Question 1: PPCA for Image Compression

Objective:
Apply PPCA on MNIST (or CIFAR-10) for dimensionality reduction and compare reconstruction quality with PCA.

Question 2: PPCA with Missing Data

Objective:
Use PPCA to handle missing values in data.

I. Create a synthetic dataset and introduce 10% missing values at random.
II. Apply PPCA to **estimate missing values** during EM steps.
III. Compare imputed values with true values (compute error).

Question 3: Blind Source Separation using ICA

Objective:
Use ICA to separate mixed audio signals (cocktail party problem).

Tasks:

1. Download 2 audio files (e.g., speech + music).
2. Create mixed signals by applying a random mixing matrix.
3. Apply **FastICA** algorithm to separate original sources.
4. Compare separated signals with original signals using correlation.
5. Plot waveforms before and after ICA.