LINEAR REGRESSION

This code performs **linear regression** to predict the PRODUCT_LENGTH based on the PRODUCT_TYPE_ID feature.

- The code starts by importing the necessary libraries: pandas for data manipulation, LinearRegression for linear regression modeling, and mean_absolute_percentage_error for evaluating the model's performance.

- The train and test data are loaded into pandas dataframes using pd.read_csv. The train and test data are then concatenated into a single dataframe using pd.concat. Any missing values in the dataframe are replaced with 0 using fillna.

- The features and target variables for the model are selected from the training and test dataframes using indexing. An instance of the LinearRegression model is created using LinearRegression.

- The model is trained using the fit method, passing in the feature and target variables from the training data.

- The model then makes predictions on the test data using predict method. The mean absolute percentage error between the predicted and actual values is calculated using the mean_absolute_percentage_error method.

- The score is calculated by subtracting the mean absolute percentage error from 100 and taking the maximum of 0 and that difference. A submission file is created using pd.DataFrame and saved using to_csv method.

In terms of feature engineering, this code only uses the PRODUCT_TYPE_ID feature and no additional feature engineering is performed. The tool used is scikit-learn, a popular machine learning library in Python.