Project: Diamond Prices

Complete each section. When you are ready, save your file as a PDF document and submit it in your classroom.

Step 1: Understanding the Model

Price = -5,269 + 8,413 x **Carat** + 158.1 x **Cut** + 454 x **Clarity**

Answer the following questions:

1. According to the model, if a diamond is 1 carat heavier than another with the same cut, how much more should I expect to pay? Why?

   You should expect to pay $8413, which is the coefficient of the Carat in the model. 1 Carat increase of the diamond, will increase the price by $8413, while keeping other variables the same.

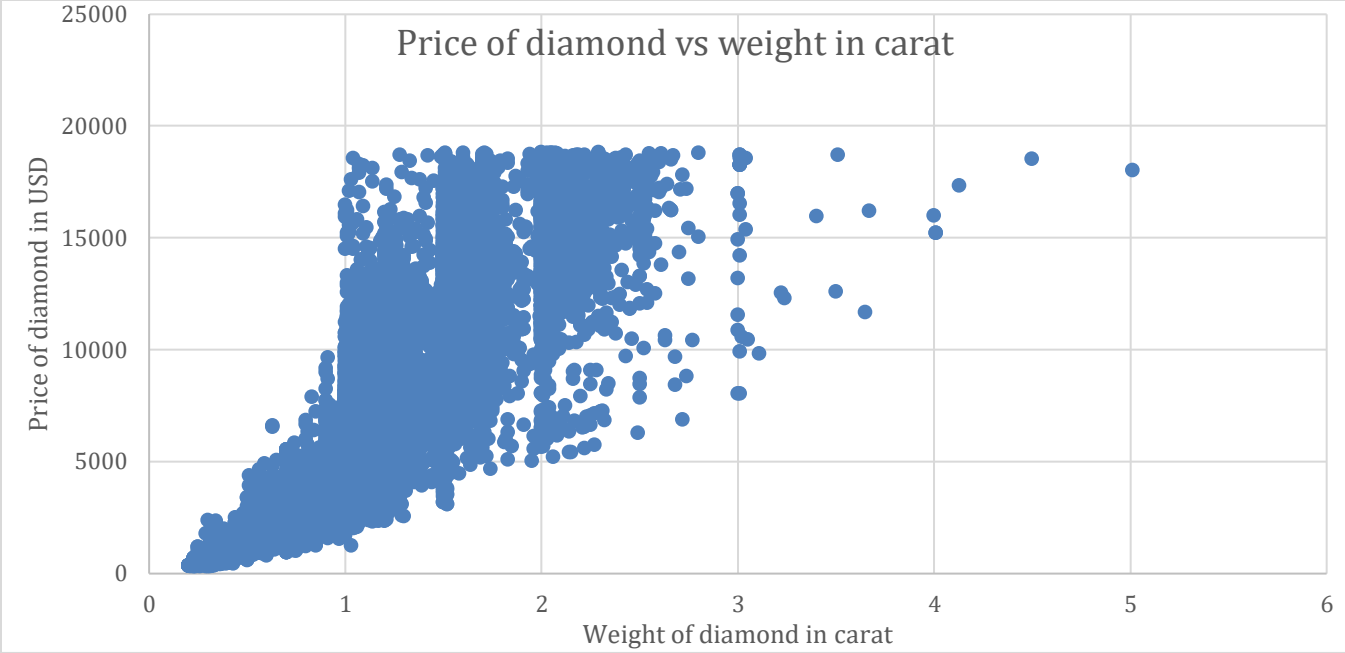
2. If you were interested in a 1.5 carat diamond with a **Very Good** cut (represented by a 3 in the model) and a **VS2** clarity rating (represented by a 5 in the model), how much would the model predict you should pay for it?

