**Task:**

1. Create a dataset of 1000 points in 4-dimensional space. The points should be randomly generated and should be distributed around the origin (0,0,0,0).
2. Perform PCA on the dataset to reduce the dimensionality to 2.
3. Plot the original data points and the transformed data points in a 2D scatter plot.

**Task:**

1. Use the MNIST dataset, which contains 60,000 images of handwritten digits (0-9) and their corresponding labels.
2. Perform PCA on the dataset to reduce the dimensionality to 20.
3. Use the transformed data as input to a simple supervised learning model such as k-Nearest Neighbors (k-NN) or Logistic Regression.
4. Evaluate the performance of the model on a test set of 10,000 images and compare it to the performance of the model when using the original data (784 dimensions).