Data Science Career Track
Model Metrics Exercise

1. Look at the table below. If the goal is to optimize the True Positives, which model would you choose and why? I chose the Logistic model. This model strikes a balance between a good score for ability to capture all of the True Positives (Recall 0.746) with the highest and good score for correctly identifying the True Positives (Precision 0.775). As a result the F1 score is the highest as it derives its value from the mean of Recall and Precision. The .999 Accuracy may indicate overfitting, if so the Logistic with auto threshold is a second choice.

Model	Recall	Precision	Accuracy	F1
Logistic	0.746	0.775	0.999	0.761
Logistic with auto threshold	0.891	0.061	0.976	0.114
Logistic with class weights	0.878	0.110	0.988	0.195
Hinge with auto threshold	0.905	0.014	0.890	0.028
Hinge with class weights	0.878	0.103	0.987	0.185

2. Calculate the F-1 scores for each model and identify the best model based on the F1 score. Deep NN has the highest F1 score (.805).

Model	Recall	Precision	F1	Auc/Roc
Deep NN	0.79	0.82	2*0.82*0.79/(0.82+0.79) 0.805	0.92
Logistic Regression	0.75	0.79	2*0.79*0.75/(0.79+0.75) 0.769	0.90
Random Forest	0.80	0.66	2*0.66*0.80/(0.66+0.80) 0.723	0.90
LinearSVC	0.74	0.75	2*0.75*0.74/(0.75+0.74) 0.745	0.82

3. Identify the best parameter values for ‘alpha’ and ‘L1-ratio’ based on the above comparison. The values of 0.5 and 0.2 in Linear Regression (row 1) have a good MAE score (84.27) coupled with the highest R-squared value. The R-squared value is not great, but based upon it and the RMSE scores it appears the data has some outliers.

Model	Parameter	Parameter	Metric	Metric	Metric
	Alpha	L1-ratio	MAE	R-squared	RMSE
Linear Regression	0.5	0.2	84.27	0.277	158.1
Linear Regression	0.2	0.5	84.08	0.264	159.6
Linear Regression	0.5	0.5	84.12	0.272	158.6
Linear Regression	0	0	84.49	0.249	161.2