Introduction:

In this project we will analysis a database called **BikeStores** to get some insights to halp us give som advice to the owner of these stores to increase their revenues they get from these stores

Introduction to data:

BikeStores database is a simple database from https://www.sqlservertutorial.net/ to learn SQL

BikeStores database has two schemas :

- Sales schema

- Production schema

1- Sales schema:

Sales schema contains 5 tables are :

- **customers** : this table contain information about customers such as (name , phone number , e-mail , zip code...etc)

- **staffs** : this table contain information about staffs such as name of sales person , his e-mail , his phone , his manager and the ID of the store in which he works

- **stores** : this table contain information about stores such as (name , phone , e-mail , city , state , zip code , street)

- **order_items** : this table contain information about order such as order id , product id , the quantity required for each order , list price and discount

- **orders** : this table contain information about orders also such as (order_id , ID of customer who made the order , required date and shipped date

2- Production schema:

Production schema contains 4 tables are :

- **categories** : this table contain information about categories such as (category id ,category name)

- **products** : this table contain information about products such as (product id ,product name , model year , category id ...etc)

- **stocks** : this table contain information such as (store id , product id and the quantity of product in each store)

- **brands** : this table contain information about brands such as (brand id ,brand name)

The following picture illustrates the BikeStores database diagram:
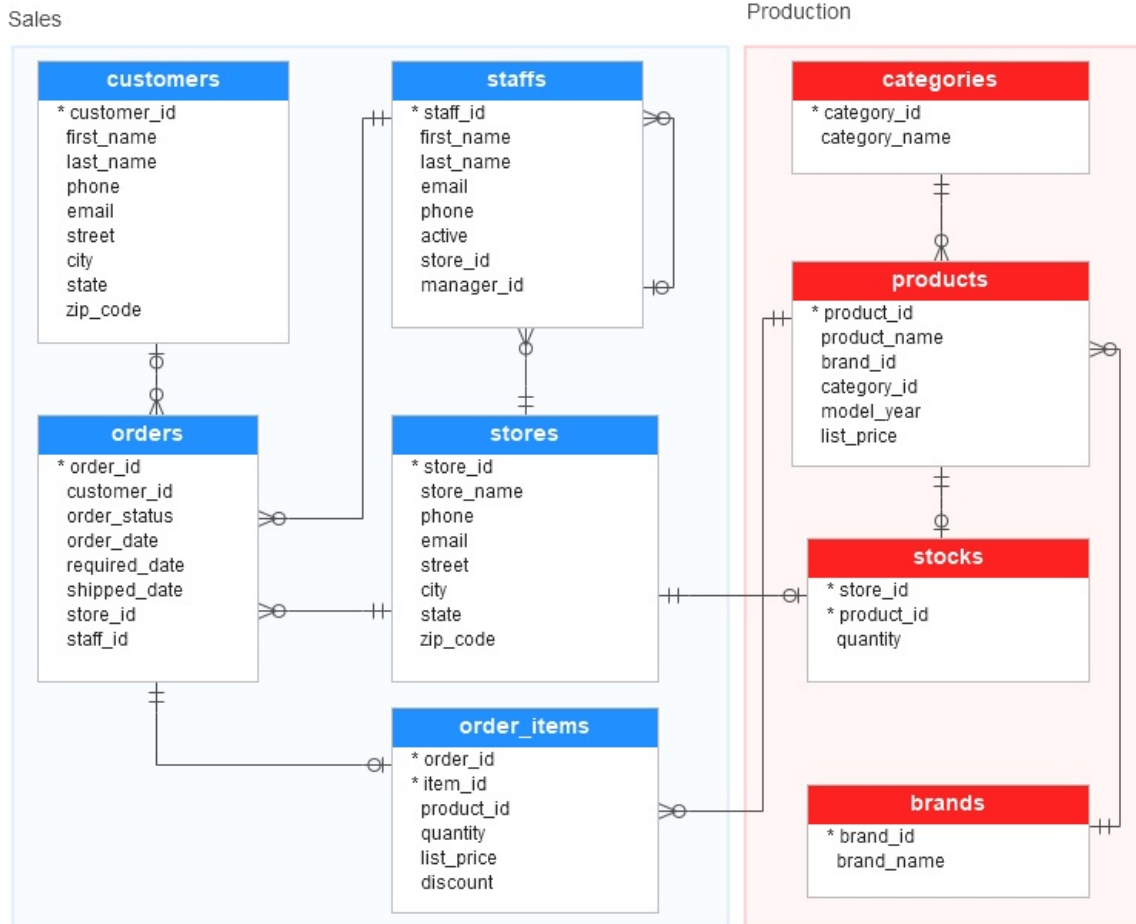
Questions:

What are the questions that we need to ask to answer them in order to give the owner of these stores some advice to increase revenues ?

If we are the owners of these stores, we will definitely need to get answers to the following questions to increase our revenues

1- What are the best-selling brands and their revenues?

2- What are the best-selling categories for each brand?

2- What is the percentage of the quantities sold for each category, according to the brand?

4- What are the best-selling products?

5- Who are the customers who bought the largest number of products?

6- What is the top store in terms of sales?

7- What are he names of the best-selling sellers for products and managers ?

8- What is the sales movement of the top three products over the three years (2016-2017-2018)?

We will answer these questions one by one

1- What are the best-selling brands and their revenues?

