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Date you took exam: 4/30/17
Time exam started: 5:00pm
Time exam ended: 5:55pm

1. A: I bought a matrix for my girlfriend, and she likes it a lot because a matrix has many "rows (rose)".
2. A: We cannot do the transform. Since we have the internal calibration and external calibration information, we can now build an epipolar plane based on the positions of two cameras. Thus we can set the location of the epipolar line on the second image, but we cannot find the location of the corresponding pixel on the second image. Only if we know the location of the object, we can calculate the other image.
3. A: Epipolar geometry is the intrinsic projective geometry between two views. This is required when we need to find corresponding points between two images.
4. A: Unknowns are the distance of the light and the depth from the surface normal. The minimum number is three. The camera and the light must be a certain distance from each other, and the object cannot be shiny or semi-translucent.
5. A: I expect the noise to reduce to 0 because in this case we are using a box filter, in which the average value is taken from the whole 3X3 kernel, so all of the noise would be deducted.
6. A: I would bet that the nature of this filtering operation is smoothing filter. This is because the value of each element in the kernel is drawn using random variables. For it to be an edge detection filter, the kernel has to have gradients in one direction, for example, a [-1, 0, 1] edge detector. This is not likely to be the case here. So I would think that the nature is more likely to be a smoothing detector. I will be more confident if filter size is 9 X 9 instead of 3 X 3 since a larger kernel would make it harder for gradients to form if the values were generated randomly.
7. A: d
8. A: The structure illumination technology requires the capture of diffracted light. But this case, we are at a "bright sunny day", which will influence the illumination and causing deflection from the correct capture of image.
9. A: False alarm rate: 10^{-6} because in that case every 1M image will make us avoid a false positive in every image. True detection rate: 0.9
10. A: In this case we need to detect all occurrences of the faces, so we would have higher false positive rate in order to capture more faces. I would choose it to be $2 * 10^{-5}$ in order to capture as many as 5 faces per image.