Digital image processing
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HW5 **Deadline**: 1403/03/11 **Support mail**:bahar.oveis.2000@gmail.com

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1 . Hough transform (40)

a. Explain the Hough transform and its usage. (10)
b. Implement the Hough transform for the image "chess.jpg" and identify the lines of the chessboard in the picture. You are not allowed to use libraries for the Hough transform; you must implement it from scratch. Locate only the lines on the chessboard and remove any lines found on the table using any method of your choice. Identify the points on the lines found which correspond to the corners of the squares on the chessboard. (30)

2 . Segmentation (40)

Segment the birds in the image "birds.jpg". First, explain your methods before implementing them. Your score will depend on the number of birds you correctly detect. Note that you are not allowed to use segmentation libraries for this task. You are free to utilize segmentation methods discussed in class, and you can also crop one of the birds and use it as a template if desired.

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3 . K-mean (20)

a. Describe how the K-Means algorithm works step by step. What assumptions are used for K-Means? (10)
b. Implement image quantization using the k-means method for the image "sight.jpg". Determine the optimal number of clusters (k) that sufficiently describes the image, and explain how you arrived at this number. (10)