The following graph illustrates that `Electra` and `Trek` brand they are the highest selling and the highest in terms of revenues

Total revenues by brand name

Quantity sold by brand name
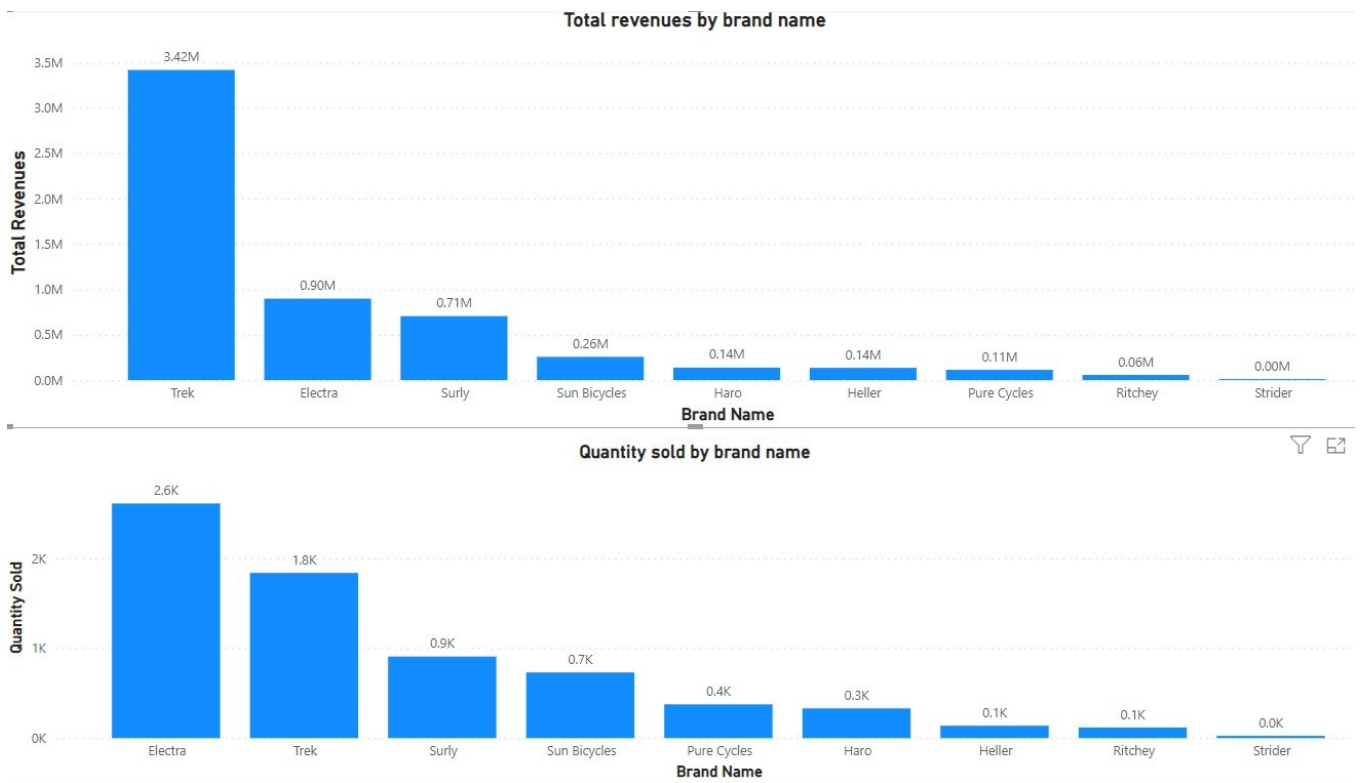
If we need to see more details we can take a look at this table

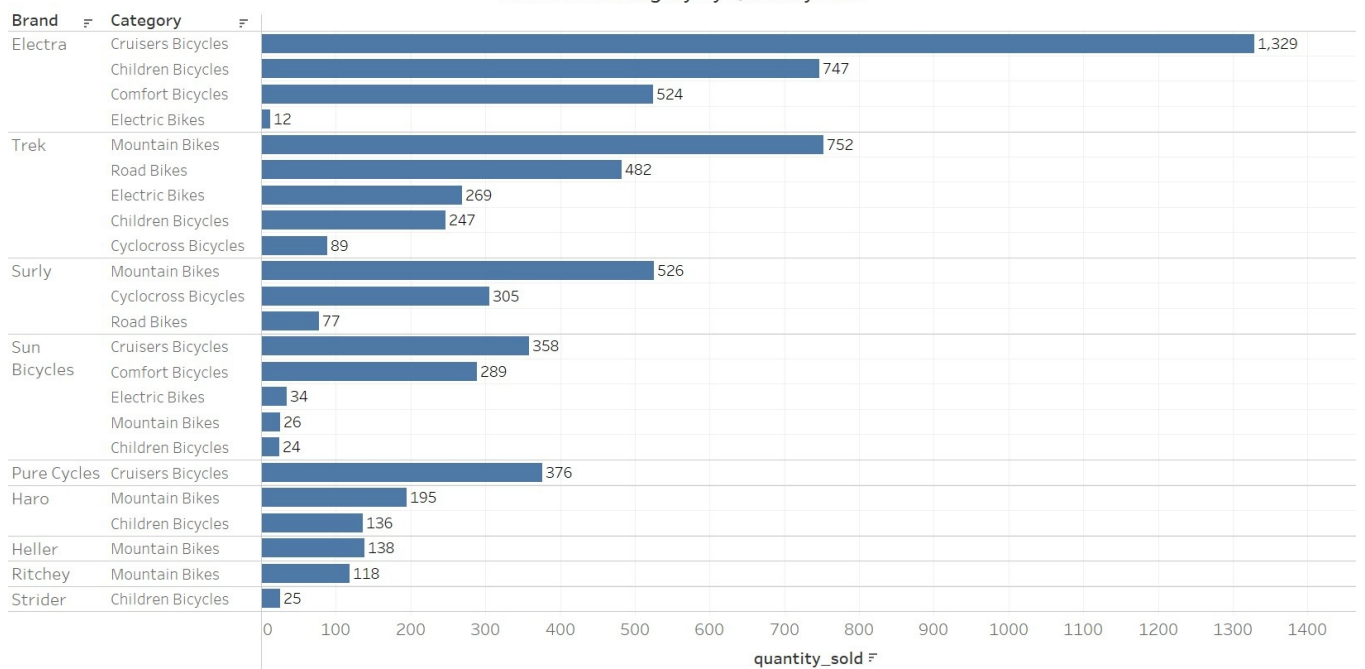| Brand	Quantity sold	Revenues
Trek	1839	3,417,088
Electra	2612	898,033
Surly	908	705,390
Sun Bicycles	731	256,763
Haro	331	138,437
Heller	138	135,804
Pure cycles	376	114,022
Ritchey	118	57,749
Strider	25	3120

