# Assignment 1

1.What is Machine Learning? Explain its types and their Applications.

2. What is Supervised learning? What the algorithms used to perform learning.

3. What is Unsupervised learning? Explain the learning algorithms.

4. What is Reinforcement learning? Types of learning algorithms.

5. Differentiate between Supervised and Unsupervised and Reinforcement learning

# Assignment 2

Que1. An airline knows that 5 percent of the people making reservations on a certain flight will not show up. Consequently, their policy is to sell 52 tickets for a flight that can hold only 50 passengers. What is the probability that there will be a seat available for every passenger who shows up?

Que2. Calculate the Eigen value and Eigen vector A

[1 2 3]
[1 -1 4]
[-2 -4 1]

Que3. Explain Statistical Decision Theory **regression** with examples.

Que4. How the **bias-variance trade-off** is linked with **underfitting and overfitting**. Illustrate with a diagram

Ques5.Compute the regression line for the following dataset using the **least squares method**:

- X = [1, 2, 3, 4, 5]
- Y = [2, 4, 5, 4, 5]

## Assignment 3

1. What are the main goals of dimensionality reduction? Explain how Principal Component Analysis (PCA) transforms data.

2. Compare and contrast shrinkage methods with subset selection techniques.

3. Given a dataset, how would you implement Linear Discriminant Analysis for classification?

4. Discuss how separating hyper planes are used in classification tasks.

## Assignment 4

1. Describe the back propagation algorithm used in training neural networks

2. Analyze the differences between decision trees and ensemble methods in classification tasks.

3. Evaluate the advantages of Bayesian parameter estimation over Maximum Likelihood Estimation.

## Assignment 5

1. What is clustering in machine learning? Explain Gaussian Mixture Models and their application
2. Analyze the impact of ensemble methods on learning accuracy.