Support Vector Machines (SVM) - Interview Questions & Answers

1. What is a support vector?

Support vectors are the closest data points to the decision boundary. They define the margin of separation.

2. What does the C parameter do?

C controls the trade-off between margin maximization and classification error. - High C = strict, less margin, risk of overfitting. - Low C = wider margin, allows some misclassification, better generalization.

3. What are kernels in SVM?

Kernels are mathematical functions that transform data into higher-dimensional space to make it linearly separable. Examples: Linear, Polynomial, RBF.

4. Difference between Linear and RBF Kernel?

- Linear: works well if data is linearly separable. - RBF: handles non-linear separation by mapping data into infinite-dimensional space.

5. Advantages of SVM?

- Works well in high dimensions. - Robust against overfitting with proper hyperparameters. - Effective when margin separation is clear.

6. Can SVMs be used for regression?

Yes, using Support Vector Regression (SVR).

7. What happens when data is not linearly separable?

Use soft margin (C parameter) or kernel trick (like RBF/Polynomial).

8. How is overfitting handled in SVM?

By tuning C and gamma, using cross-validation, and scaling features.