1. **What is the difference between precision and recall?**

**Precision, Recall, and Cross-Validation:**

**Difference between Precision and Recall**:

1. **Precision**: The ratio of true positives to the sum of true positives and false positives. It measures the accuracy of the positive predictions. Precision=True PositivesTrue Positives+False PositivesPrecision = \frac{True\ Positives}{True\ Positives + False\ Positives}Precision=True Positives+False PositivesTrue Positives​
2. **Recall**: The ratio of true positives to the sum of true positives and false negatives. It measures the model’s ability to detect all relevant instances. Recall=True PositivesTrue Positives+False NegativesRecall = \frac{True\ Positives}{True\ Positives + False\ Negatives}Recall=True Positives+False NegativesTrue Positives​
3. **Key Difference**: Precision focuses on the correctness of positive predictions, while recall focuses on the model's ability to find all positive instances.

**2.What is cross-validation, and why is it important in binary classification?**

**Cross-Validation**:

* **Definition**: A technique for assessing how a model generalizes to an independent dataset. The dataset is divided into "k" subsets, and the model is trained on k-1 of them while tested on the remaining one. This process repeats k times (k-fold cross-validation).
* **Importance in Binary Classification**: It helps in preventing overfitting by ensuring the model's performance is robust across different data subsets. It provides a more reliable evaluation than a single train-test split