1. A bank wants to predict whether a loan applicant will default based on credit score, income, and past loan history. What type of ML problem is this, and what steps would you take to solve it?

**Classification**

Steps:

* Collect data - Gather customer financial records, income, credit-score, and loan repayment records.
* Preprocess data - Handle missing values, check for outliers, and encode categorical variables.
* split the dataset - Split for training and testing sets.
* Choose Algorithm – Use Logistic Regression, Decision Tree or Random Forest.
* Train Model - Fit the model into loan data.
* Performance Evaluation - Evaluate the model using Accuracy, Precision, Recall, f1 score and roc-auc score.
* Make predictions – Predict loan default for new applicants
* Deployment – Save and deploy the model.

1. A retail store wants to predict the demand for different products to optimize inventory levels. What type of ML problem is this, and what steps would you take to solve it?

**Regression**

Steps:

* Collect data - Gather past sales data, seasonal trends, and product demand.
* Preprocess data - Handle missing values, check for outliers, and encode categorical variables.
* split the dataset - Split for training and testing sets.
* Choose Algorithm – Use Linear Regression, Random Forest or Decision Tree.
* Train Model - Fit the model into historical demand data.
* Performance Evaluation - Evaluate the model using R2 score.
* Make predictions – Forecast demand for upcoming sales records.
* Deployment – Save and deploy the model.

1. A factory wants to detect whether a manufactured product is defective based on sensor readings and quality control data. What type of ML problem is this, and what steps would you take to solve it?

**Classification**

Steps:

* Collect data - Gather sensor recordings, production details and defect labels.
* Preprocess data - Handle missing values, check for outliers, and encode categorical variables.
* split the dataset - Split for training and testing sets.
* Choose Algorithm – Use SVM, Decision Tree or Random Forest.
* Train Model - Fit the model using labeled defect data.
* Performance Evaluation - Evaluate the model using Accuracy, Precision, Recall, f1 score and roc-auc score.
* Make predictions – Detect defective products in real time.
* Deployment – Save and deploy the model.

1. A healthcare provider wants to analyze patient symptoms and classify them into different disease categories. What type of ML problem is this, and what steps would you take to solve it?

**Classification**

Steps:

* Collect data - Gather patient records with symptoms and diagnoses.
* Preprocess data - Handle missing values, check for outliers, and encode categorical features.
* split the dataset - Split for training and testing sets.
* Choose Algorithm – Use SVM, Decision Tree or Random Forest.
* Train Model - Fit the model using labeled defect data.
* Performance Evaluation - Evaluate the model using Accuracy, Precision, Recall, f1 score and roc-auc score.
* Make predictions – Predict disease category based on patient symptoms.
* Deployment – Save and deploy the model.

1. An e-commerce company wants to identify and remove fake reviews posted by bots or fraudsters. What type of ML problem is this, and what steps would you take to solve it?

**Classification**

Steps:

* Collect data - Gather the dataset of real and fake reviews.
* Preprocess data - Handle missing values, check for outliers, and encode categorical features.
* split the dataset - Split for training and testing sets.
* Choose Algorithm – Use Naïve Bayes, Logistic Regression or Random Forest
* Train Model - Fit the model using labeled review data.
* Performance Evaluation - Evaluate the model using Accuracy, Precision, Recall, f1 score and roc-auc score.
* Make predictions – Detect fake reviews in real time.
* Deployment – Save and deploy the model.

1. A financial firm wants to predict stock price movements based on historical price data and market indicators. What type of ML problem is this, and what steps would you take to solve it?

**Regression**

Steps:

* Collect data – Gather historical stock prices, trading volumes, and economic indicators.
* Preprocess data - Handle missing values, check for outliers, and encode categorical variables.
* Split the dataset - Split for training and testing sets.
* Choose Algorithm – Use Random Forest, SVM or Decision Tree.
* Train Model - Fit the model into historical stock data.
* Performance Evaluation - Evaluate the model using R2 score.
* Make predictions – Forecast future stock price movements.
* Deployment – Save and deploy the model.

1. A social media platform wants to detect fake user accounts based on user activity and profile data. What type of ML problem is this, and what steps would you take to solve it?

**Classification**

Steps:

* Gather account details, activity logs, and engagement patterns.
* Preprocess data - Handle missing values, check outliers, encode categorical features.
* split the dataset - Split for training and testing sets.
* Choose Algorithm – Use Naïve Bayes, Logistic Regression or Random Forest
* Train Model - Fit the model using labeled real and fake account data.
* Performance Evaluation - Evaluate the model using Accuracy, Precision, Recall, f1 score and roc-auc score.
* Make predictions – Identify fake accounts.
* Deployment – Save and deploy the model.

1. A marketing agency wants to segment customers into different groups based on their purchasing behavior. What type of ML problem is this, and what steps would you take to solve it?

**Clustering**

Steps:

* Gather user click behavior, browsing history, and demographic data.
* Preprocess data - Handle missing values, check for outliers, and encode categorical features.
* Find n-clusters value
* Choose Algorithm – Use K-Means, or Hierarchical clustering
* Train Model – Apply clustering algorithm to segment users.
* Performance Evaluation - Evaluate the model to identify user groups e.g., Tech info., fashion trends, etc.,
* Make predictions – Identify user groups.
* Deployment – Deliver targeted ads based on cluster preferences.

1. A geospatial research team wants to analyze satellite images to classify different land types (forest, water, urban). What type of ML problem is this, and what steps would you take to solve it?

**Classification**

Steps:

* Use satellite images labeled with land types.
* Preprocess data - Handle missing values, check outliers, encode categorical features.
* Split the dataset - Split for training and testing sets.
* Choose Algorithm – Use Decision trees, SVM, or Random Forest
* Train Model - Fit the model on labeled satellite images.
* Performance Evaluation - Evaluate the model through accuracy and confusion matrix.
* Make predictions – Classify new satellite images to land cover types.
* Deployment – Save and deploy the model

1. A streaming service wants to predict which users are likely to cancel their subscriptions. What type of ML problem is this, and what steps would you take to solve it?

**Classification**

Steps:

* Use satellite images labeled with land types.
* Preprocess data - Handle missing values, check outliers, encode categorical features.
* Split the dataset - Split for training and testing sets.
* Choose Algorithm – Use Decision trees, SVM, or Random Forest
* Train Model - Fit the model on labeled satellite images.
* Performance Evaluation - Evaluate the model through accuracy and confusion matrix.
* Make predictions – Classify new satellite images to land cover types.
* Deployment – Save and deploy the model