Housing Sales Price

Subjective Question

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Question 1: What is the optimal value of alpha for ridge and lasso regression? What will be the changes in the model if you choose double the value of alpha for both ridge and lasso? What will be the most important predictor variables after the change is implemented?

Answer 1:
The optimal value for alpha for

1. Ridge Regression is 600.0
2. Lasso Regression is 0.015625

If the values of alphas are doubled for Ridge Regression, R2 value dropped to 0.87, and for Lasso Regression the value dropped to 0.81.

```
ridge_coeff_df_2 = pd.DataFrame(list(zip(X_train.columns, ridge_lr_best_model_2.coef_)), columns=['ColumnName', 'Coefficient'])
ridge_coeff_df_2.sort_values(by=['Coefficient'], ascending=False)
```

	ColumnName	Coefficient
213	GrLivArea	0.027495
220	GarageCars	0.026205
233	1stFlrSF	0.023326
208	Fireplaces	0.023303
221	GarageArea	0.022704
...	...	...
116	KitchenQual_TA	-0.014629
15	MSSubClass_30	-0.014974
230	BuiltAge	-0.015046

```
lasso_coeff_df_2 = pd.DataFrame(list(zip(X_train.columns, lasso_lr_best_model_2.coef_)), columns=['ColumnName', 'Coefficient'])
lasso_coeff_df_2.sort_values(by=['Coefficient'], ascending=False)
```

	ColumnName	Coefficient
213	GrLivArea	0.122650
220	GarageCars	0.078786
208	Fireplaces	0.038651
212	TotalBsmtSF	0.031439
140	CentralAir_Y	0.021492
...	...	...
116	KitchenQual_TA	-0.014208
195	ExterQual_TA	-0.014488
199	MSZoning_RM	-0.015813

Question 2: You have determined the optimal value of lambda for ridge and lasso regression during the assignment. Now, which one will you choose to apply and why?

Answer 2:
I will choose Lasso Regression as the R2 value is comparable to that of Ridge Regression, but the model is much more explainable. We have 44

```
lasso_coeff_df = pd.DataFrame(list(zip(X_train.columns, lasso_lr_best_model.coef_)), columns=['ColumnName', 'Coefficient'])
lasso_coeff_df[lasso_coeff_df.Coefficient != 0]
```

	ColumnName	Coefficient
1	KitchenAbvGr_2	-0.015094
5	Functional_Maj2	-0.000350
10	Functional_Typ	0.010736
11	MSSubClass_160	-0.011395
15	MSSubClass_30	-0.011773
25	LotConfig_CulDSac	0.004561
29	LandContour_HLS	0.000827
38	Exterior1st_BrkFace	0.004656
55	Neighborhood_Crawfor	0.011061
56	Neighborhood_Edwards	-0.005512
59	Neighborhood_MeadowV	-0.001487
65	Neighborhood_NridgHt	0.008953
71	Neighborhood_StoneBr	0.003909
107	OverallQual_3	-0.017396
108	OverallQual_4	-0.018163
109	OverallQual_5	-0.007467
112	OverallQual_8	0.028738