1. A real estate company wants to develop a system that predicts house prices based on square footage, number of bedrooms, and location.  
    **Q:** Identify the problem type and outline the step-by-step logic to solve it.

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1. **Regression because the output house price is a continuous numerical value**
2. **Supervised Learning**
3. **Goal is to predict the house price**
4. **Collect and Prepare the Data**
5. **Preprocess the Data by using using One-Hot Encoding for location**
6. **Split train and test set**
7. **Create model by using linear regresssion**
8. **Make prediction and evaluate the model**
9. **Deploy the best model**
10. A bank wants to build a model to detect fraudulent transactions by analyzing customer spending behavior and transaction history.  
     **Q:** Identify the problem type and outline the step-by-step logic to solve it.
11. **Supervised Machine Learning and Classification Problem because the goal is to classify the transaction is fraudulent (1) or not fraudulent (0)).**
12. **Collect and Prepare the Data.**
13. **Preprocess the Data by using using One-Hot Encoding for location.**
14. **Split train and test set .**
15. **Create model by using clssification model LogisticRegression, RandomForestClassifier, XGBoostClassifier.**
16. **Make prediction and evaluate the model**
17. **Deploy the best model**
18. A supermarket wants to segment its customers based on their shopping patterns to provide personalized promotions.  
     **Q:** Identify the problem type and outline the step-by-step logic to solve it.
19. **Unsupervised Machine Learning and Clustering Problem because we want to group customers based on shopping behavior no labeled output.**
20. **Collect and Prepare the Data.**
21. **Preprocess the Data Scale numerical values using StandardScaler.**
22. **Choose a Clustering Algorithm KMeans, DBSCAN, Hierarchical Clustering.**
23. **Use Elbow Method or Silhouette Score.**
24. **Then analyze the cluster.**

1. A company wants to estimate an employee’s salary based on their years of experience, job title, and education level.  
    **Q:** Identify the problem type and outline the step-by-step logic to solve it.
2. **Supervised and regression problem because Goal Predict an employee’s salary.**
3. **Collect and Prepare the Data.**
4. **Encode Categorical Variables use OneHotEncoder.**
5. **Split train and test set .**
6. **Choose a Regression ModelLinearRegression, RandomForestRegressor, GradientBoostingRegressor.**
7. **Train the Model**
8. **Make Predictions**
9. **Evaluate the Model**
10. **Deploy the best model**
11. An email provider wants to automatically classify incoming emails as spam or not spam based on their content and sender details.  
     **Q:** Identify the problem type and outline the step-by-step logic to solve it.
12. **Supervised and Classification Problem because classifying emails into two categories Spam (1) or Not Spam (0). goal is to automatically label incoming emails as spam or not.**
13. **Collect and Clean the Data.**
14. **Preprocess the Text Data.**
15. **Encode the Features.**
16. **Split train and test set .**
17. **Create model by using clssification model LogisticRegression, RandomForestClassifier, XGBoostClassifier and some other .**
18. **Train the Model.**
19. **Predict on Test Data.**
20. **Evaluate the Model.**
21. **Deploy the best model.**

1. A business wants to analyze customer reviews of its products and determine whether the sentiment is positive or negative.  
    **Q:** Identify the problem type and outline the step-by-step logic to solve it.
2. **Supervised and Classification Problem. Because classifying each customer review Positive or Negative.**
3. **Collect and Prepare the Dataset**
4. **Split train and test set .**
5. **Choose a Classification Mode LogisticRegression, MultinomialNB , SVM.**
6. **Predict and Evaluate.**
7. **Predict New Sentiment.**
8. **Deploy the best model.**

1. An insurance company wants to predict whether a customer is likely to file a claim in the next year based on their driving history and demographics.  
    **Q:** Identify the problem type and outline the step-by-step logic to solve it.
2. **Supervised and Classification Problem. because goal is to predict whether a customer will file a claim Yes/No based on their past data.**
3. **Collect and Prepare the Dataset**
4. **Encode Categorical Variables**
5. **Split train and test set .**
6. **Choose a Classification Mode LogisticRegression, MultinomialNB , SVM.**
7. **Predict and Evaluate.**
8. **Predict New Sentiment.**
9. **Deploy the best model.**
10. A streaming platform wants to recommend movies to users by grouping them based on their viewing preferences and watch history.  
     **Q:** Identify the problem type and outline the step-by-step logic to solve it.
11. **Unsupervised Machine Learning and Clustering Problem.**
12. **Goal is to grouping them based on their viewing preferences and watch history.**
13. **Collect and Prepare Data**
14. **Normalize the Data.**
15. **Choose a Clustering Algorithm: K-Means, DBSCAN, Hierarchical Clustering .**
16. **Create model.**
17. **Analyze the Clusters.**

1. A hospital wants to predict the recovery time of patients after surgery based on their age, medical history, and lifestyle habits.  
    **Q:** Identify the problem type and outline the step-by-step logic to solve it.
2. **Supervised Machine Learning and Regression Problem.**
3. **Goal is to predict the recovery time of patients after surgery based on their age, medical history, and lifestyle habits.**
4. **Collect and Prepare Data.**
5. **Encode Categorical Variables.**
6. **Split Data into Train and Test Sets.**
7. **Choose and Train a Regression Model:LinearRegression, RandomForestRegressor, XGBoostRegressor.**
8. **Evalute and predict.**
9. **Deploy the best model.**
10. A university wants to predict a student’s final exam score based on study hours, attendance, and past academic performance.  
     **Q:** Identify the problem type and outline the step-by-step logic to solve it.
11. **Supervised Machine Learning and Regression Problem.**
12. **Goal is to predict the student’s final exam score based on study hours, attendance, and past academic performance.**
13. **Collect and Prepare Data.**
14. **Split Data into Training and Testing.**
15. **Choose and Train a Regression Model.**
16. **Predict and evaluate the model.**
17. **Deploy the best model**