**DAD 220 Module 7-1 Project Two**

1. Begin by writing SQL commands to**capture usable data** (which you’ve preloaded into Codio) for your analysis.

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Description: To access the integrated development environment, I changed permissions so I can edit items once I’m in mysql. I changed the ownership with the following commands:

**chmod +x change\_perm.sh ./change\_perm.sh mysql**

Next, I accessed the QuantigrationUpdates database with the “use database” command. I then checked the database with the “show tables” command to confirm that the Orders, RMA, and Collaborators tables were still listed from project one. Lastly I used the “select count(\*)” command on each table to confirm the data from project one was still present in the tables.

1. Specifically, the product manager wants you to analyze the following:
   * **Analyze** the **number of returns** **by state** and describe your findings in your report.

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Description: For this query I joined the Orders table with the RMA table using the OrderId and joined the Collaborators table with the combined Orders and RMA tables using the CollaboratorID. The data is then grouped by the state column and displayed in descending order. The results showed that the top five states with the most returns are Massachusetts, Arkansas, Oregon, West Virginia, and Alabama. Massachusetts had the most returns with a total of 972, followed by Arkansas with 844 returns, and Oregon with 840 returns. This suggests that these states may be having issues with defective products. The company should investigate the reason behind the mass number of returns and improve upon these products, which would then improve customer relations and sales. The results of the query also showed the five states with the least number of returns are South Carolina, New Jersey, Colorado, Georgia, and Nebraska. South Carolina had the least number of returns with 702, followed by New Jersey with 711 returns, and Colorado with 718 returns. This suggests that these states may have more satisfied customers, or they are selling more durable products. The company should investigate the low returns in these states and try to replicate their findings to the states with the higher number of returns. After investigating both the high number of returns and the low number of returns the company should be able to build better customer support, the distribution of better-quality products, and see an increase in revenue.

**SELECT Collaborators.State AS State, Count(\*) AS Return\_Number FROM Orders INNER JOIN RMA ON Orders.OrderID = RMA.OrderID INNER JOIN Collaborators ON Collaborators.CollaboratorID = Orders.CollaboratorID GROUP BY State ORDER BY Return\_Number DESC;**

* + **Analyze**the **percentage of returns by product type** and describe your findings in your report.

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Description: For this query I selected the SKU and Description columns and gave them clear understandable aliases. Then the query counts the number of rows for each product and displays it as a total. Then, it calculates the percentage of returns for each product by dividing the count of returns by the total count of returns in the entire dataset times 100 to display the percentage as a whole number. The analysis of the percentage of returned products showed that the Basic Switch 10/100/1000 BaseT 48 port has the highest return percentage with 19.71%. The second highest return percentage was the Enterprise Switch 40GigE SFP+ 48 port with a total return of 14.56%. This determines that customers are having issues with these two products quite often, possibly from poor performance, or the products aren’t very durable. Investigating the reasons behind the high returns of the above nine products is essential for the company. Figuring out how to prevent the high rate of returns would strengthen customer relations, the company’s reputation, and increase the company’s revenue. The company should focus their resources on making these products more durable, and efficient to counteract the number of returns. The analysis of the returned products also showed that the Basic Switch 10/100/1000 BaseT 24 port has the lowest return percentage with 0.07%. The second lowest return percentage was the Enterprise Switch 40GigE SFP+ 24 port with a total return of 4.99%. These two products suggest that customers are mostly satisfied with only a small percentage of returns. The company should investigate these products and see what differences there are compared to the highly returned products. They can use their findings to model a plan to lower the number of returns on all their products. I recommend that the company sends out a survey to their customers to see the reasons for the returns and ask them what the company can do better to meet their needs. This will help the company narrow down areas of improvement and build on customer relations as well. I used the following command to complete this step:

**SELECT SKU AS Product\_SKU, Description AS Product\_Description, COUNT(\*) AS Total, (Count(\*) / (SELECT COUNT(\*) FROM Orders INNER JOIN RMA ON Orders.OrderID = RMA.OrderID) \* 100 ) AS Percentages\_of\_Returns FROM Orders INNER JOIN RMA ON Orders.OrderID = RMA.OrderID WHERE UPPER(Status) = 'COMPLETE' GROUP BY Product\_SKU ORDER BY Percentages\_of\_Returns DESC;**

