**HOMEWORK 2**

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**Note:**

* To submit, name the file consisting your answers in the following format:

[YourName]\_[Your StudentID]\_Homework2

Ex: NguyenVanA\_123456\_Homework2

In this homework, your task is to load Ames Housing Data given by your instructor and answer following question

**Question 1 (1pt)**

How many columns contain string values? Show evidence (code and results from notebook or console)

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**Question 2: (1pt)**

Write a function **rmse** that takes in truth and prediction values and returns the root-mean-squared error. Use sklearn's **mean\_squared\_error**.

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**Question 3: 2(pt)**

Use the following code to split train and test set.

**Do the following steps:**

* Fit a basic linear regression model.
* Print the root-mean-squared error for this model

**Then, answer the following question:**

What is rmse between X\_test and y\_test? (show code and result)

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**Question 4: (2pt)**

Performs Ridge regression with cross-validation

Ridge regression uses L2 normalization to reduce the magnitude of the coefficients. This can be helpful in situations where there is high variance. The regularization functions in Scikit-learn each contain versions that have cross-validation built in.

* Fit a Ridge model to a range of alpha values.
* Use [0.005, 0.05, 0.1, 0.3, 1, 3, 5, 10, 15, 30, 80] as the range of alphas.
* Evaluate performance on test data by using Print(ridgeCV.alpha\_, ridgeCV\_rmse).

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**Question 5: (2pt)**

Performs Lasso regression with cross-validation

* Fit a Ridge model to a range of alpha values.
* Use [1e-5, 5e-5, 0.0001, 0.0005] as the range of alphas
* Evaluate performance on test data by using Print(lassoCV.alpha\_, lassoCV\_rmse)

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**Question 6: (2pt)**

* Try the elastic net, with the same alphas as in Lasso, and l1\_ratios between 0.1 and 0.9
* Evaluate performance on test data by using Print(elasticNetCV.alpha\_, elasticNetCV.l1\_ratio\_, elasticNetCV\_rmse)

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