

Retail Sales Analytics

Phase 1: Excel – Data Cleaning & Preparation

Task 1

Standardize Column Headers

Done.

Task 2

Remove Duplicates

Delete the duplicates by using remove duplicates.

Task 3

Handle Missing Values

Find the empty values by using filter. Then fill the blanks with “NA”.

Task 4

Data Type Conversion

Change the column data type to suitable data type. Example for change the order date to date. Qty to number.

Task 5

Data Validation

Use dropdowns for fields like order_status (Pending, Shipped, Delivered) to ensure consistency

6 03-01-2016	Pending	2
6 05-01-2016	Pending	1
6 06-01-2016	pending	2
6 05-01-2016	shippend	2
6 05-01-2016	delivered	2
6 08-01-2016		1
6 06-01-2016	Pending	2
6 07-01-2016	Pending	2

Task 6

Create New Derived Columns

	D	E	F	G	H	I	
Quantity	1	600	20%	0.2	120	480	Elect
	2	1800	7%	0.07	252	3348	Trek

total_price = (list_price * quantity) - discount

Task 7

Merge Lookup Data

XLOOKUP to merge product names into order_items using product_id.

	I	J	K	L	M	N
		=XLOOKUP(C2,products.csv!\$A:\$A,products.csv!\$B:\$B,"NA",0,1)				
int Total_price	Product_name					
20	480	Electra Townie Original 7D EQ - Women's - 2016				
52	3348	Trek Remedy 29 Carbon Frameset - 2016				
1.9	2943.1	Surly Straggler - 2016				
60	1140	Electra Townie Original 7D EQ - 2016				
80	2320	Trek Fuel EX 8 29 - 2016				
42	558	Electra Townie Original 7D EQ - Women's - 2016				
60	1140	Electra Townie Original 7D EQ - 2016				
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Task 8

pivot table summarizing total sales by product category

Category_name	Sum of Total_price
Children Bicycles	292149
Comfort Bicycles	394016
Cruisers Bicycles	995007
Cyclocross Bicycles	711026
Electric Bikes	916689
Mountain Bikes	2715064
Road Bikes	1665095
Grand Total	7689046

Task 9

Sort and Filter for Outliers

	Product Name	Price
highest value	Trek Domane SLR 9 Disc - 2018	12000
lowest value	Strider Classic 12 Balance Bike - 2018	90

Task 10

Prepare Final CSVs

Done

Phase 2: SQL – Database Management and Querying

Task 1

Create Tables Based on ERD

```
create table customer (
    Customer_id int ,
    First_name varchar(50),
    Last_name varchar(50),
    Email varchar(50),
    Email_website varchar(50),
    Phone varchar(50),
    Street varchar(50),
    City varchar(50),
    State varchar(50),
    Zip_code varchar(50)
);
```

Task 2

Import CSVs into SQL

Done

Task 3

Inner Join for Order Details

```
select orders.order_id,orders.customer_id,products.product_id,products.product_name,  
order_items.Quantity,order_items.list_price,order_items.discount1 from orders join order_items on  
orders.order_id= order_items.order_id join products on order_items.product_id=  
products.product_id  
order by orders.order_id,products.product_name;
```

Task 4

Total Sales by Store

```
select orders.store_id,stores.store_name,sum(order_items.quantity*order_items.list_price*(1-  
order_items.discount1)) as Total_sales from orders  
join order_items on orders.order_id=order_items.order_id  
join stores on orders.store_id=stores.store_id  
group by orders.store_id,stores.store_name;
```

Task 5

Top 5 Selling Products

```
select product_id,product_name,sum(quantity)as Total_qty from order_items group by  
product_id,product_name order by Total_qty desc limit 5;
```

Task 6

Customer Purchase Summary

```
select customers.customer_id,customers.first_name as customer_name, count( distinct  
orders.order_id) as total_order,  
sum(order_items.quantity) as Total_Qty,  
sum(order_items.quantity*order_items.list_price*(1-order_items.discount1)) as Total_sale from  
customers  
join orders on customers.customer_id=orders.customer_id  
join order_items on orders.order_id=order_items.order_id group by  
customers.customer_id,first_name  
order by total_sale desc;
```

Task 7

Segment Customers by Total Spend

```
select customers.customer_id,customers.first_name as customer_name, count( distinct  
orders.order_id) as total_order,  
sum(order_items.quantity*order_items.list_price*(1-order_items.discount1)) as total_spent,  
case  
when sum(order_items.quantity*order_items.list_price*(1-order_items.discount1))<5000  
then 'Low' when sum(order_items.quantity*order_items.list_price*(1-order_items.discount1))  
between 5000 and 15000  
then 'mid' else 'high' end as spending_brackets from customers  
join orders on customers.customer_id=orders.customer_id  
join order_items on orders.order_id=order_items.order_id  
group by customer_id,first_name order by total_spent desc;
```

