to each other. After rotating 20 degrees, the number of matches decreases significantly. Because the BRIEF descriptors are computed from the nearby 9*9 matrix, the changes of the points will result in the changes in the key points, thus we will has less matches.

Q3:

(a)

For pi = (xi, yi, 1) and qi = (ui, vi, 1)

we have:

$$u(h31x + h32y + h33) = h11x + h12y + h13$$
$$v(h31x + h32y + h33) = h21x + h22y + h23$$

Then

$$xh11 + yh12 + h13 - xuh31 - yuh32 - uh33 = 0$$
$$xh21 + yh22 + h23 - xvh31 - yvh32 - vh33 = 0$$

So,

$$A = [xi\ yi\ 1\ 0\ 0\ 0\ -xu\ -yu\ -u\ ;\ 0\ 0\ 0\ xi\ yi\ 1\ -xv\ -yv\ -v;\ \ldots\ \ldots]$$

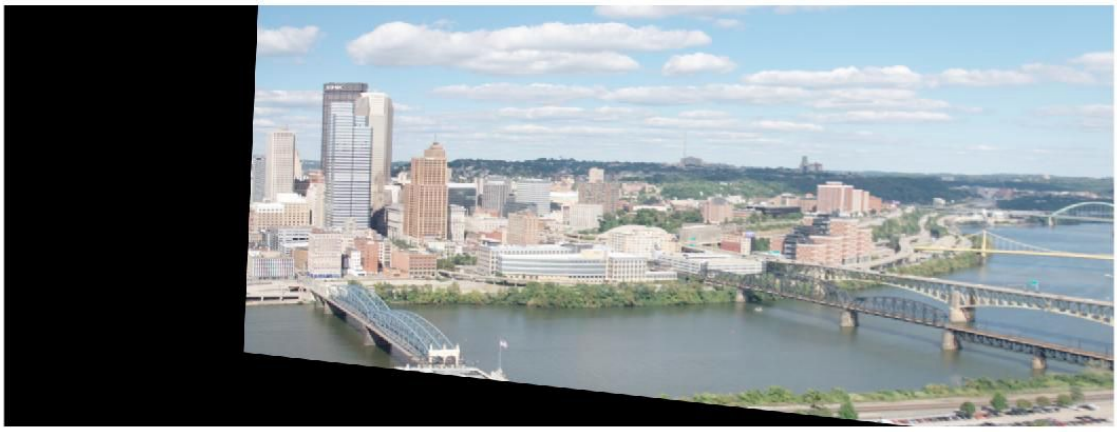
(b)

9

(c)

4

Q 5.1



Q5.2

Q 6.2