This table also illustrates that `Ritchey` and `strider` brand they are the lowest selling and the lowest in terms of revenues

From the table also, it is clear that customers prefer the first four brands `Electra` , `Trek` , `Surly` and `Sun Bicycles` in the table, so we will need to continue selling these brands, and we may stop selling more of the last two brands `Ritchey` and `strider` in the table.

2-What are the best-selling categories for each brand?

If we want to increase the financial returns of these stores, of course we need to know the number of quantities sold for each category and its brand. For example, we don't need to bring in too many categories of bikes with a certain brand, and people don't buy them very often, and so we'll need to identify the categories and brand of the best selling bikes so that we don't bring in too many categories of other brands and they don't get sold out and focus on Certain categories with a particular brand

Brand and Category By Quantity Sold

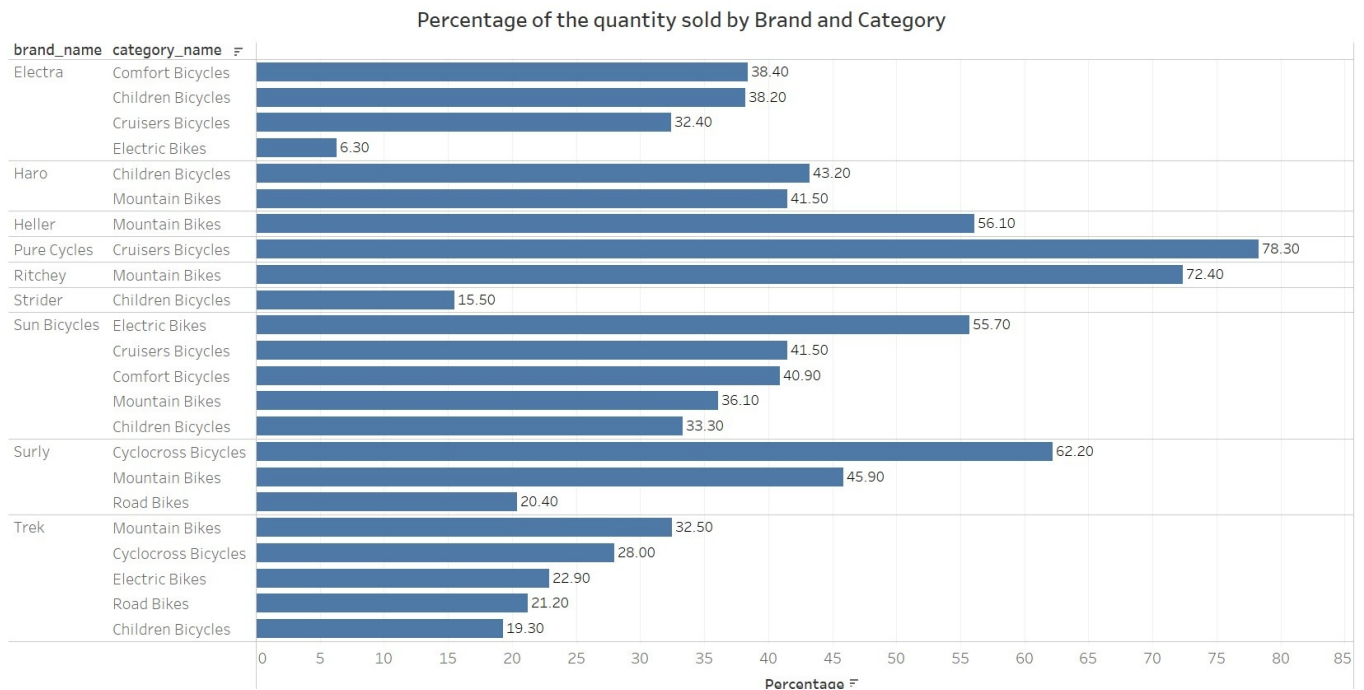| Brand	Category	quantity_sold
Electra	Cruisers Bicycles	1,329
	Children Bicycles	747
	Comfort Bicycles	524
	Electric Bikes	12
Trek	Mountain Bikes	752
	Road Bikes	482
	Electric Bikes	269
	Children Bicycles	247
	Cyclocross Bicycles	89
Surly	Mountain Bikes	526
	Cyclocross Bicycles	305
	Road Bikes	77
Sun Bicycles	Cruisers Bicycles	358
	Comfort Bicycles	289
	Electric Bikes	34
	Mountain Bikes	26
	Children Bicycles	24
Pure Cycles	Cruisers Bicycles	376
Haro	Mountain Bikes	195
	Children Bicycles	136
Heller	Mountain Bikes	138
Ritchey	Mountain Bikes	118
Strider	Children Bicycles	25

if we look to this graph we can note some things we can summarize in the following point :

