[Lab] K-means and PCA

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Lab due: Before the end of today lab session
Evaluation: Code and explanation about the code in groups of only two or three people
Remark:

- Only groups of two or three people accepted (preferably three).
- Before you leave today lab session, you must show the lab task results to the professor.
- No plagiarism. If plagiarism happens, both the "lender" and the "borrower" will have a zero.
- Code yourself from scratch. No pre-lab/lab will be considered if any ML library is used.
- Do thoroughly all the demanded tasks.
- Study the theory for the questions.

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1 Tasks

1. You need to show what you did for the Pre-Lab (which is the K-means part):
   a. Download from the course site the 2D data stored in `data_kmeans.txt` file.
   b. Cluster them using the K-means algorithm using the formulas seen in class.
   c. Test your model with some new data.
   d. Plot both training and test results in a 2D graph.

2. Implement PCA:
   a. Download from the course site the 2D data stored in `data_pca.txt` file.
   b. Implement the PCA algorithm from the formulas seen in class.
   c. Indicate the principal axes of the data.
   d. Test your model with some new data.
   e. Plot both training and test results in a 2D graph.

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