Assignment 6

This assignment is due on October 30th; marks will be deducted for late homework. Remember to include all references and the names of students in your study group.

1. Using the image 'camera' from skimage.data as A and a disk element B. Prove the following relationships:

   a) $\overline{A \oplus B} = \overline{A} \ominus B$

   b) $\overline{A \ominus B} = \overline{A} \oplus B$

   (The bar means that the complement of the image should be taken) *(10 points)*

2. Use the image of Richard Feynman and with morphological operators, make an outline of the boundary. You should get a result similar to the one below: (a) input image; (b) output image. Include explanations in your report, to justify the choice of morphological operators for this exercise. *(10 points)*


(a): Original Image (b): Outlined Image

3. Consider figure shown below that illustrates the result of simple thresholding (b). The result is suboptimal because the original image (a) was corrupted with shading artifact; Demonstrate that morphological operators can remove the shading artifact and thresholding the resulting figure will indeed produce an image similar to that shown in (c). (You can choose a threshold value 't' of your choice to demonstrate the effectiveness of the morphological operation performed. *(15 points)*

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(a) Original Image	(b) Simple Threshold	c) Thresholded result after performing some morphological operation.

4. Develop an algorithm to segment image a) shown below into two images b) and c). You may threshold the image as required. Include explanations and intermediate results in your report, to justify the choice of morphological operators for this exercise. *(10 points)*
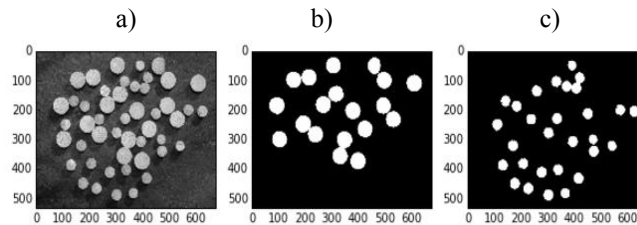
5. Develop an algorithm for segmenting image4.jpg, into different textual components (similar to the image shown below). Include explanations and intermediate results in your report, to justify the choice of morphological operators for this exercise. *(15 points)*