- As for **Cruisers bicycles** , the quantity sold for this category of **Electra** brand is much higher compared to other brands **(Sun Bicycles - Pure Cycles)**

- As for **children bicycles**, the quantity sold for this category of **Electra** brand is about **747**, then **Trek** brand is about **247**, then **Haro** brand is about **136**, and the quantity sold for that category of **Sun bicycles** and **Strider** brand is the lowest compared to the first three brands

- As for **comfort bicycles** , the quantity sold for this category of **Electra brand** is about **524** , and then **Sun Bicycles brand** is about *289*

- As for **comfort bicycles** , the quantity sold for this category of **Electra brand** is about **524** , and then **Sun Bicycles brand** is about *289*

- As for **Electric bikes** , the quantity sold for this category of **Trek** brand is much higher compared to other brands **(Electra - Sun Bicycles)**

- As for **Mountain bikes** , the quantity sold for this category of **Trek** brand is about **752** , then **Surly** brand is about **526** , then **Haro** brand is about **195** , then **Ritchey** brand is about **118** and a very small amount for **Strider** brand

- As for **Road bikes** , the quantity sold for this category of **Trek** brand is much higher compared to **Surly** brand

- As for **Cyclocross bicycles** , the quantity sold for this category of **Surly** brand is much higher compared to **Trek** brand

3- What is the percentage of the quantities sold for each category, according to the brand?

We don't need to have a large number of certain categories that are not yet sold out and are still in stock, so we need to look at each category by brand to try to reduce the quantities that we put in our stores and so we save money that we spend on specific branded categories and demand on it a little bit

The following chart shows the percentage of sale of each category according to the brand (we added the quantities sold and the quantities stored to get the total, and then we divided the quantity sold by the total)
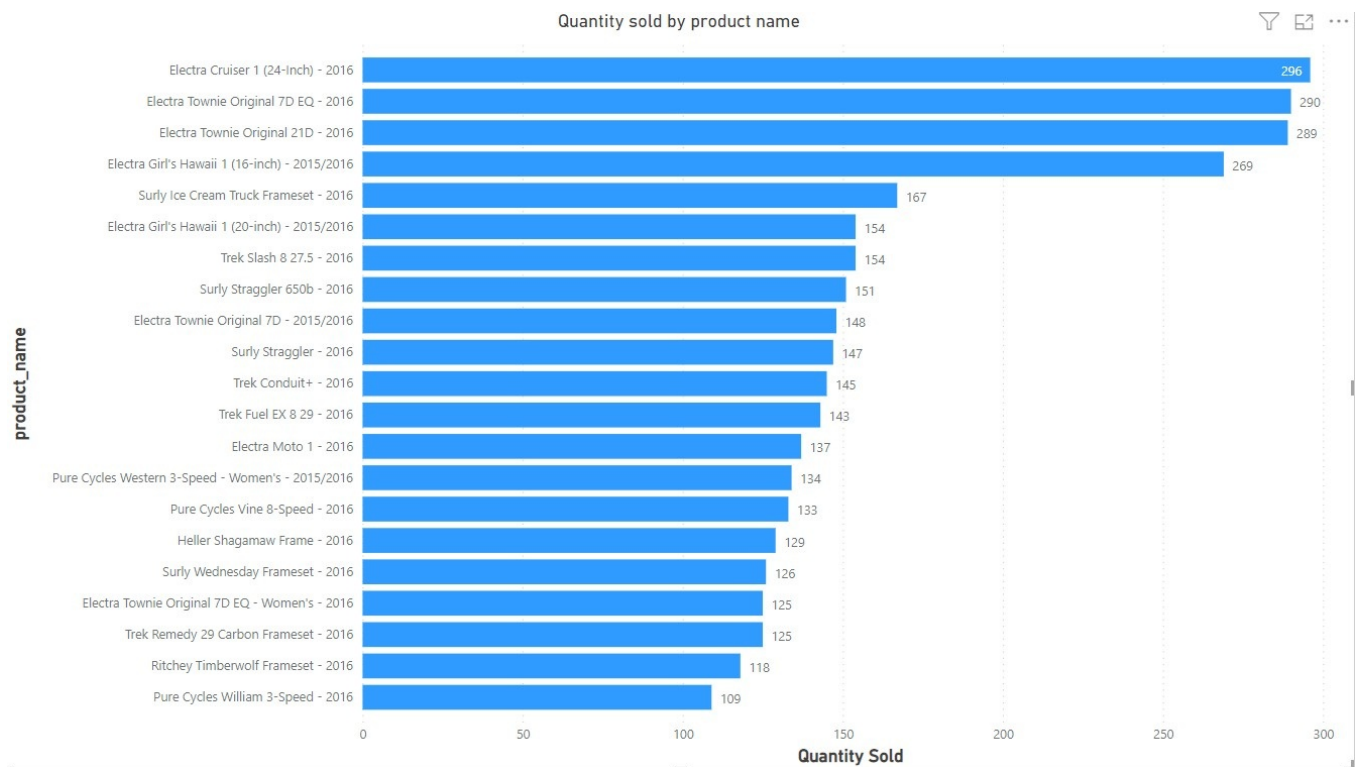
Percentage of the quantity sold by Brand and Category