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Description: For this query I wanted to see the total number of orders, returns, and the percentage of returned orders. I joined the Collaborators table with the Orders table using the CollaboratorID and I joined the Orders table with the RMA table using the OrderID. The data is filtered based on the condition in the RMA table with the status COMPLETE, and the data is counted by total number of orders returned, which then are calculated as a percentage. After running this query, the results showed that this company is struggling and needs to make significant changes if they are going to survive. The total number of orders is 37998, the total number of returns is 33653, and the percentage of orders returned is 88.5652%. This percentage is very alarming and indicates that roughly 11.5% of orders are successful. This low success calls for a complete revamp of the company. I used the following command to complete this step:

**SELECT (SELECT COUNT(\*) FROM Orders) AS NUMBER\_OF\_ORDERS, COUNT(\*) AS NUMBER\_OF\_RETURNS, COUNT(\*)/(SELECT COUNT(\*) FROM Orders)\*100 AS Percentage\_of\_Orders\_Returned FROM Collaborators INNER JOIN Orders ON Collaborators.CollaboratorID = Orders.CollaboratorID INNER JOIN RMA ON Orders.OrderID = RMA.OrderID WHERE UPPER(RMA.Status) = 'COMPLETE';**

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Description: For this query I wanted to see the reasons for the high return volume. I selected the reason column from the RMA table and grouped the results by their specific reasons. The results showed that 12609 orders were returned because they were defective, 13116 orders were returned because they were incorrect, and 11841 orders were returned for other reasons. These results are crucial to the company. The company needs to find the cause for the defects in these orders and make that a top priority. Sending out defective products gives the company a bad reputation and ruins customer relations. The company should also address their shipping and handling and see why so many orders are being returned because they were incorrect. I suggest sending all customers an apology letter, as well as discount coupons for future purchases. This will show the customers that the company is truly sorry for the poor service, and hopefully the coupon will entice the customer to give the company another opportunity. I used the following command to complete this step:

**SELECT REASON, COUNT(\*) FROM RMA GROUP BY REASON;**

1. In your report, clearly **summarize your analysis of the data for stakeholders**. Include screenshots of the results of each query. When summarizing results, you may want to consider the following questions:
   * How does the data provide the product manager with usable information?
   * What are the potential flaws in the data that has been presented?
   * Are there any limitations on your conclusions, or any other ways of looking at it that you haven’t considered? Clearly communicate your findings to stakeholders.

I started my analysis by analyzing the number of returns by state.

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Description automatically generated As you can see from the above image, I arranged the states in descending order for easy readability. Massachusetts, Arkansas, and Oregon are the top three states with the highest number of returned orders. These states should be of high concern and need immediate investigation. High returns suggest problems with product quality, customer satisfaction, or distribution issues.

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On the other hand, states like South Carolina, New Jersey, and Colorado had the lowest return rates. This suggests better customer satisfaction, better product quality, and more efficient distribution. I suggest implementing what’s working in these states to the other states on the list with much higher return rates to create more balance across the country.

Next my analysis investigated the percentage of returns by product type.

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As you can see from the above image the BAS-48-1 C (Basic Switch 10/100/1000 BaseT 48 port) had the highest return percentage at 19.71%. This indicates that there are possible issues with the product’s performance, durability, or functionality. The same could be said of the Enterprise Switches who also have high return percentages. These products should be tested thoroughly to see if there are any potential flaws in their designs. Improving the quality of the products will lower the number of returned orders.

Next, I analyzed the number of orders, and returns as a whole.

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The analysis revealed that 88.57% of orders were returned. This indicates a very serious issue and should be the number one concern.

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I also looked at the reasons for the returns. The results showed that 12609 orders were returned because the product was defective, 13116 orders were returned because the product received was incorrect, and 11841 orders were returned for other reasons. Addressing these reasons should resolve the high volume of returns. Facilitating more resources to see why these products were defective and fixing the logistic issues of sending out incorrect products should limit the number of returned orders.

The analysis of your company’s data provides valuable insight to optimize operations and resources. By seeing the return rates by state and product type, the company can strategize ways to improve their customer relations in certain regions and improve the quality of their products. The analysis also shows the reason for the high returns, and these reasons can be addressed by improving the quality of the products and fixing the distribution issues. While this analysis offers valuable information there are also potential flaws and limitations to consider. The data gives an “Other” reason for many of the overall returns. These “Other” returns should be investigated further by possibly sending out surveys to customers. This would give a better understanding of why so many products were returned. Another factor that the data doesn’t account for is current market trends that may be affecting sales. Also, the data doesn’t give timeframe information. Knowing the timeframe of the sales and returns would give better insight into when most of the returns occurred.