Practise session 11: Image presentation and description.

1. Chain code. (1)
    a. Compute the first difference of the chain code **0101030303323232212111**.
    b. Show that the first difference of the chain code normalizes it to the rotation (i.e the code becomes rotation invariant if the original boundaries are rotation invariant).

2. Co-occurrence matrix. (1)
   Find the co-occurrence matrix for the images in Fig. 1. Use rule "one-pixel immediately to the right". Describe the contents in the co-occurrence matrices. Also compute the statistical features (e.g. maximum probability, contrast, correlation, energy, uniformity, entropy, and homogeneity) from the matrices.

3. Problem. (1)
   A company is interested in automating bubble-counting as one part of the quality control. The imaging system produces images like the one in Fig. 2. There would be two tasks to complete in bubble-counting, a) determine the area occupied by the bubbles with respect to the size of the image (the image size is known, it is 7 cm^2); b) count the number of distinct bubbles. As a machine vision expert, what would be your proposal as a solution to the bubble-counting problem?
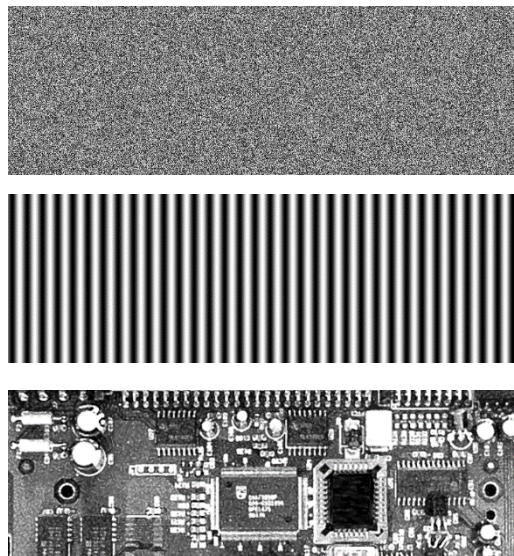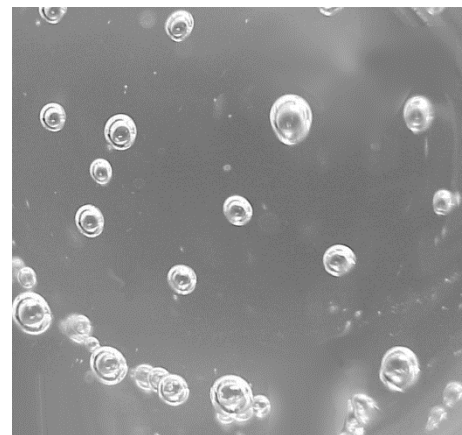

Fig. 1. Three images for Task 2.

Fig.2. Bubbles, Task 3.