brand_name	category_name	Percentage
Electra	Comfort Bicycles	38.40
	Children Bicycles	38.20
	Cruisers Bicycles	32.40
	Electric Bikes	6.30
Haro	Children Bicycles	43.20
	Mountain Bikes	41.50
Heller	Mountain Bikes	56.10
Pure Cycles	Cruisers Bicycles	78.30
Ritchey	Mountain Bikes	72.40
Strider	Children Bicycles	15.50
Sun Bicycles	Electric Bikes	55.70
	Cruisers Bicycles	41.50
	Comfort Bicycles	40.90
	Mountain Bikes	36.10
	Children Bicycles	33.30
Surly	Cyclocross Bicycles	62.20
	Mountain Bikes	45.90
	Road Bikes	20.40
Trek	Mountain Bikes	32.50
	Cyclocross Bicycles	28.00
	Electric Bikes	22.90
	Road Bikes	21.20
	Children Bicycles	19.30

4- What are the best-selling products?

The following graph illustrates the highest products in terms of the quantity sold

Note:

We have filtered the products to get the names of the products that were sold in more than 100 pieces

Quantity sold by product name

product_name	Quantity Sold
Electra Cruiser 1 (24-Inch) - 2016	296
Electra Townie Original 7D EQ - 2016	290
Electra Townie Original 21D - 2016	289
Electra Girl's Hawaii 1 (16-inch) - 2015/2016	269
Surly Ice Cream Truck Frameset - 2016	167
Electra Girl's Hawaii 1 (20-inch) - 2015/2016	154
Trek Slash 8 27.5 - 2016	154
Surly Straggler 650b - 2016	151
Electra Townie Original 7D - 2015/2016	148
Surly Straggler - 2016	147
Trek Conduit+ - 2016	145
Trek Fuel EX 8 29 - 2016	143
Electra Moto 1 - 2016	137
Pure Cycles Western 3-Speed - Women's - 2015/2016	134
Pure Cycles Vine 8-Speed - 2016	133
Heller Shagamaw Frame - 2016	129
Surly Wednesday Frameset - 2016	126
Electra Townie Original 7D EQ - Women's - 2016	125
Trek Remedy 29 Carbon Frameset - 2016	125
Ritchey Timberwolf Frameset - 2016	118
Pure Cycles William 3-Speed - 2016	109

5-Who are the customers who bought the largest number of products?

The following table show information about the customers who have purchased the largest number of our products
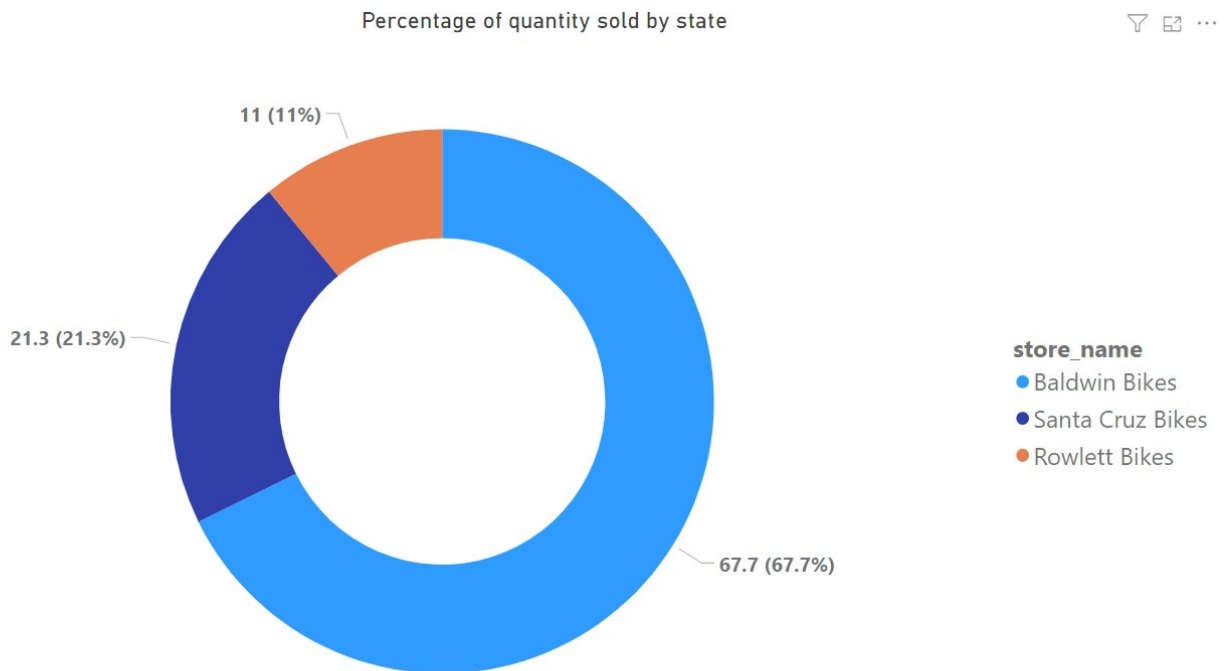
Of course, we will need to keep these distinguished customer, so we can give them discounts on our products