   Price = -5,269 + 8,413 x **Carat** + 158.1 x **Cut** + 454 x **Clarity**
   = -5,269 + 8,413 x **1.5** + 158.1 x **3** + 454 x **5**
   = $10094.8

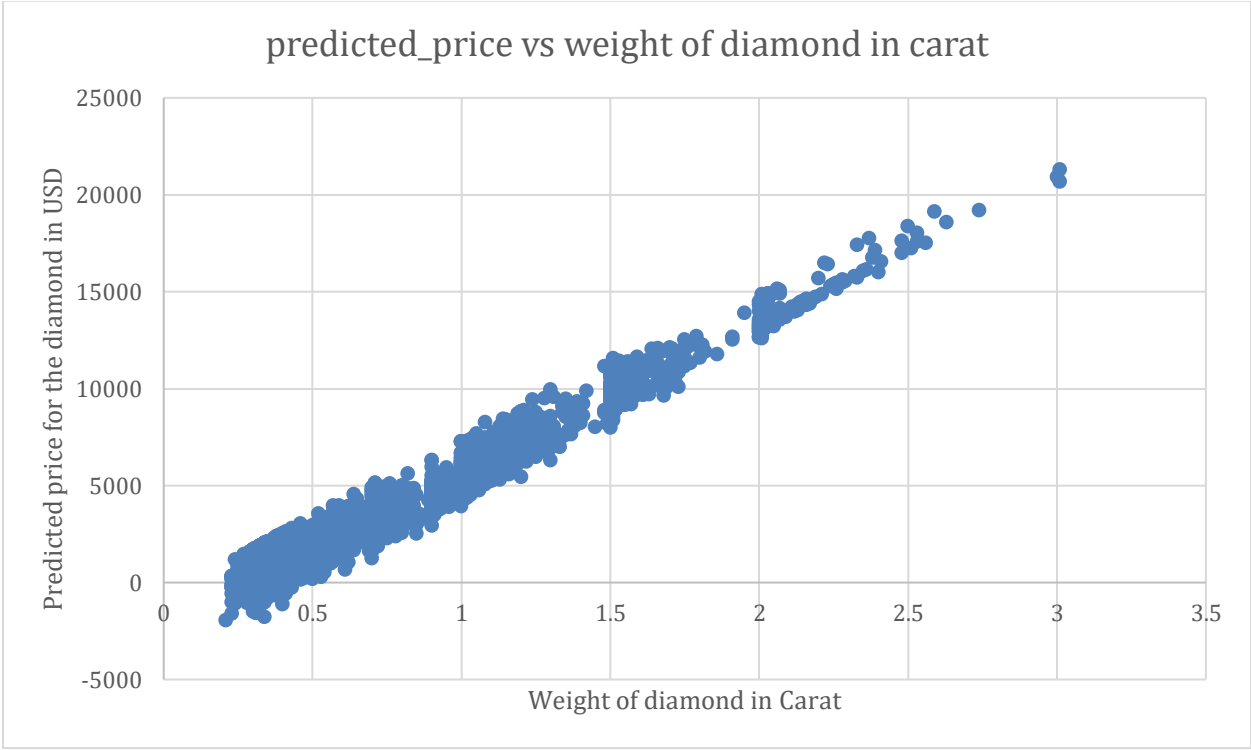
Step 2: Visualize the Data

Make sure to plot and include the visualizations in this report. For example, you can create graphs in Excel and copy and paste the graphs into this Word document.

1. Plot 1 - Plot the data for the diamonds in the database, with carat on the x-axis and price on the y-axis.



2. Plot 2 - Plot the data for the diamonds for which you are predicting prices with carat on the x-axis and predicted price on the y-axis.
    - **Note**: You can also plot both sets of data on the same chart in different colors.



3. What strikes you about this comparison? After seeing this plot, do you feel confident in the model's ability to predict prices?

- The old diamond data price and weight is not a very good linear regression line, especially for weight between 1~3 carats, data are more scattered. While in prediction data sets, since we are using the linear model to predict the price, predicted price and weight are in much better linear relations.
- For weight of diamond less than 0.5 carats, the predicted price is less than 0, which do not make too much sense.
- But we can see that the predicted price of diamonds are mostly less than $20000, which is reasonable correct from the previous data.

Step 3: Make a Recommendation

Answer the following questions:

1. What price do you recommend the jewelry company to bid? Please explain how you arrived at that number.

   The total bid price will be **$8,213,465.93**
   The way I got the numbers is by sum all the predicted prices (use the formular in above) for these jewelries, then sum them up, finally apply 70% of the sum price for bidding price.