# Dimensionality Reduction-4

## Assignment Questions

# Assignment: PCA Implementation

**Objective:**
The objective of this assignment is to implement PCA on a given dataset and analyse the results.

**Instructions:**
Download the wine dataset from the UCI Machine Learning Repository
**(https://archive.ics.uci.edu/ml/datasets/Wine).**
Load the dataset into a Pandas dataframe.
Split the dataset into features and target variables.
Perform data preprocessing (e.g., scaling, normalisation, missing value imputation) as necessary.
Implement PCA on the preprocessed dataset using the scikit-learn library.
Determine the optimal number of principal components to retain based on the explained variance ratio.
Visualise the results of PCA using a scatter plot.
Perform clustering on the PCA-transformed data using K-Means clustering algorithm.
Interpret the results of PCA and clustering analysis.

**Deliverables:**
Jupyter notebook containing the code for the PCA implementation.
A report summarising the results of PCA and clustering analysis.
Scatter plot showing the results of PCA.
A table showing the performance metrics for the clustering algorithm.

**Additional Information:**
You can use the python programming language.
You can use any other machine learning libraries or tools as necessary.
You can use any visualisation libraries or tools as necessary.

**Note:** *Create your assignment in Jupyter notebook and upload it to GitHub & share that github repository link through your dashboard. Make sure the repository is public.*