customer_name	email	state	city	street	zip_code	Purchased_quantity
Emmitt Sanchez	emmitt.sanchez@hotmail.com	NY	New York	461 Squaw Creek Road	10002	19
Tameka Fisher	tameka.fisher@aol.com	CA	Redondo Beach	769C Honey Creek St.	90278	19
Pamelia Newman	pamelia.newman@gmail.com	NY	Monroe	476 Chestnut Ave.	10950	18
Debra Burks	debra.burks@yahoo.com	NY	Orchard Park	9273 Thorne Ave.	14127	17
Elinore Aguilar	elinore.aguilar@msn.com	TX	San Angelo	9766 Rockcrest Ave.	76901	17
Mozelle Carter	mozelle.carter@aol.com	TX	Houston	895 Chestnut Ave.	77016	17
Bridgette Guerra	bridgette.guerra@hotmail.com	CA	San Lorenzo	9982 Manor Drive	94580	16
Corene Wall	corene.wall@msn.com	CA	Atwater	9601 Ocean Rd.	95301	16
Damien Dorsey	damien.dorsey@yahoo.com	NY	Central Islip	161 Old York Street	11722	16
Lyndsey Bean	lyndsey.bean@hotmail.com	NY	Fairport	769 West Road	14450	16
Ronna Butler	ronna.butler@gmail.com	CA	Encino	9438 Plymouth Court	91316	16
Georgetta Hardin	georgetta.hardin@aol.com	NY	Canandaigua	474 Chapel Dr.	14424	15
Jeanice Frost	jeanice.frost@hotmail.com	NY	Ossining	76 Devon Lane	10562	15
Kasha Todd	kasha.todd@yahoo.com	CA	Campbell	910 Vine Street	95008	15
Saturnina Garner	saturnina.garner@gmail.com	CA	Glendora	8538 Fairground St.	91740	15
Sharyn Hopkins	sharyn.hopkins@hotmail.com	NY	Baldwinsville	4 South Temple Ave.	13027	15
Williemae Holloway	williemae.holloway@msn.com	CA	Oakland	69 Cypress St.	94603	15

6- What is the top store in terms of sales?

The graph show that Baldwin Bikes are the highest in terms of sales

The graph also show that Rowlett Bikes Which is located in Texas had the lowest percentage of sales

Percentage of quantity sold by state

store_name
- Baldwin Bikes
- Santa Cruz Bikes
- Rowlett Bikes

11 (11%)
21.3 (21.3%)
67.7 (67.7%)

