Name: <Your Name>
Github Username: <Your Github username>
Purdue Username: <Your PUID>
Instructor: < Qiu/Kocaoglu/Makur>

Problem 1.

(1) <u>Estimated Functions:</u>

$\hat{y}_1(x) = a_1 x + b$ (*Write numerical values for $a_i's$ and $b's$)*

$\hat{y}_2(x) = a_2 x^2 + a_1 x + b$

$\hat{y}_3(x) = a_3 x^3 + a_2 x^2 + a_1 x + b$

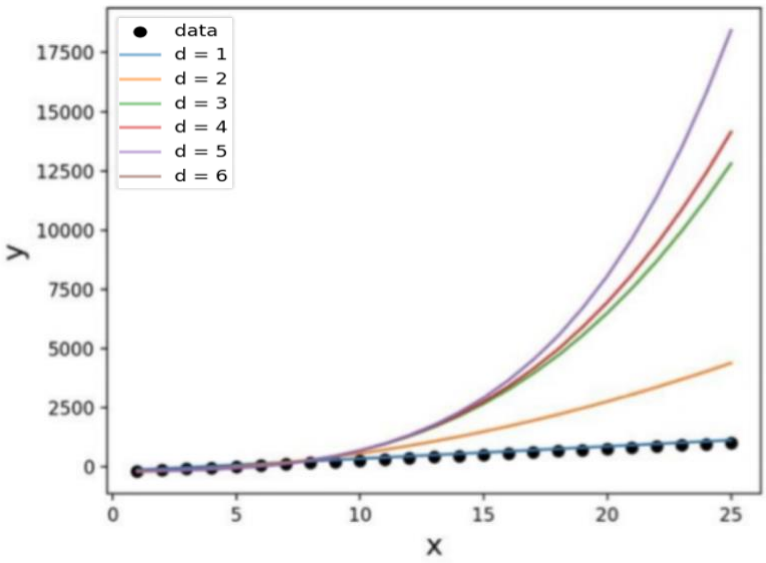
$\hat{y}_4(x) = a_4 x^4 + a_3 x^3 + a_2 x^2 + a_1 x + b$

$\hat{y}_5(x) = a_5 x^5 + a_4 x^4 + a_3 x^3 + a_2 x^2 + a_1 x + b$

$\hat{y}_6(x) = a_6 x^6 + a_5 x^5 + a_4 x^4 + a_3 x^3 + a_2 x^2 + a_1 x + b$

(2) <u>Data Visualization:</u>

(Insert plot obtained from data in poly.txt. Note that the plot below is not the solution)



(3) <u>What degree polynomial does the relationship seem to follow? Please explain your answer.</u>

(Discuss relationship of data and state a numerical value for the best-fitting polynomial degree)

Sample answer:

The data seems to best follow a first order polynomial (i.e., a line) which can be seen from the low error between the estimated regression function, $\hat{y}_1(x)$ and the data in the plot above.

(4) <u>If we measured a new data point, $x = 2$, what would be the predicted value of y, based on the polynomial identified as the best fit in Question (3)?</u>

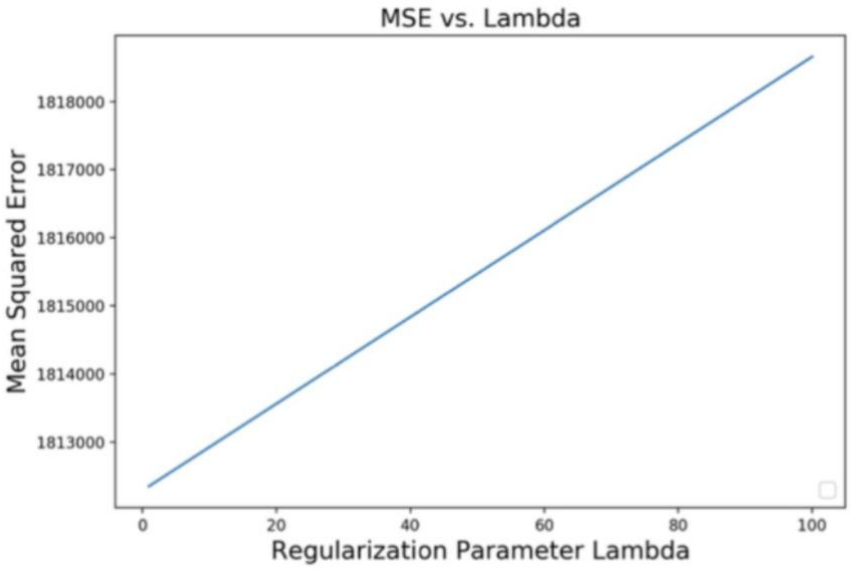
Sample answer:

If we measured a new data point, x = 2, the corresponding predicted value would be $\hat{y}_1(2)$.

Problem 2.

(1) Plot the mean squared error as a function of lambda in Ridge Regression:

*(Insert plot obtained by completing the **main** function. Note that the plot below is not the solution)*



(2) Find best lambda:

Sample answer: *(insert numerical values for c and d)*

Based on the range of Lambda values tested, the best lambda value is c, which yields an MSE of d as shown on the plot above.

(3) Find equation of the best fitted model:

(*Insert numerical values for a_i's and b)*

$\hat{y}(x) = a_1x_1 + a_2x_2 + a_3x_3 + a_4x_4 + a_5x_5 + a_6x_6 + b$

(4) <u>Plot the predicted stock prices and actual stock prices using Google data</u>

(Note that the plot below is not the solution)