Make a simple linear regression model using fish.csv

0. Feature Selection:

- How can you evaluate and select the most appropriate feature(s) from Fish.csv for your single linear regression model to predict the weight of fish?

1. Data Splitting:

- What methods can you use to split Fish.csv into training and testing sets, and what is the impact of different random states on this split?

2. Random State Optimization:

- What is the effect of different random states on the performance of your single linear regression model when splitting Fish.csv?
- Which strategies can you employ to find the optimal random state for improved model performance on Fish.csv?

3. Model Fitting:

- What are the key steps to fit a single linear regression model using the training data from Fish.csv?

4. Prediction:

- How do you utilize a trained single linear regression model to make predictions on the test data from Fish.csv?

5. R2 Score:

- What is the R2 score, and how do you interpret its value for your single linear regression model using Fish.csv?
- How does the R2 score vary with different random states when splitting Fish.csv?

6. Mean Squared Error (MSE):

- How is the Mean Squared Error (MSE) calculated for your model's predictions, and what insights does this metric provide?
- How does the Mean Squared Error (MSE) change with different random states when splitting Fish.csv?

Q-2 Make a multi-linear regression model using fish.csv

0. Feature Selection:

- How can you evaluate and select the most appropriate feature(s) from Fish.csv for your multi-linear regression model to predict the weight of fish?

1. Data Splitting:

- What methods can you use to split Fish.csv into training and testing sets, and what is the impact of different random states on this split?

2. Random State Optimization:

- What is the effect of different random states on the performance of your single linear regression model when splitting Fish.csv?
- Which strategies can you employ to find the optimal random state for improved model performance on Fish.csv?

3. Model Fitting:

- What are the key steps to fit a single linear regression model using the training data from Fish.csv?

4. Prediction:

- How do you utilize a trained single linear regression model to make predictions on the test data from Fish.csv?

5. R2 Score:

- What is the R2 score, and how do you interpret its value for your single linear regression model using Fish.csv?
- How does the R2 score vary with different random states when splitting Fish.csv?

6. Mean Squared Error (MSE):

- How is the Mean Squared Error (MSE) calculated for your model's predictions, and what insights does this metric provide?
- How does the Mean Squared Error (MSE) change with different random states when splitting Fish.csv?

Q-3 Make a polynomial linear regression model using fish.csv

0. Feature Selection:

- How can you evaluate and select the most appropriate feature(s) from Fish.csv for your polynomial regression model to predict the weight of fish?

1. Data Splitting:

- What methods can you use to split Fish.csv into training and testing sets, and what is the impact of random states = 5 on this split?

2. Degree Optimization:

- What is the effect of different degrees on the performance of your polynomial regression model when splitting Fish.csv?
- Which strategies can you employ to find the optimal degree for improved model performance on Fish.csv?

3. Model Fitting:

- What are the key steps to fit a polynomial linear regression model using the training data from Fish.csv?

4. Prediction:

- How do you utilize a trained polynomial linear regression model to make predictions on the test data from Fish.csv?

5. R2 Score:

- What is the R2 score, and how do you interpret its value for your polynomial linear regression model using Fish.csv?
- How does the R2 score vary with different degrees for Fish.csv?

6. Mean Squared Error (MSE):

- How is the Mean Squared Error (MSE) calculated for your model's predictions, and what insights does this metric provide?
- How does the Mean Squared Error (MSE) change to a different degree when the model fit for Fish.csv?

Q-4 make a KNN model for fish.csv

0. Feature Selection:

- select the relevant features from Fish.csv for your KNN model, considering the columns Species, Weight, Length1, Length2, Length3, Height, and Width?

1. Data Splitting:

- What steps are involved in splitting Fish.csv into training (80%) and testing (20%) sets using a random state of 0.2?

2. Model Training:

- How do you train a KNN model using the training set from Fish.csv?

3. Prediction:

- How do you use a trained KNN model to predict the species of fish in the test set from Fish.csv?

4. Model Evaluation - Accuracy:

- What methods do you use to measure the accuracy of your KNN model on Fish.csv, and how can you optimize the number of neighbors (k) to improve the model's Performance?

5. Model Evaluation - Confusion Matrix:

- What is a confusion matrix, and how can you use it to evaluate the performance of your KNN model on the test set from Fish.csv?

6. Model Optimization:

- How can you determine the optimal number of neighbors (k) for your KNN model using Fish.csv, and what techniques can help in this optimization process?

Q-5 Make a Decision Tree model for Fish.csv

0. Feature Selection:

- select the features from Fish.csv for your Decision Tree model, considering the columns Species, Weight, Length1, Length2, Length3, Height, and Width.

1. Data Splitting:

- What steps are involved in splitting Fish.csv into training (80%) and testing (20%) sets using a random state of 0.2?

2. Model Training:

- How do you train a Decision Tree classifier using the training set from Fish.csv?

3. Prediction:

- How do you use a trained Decision Tree classifier to predict the species of fish in the test set from Fish.csv?

4. Model Evaluation - Accuracy:

- What methods do you use to measure the accuracy of your Decision Tree classifier on Fish.csv, and how can you optimize its performance?

5. Model Evaluation - Confusion Matrix:

- **:** What is a confusion matrix, and how can you use it to evaluate the performance of your Decision Tree classifier on the test set from Fish.csv?

6. Model Optimization:

- How can you determine the optimal parameters (such as depth or split, etc.) for your Decision Tree classifier using Fish.csv, and what techniques can help in this optimization process?

Q-6 Make a Confusion Matrix calculate accuracy, error, precision, recall, specificity

Actual	C	D	C	D	D	D	C	D	D	D
KNN	C	D	D	D	C	D	C	C	D	D

Predict	Actual	
	C	D
C	TP	FP
D	FN	TN