7-What are he names of the best-selling sellers for products and managers
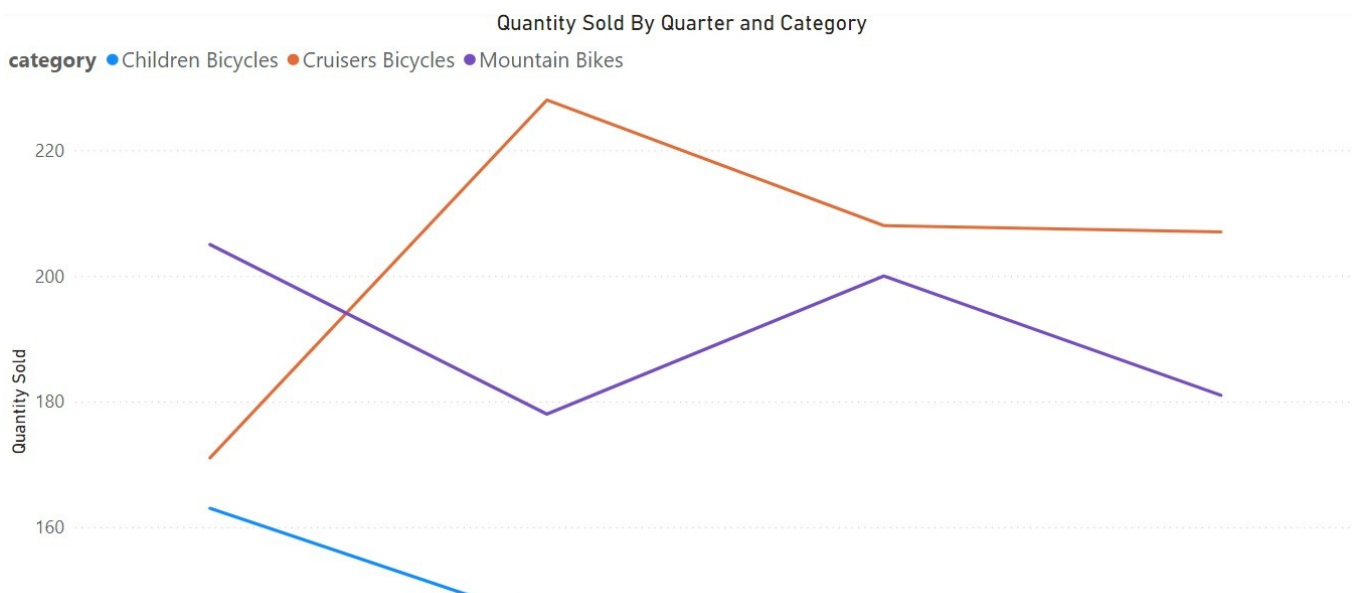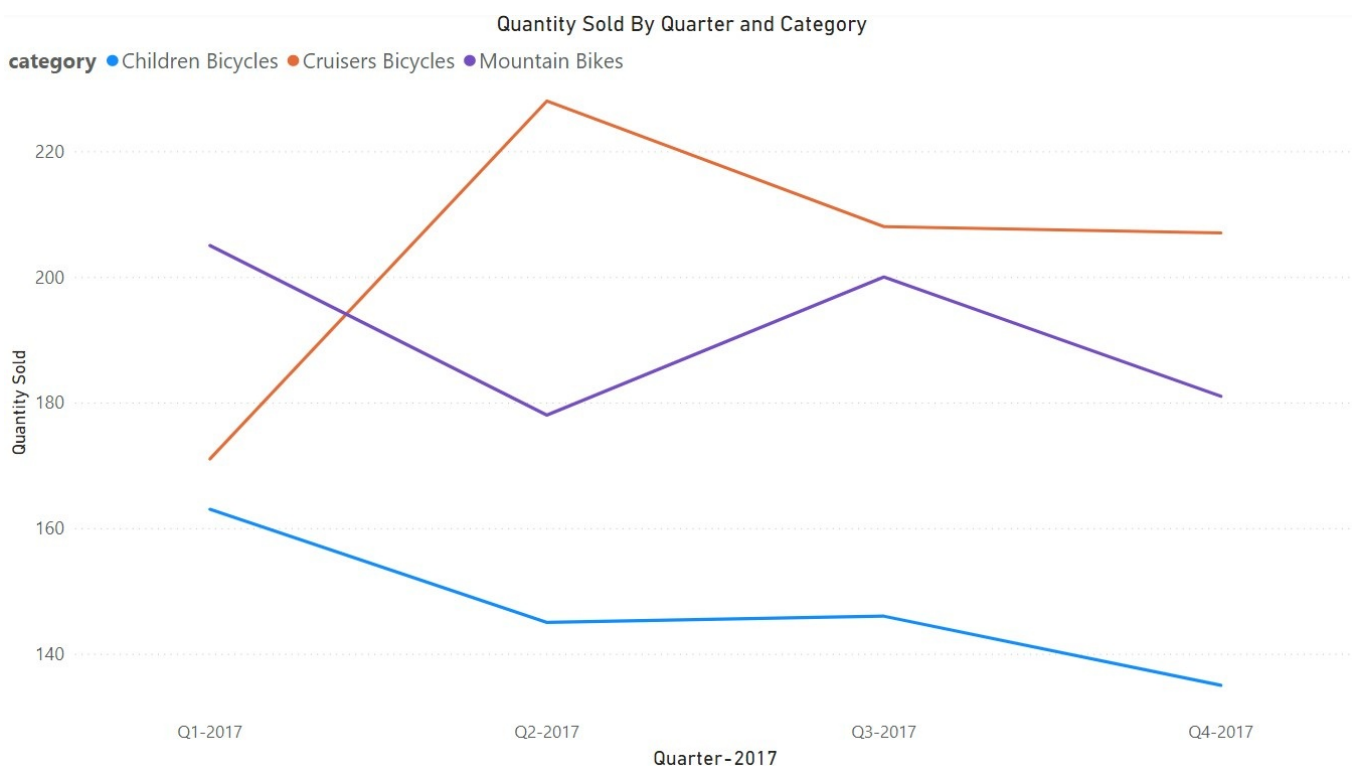
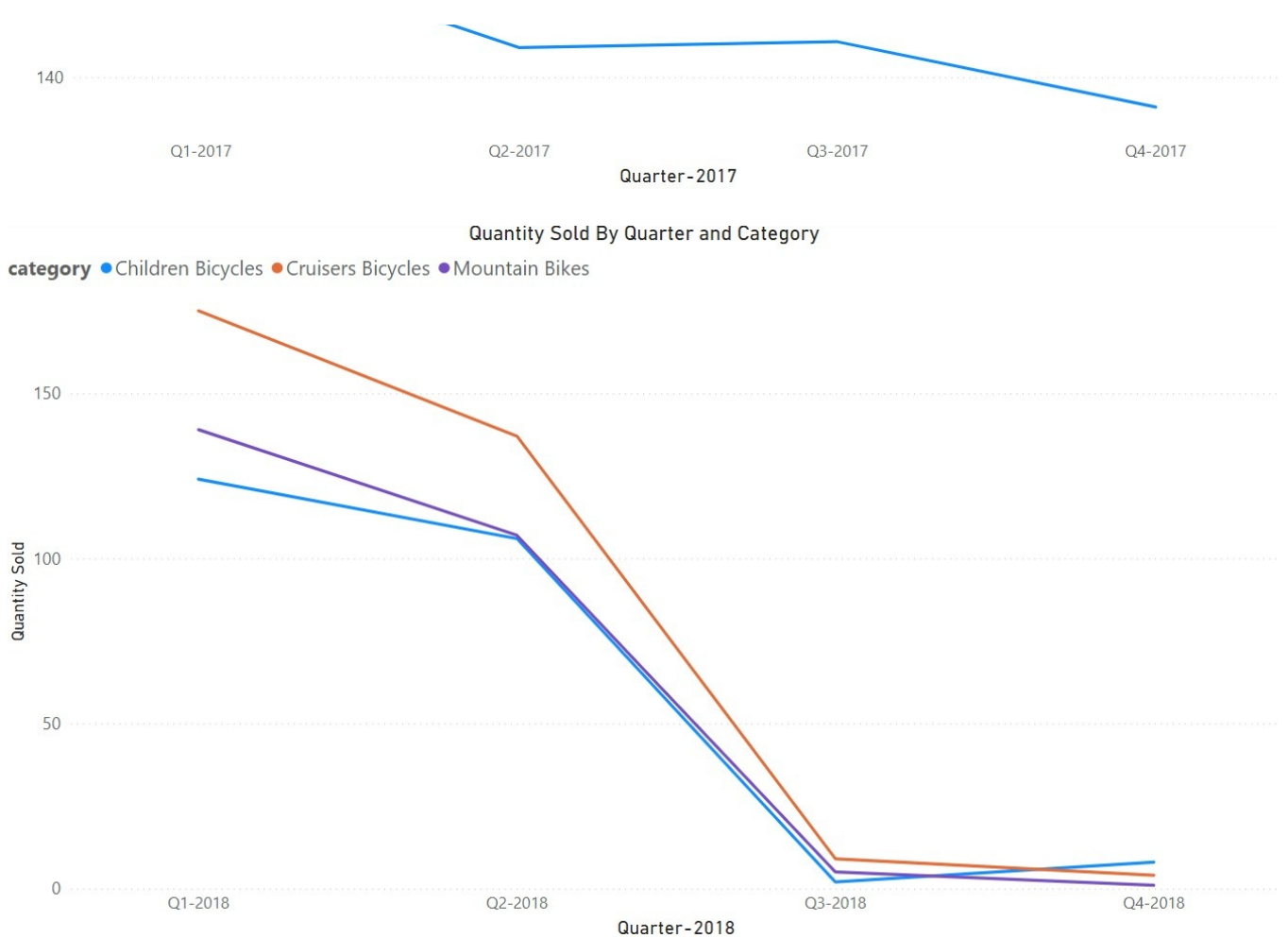The following table show the best-selling sellers and there are some sellers don't have products they sold

Venita Daniel, Marcelene Boyer and their manager Jannette David, are doing a great job. They are responsible for the high sales rate of the store. However, there are sellers who do not have any sales activity as shown at the end of the table

Seller	Manager	Store	State	Quantity_sold
Venita Daniel	Jannette David	Baldwin Bikes	NY	2360
Marcelene Boyer	Jannette David	Baldwin Bikes	NY	2419
Layla Terrell	Venita Daniel	Rowlett Bikes	TX	371
Kali Vargas	Fabiola Jackson	Rowlett Bikes	TX	412
Mireya Copeland	Fabiola Jackson	Santa Cruz Bikes	CA	685
Genna Serrano	Mireya Copeland	Santa Cruz Bikes	CA	831
Bernardine Houston	Venita Daniel	Rowlett Bikes	TX	NULL
Fabiola Jackson	NULL	Santa Cruz Bikes	CA	NULL
Jannette David	Fabiola Jackson	Baldwin Bikes	NY	NULL
Virgie Wiggins	Mireya Copeland	Santa Cruz Bikes	CA	NULL

8-What is the sales movement of the top three products (Cruisers - mountain - children) bicycles over the three years (2016-2017-2018) ?

- With the exception of 2017, the order for **Cruisers bicycles** is high in the first quarter of the year

- In 2016 and 2017 , the order for **mountain bicycles** is increasing in the third quarter of the year and the order decreases in the last quarter of the year

- Over three years, the order for **children bicycles** has been increasing in the first quarter of the year only

Quantity Sold By Quarter and Category

Quantity Sold By Quarter and Category

140

Q1-2017   Q2-2017   Q3-2017   Q4-2017

Quarter-2017

Quantity Sold By Quarter and Category

category ● Children Bicycles ● Cruisers Bicycles ● Mountain Bikes

150

Quantity Sold

100

50

0

Q1-2018   Q2-2018   Q3-2018   Q4-2018

Quarter-2018

Conclusion:

- Reducing the quantities we have of the following brands(Trek - Electra - Surly - Sun bicycles) because they are the most ordered by customers.

- Reducing the quantities we have of the following brands (Ritchey - strider) because they are the least in ordered and the least in terms of financial revenue.

- Do not spend a lot of money or bring a large number of **children bicycles** from **Sun Bicycles** and **Strider** brand

- Do not spend a lot of money or bring a large number of Electric bikes from **Electra** and **Sun Bicycles** brand

- Do not spend a lot of money or bring a large number of **Road bikes** from **Surly** brand

- Do not spend a lot of money or bring a large number of **cyclocross Bicycles** from **Trek** brand

- Do not spend a lot of money or bring a large number of **Mountain bikes** from **Sun bicycles , Ritchey , Haro and Heller** brand

- Reducing the quantities that we bring and put in our stocks because the percentage of the quantities sold for each category according to the brand out of the total quantities is less than half, except for **mountain bikes** of **Ritchey** brand , the mountain bikes of the Heller brand , **cyclocross bicycles** of **Surly** brand and **cruisers bikes** of **Pure** brand, so we will need to bring in much smaller quantities in the rest of the categories in order to have The difference between the quantity sold and stored is small, and therefore we save on the money that is spent

- Increasing the quantity of products that we have previously show because they are the most ordered by customers

- Maintaining our best customers by offering them some discounts

- Reward our best sellers and look at the performance of other sellers who do not have a sales history

- Looking at the movement of selling different categories of bicycles by looking at the time period in the three years to take appropriate decisions, whether to increase or decrease the products of this category in a certain period

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