Task 8

Staff Performance Analysis

```
select orders.store_id,orders.staff_id,staffs.first_name as  
staff_name,sum(order_items.quantity*order_items.list_price*(1-order_items.discount1)) as sales  
from orders join order_items on orders.order_id=order_items.order_id
```

```
join staffs on orders.staff_id=staffs.staff_id  
group by orders.staff_id,orders.store_id order by staff_id;
```

Task 9

Stock Alert Query

```
select stocks.store_id,stocks.product_id,products.product_name,stocks.quantity from stocks  
join products on products.product_id=stocks.product_id  
where stocks.quantity<10 order by stocks.store_id;
```

Task 10

Create Final Segmentation Table

```
create table customer_segments (  
customer_id int,  
customer_name varchar(50),  
recency int,  
frequency int,  
monetary double  
);
```

Phase 3: Python and ML Tasks Mandatory Tasks

Task 1

Load Data from SQL

```
engine = create_engine("mysql+pymysql://root:312712@localhost:3306/retail")  
pd.read_sql("select * from orders;",engine)
```

Task 2

Basic EDA (Exploratory Data Analysis)

```
4]: df.describe()
```

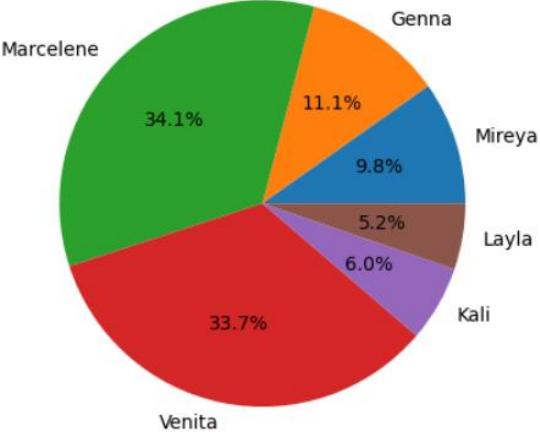
	Order_id	Customer_id	Order_status	Store_id	Staff_id
count	1615.000000	1615.000000	1615.000000	1615.000000	1615.000000
mean	808.000000	654.171517	3.778947	1.892260	5.855108
std	466.354658	443.229967	0.693430	0.558395	1.913899
min	1.000000	1.000000	1.000000	1.000000	2.000000
25%	404.500000	237.000000	4.000000	2.000000	6.000000
50%	808.000000	638.000000	4.000000	2.000000	6.000000
75%	1211.500000	1041.500000	4.000000	2.000000	7.000000
max	1615.000000	1445.000000	4.000000	3.000000	9.000000

```

1]: pc
1]:   store_id  staff_id  staff_name    sales
0      1         2       Mireya  752541.36
1      1         3       Genna   853294.29
2      2         6     Marcelene 2624140.52
3      2         7      Venita  2591649.90
4      3         8        Kali   463921.74
5      3         9       Layla  403627.01

5]: plt.pie(pc['sales'], labels=pc['staff_name'], autopct='%1.1f%%')
plt.Category("pie chart Example")
plt.show()

```



Task 3

Calculate RFM Features for Customers

```

rfm_data =pd.read_sql("select orders.customer_id,customers.first_name as
customer_name,datediff(curdate(),max(orders.order_date))as recency,count(orders.order_id) as
frequency, sum(order_items.quantity*order_items.list_price*(1-order_items.discount1)) as
monetary from orders join order_items on orders.order_id=order_items.order_id join customers on
customers.customer_id=orders.customer_id group by customer_id,first_name order by
customer_id;",engine)

```

```

1]: rfm_data
1]:   customer_id  customer_name  recency  frequency  monetary
0      1           Debra      2557       11  27888.30
1      2           Kasha      2780       10  19329.22
2      3          Tameka      2585       13  24051.70
3      4          Daryl      2771        9  21151.00
4      5        Charolette      2772        8  17520.40
...     ...
1440  1441         Jamaal      2853        3  9173.40
1441  1442         Cassie      3033        5  6987.30
1442  1443        Lezlie      3290        5  10372.14
1443  1444        Ivette      3255        2  1400.00
1444  1445         Ester      2813        1  8000.00

```

1445 rows × 5 columns

Task 4

Export Segmentation Results to SQL

```
rfm_data.to_sql('customer_segments',con=engine,if_exists='append',index=False)
```

Phase 4: Power BI – Visualization & Dashboarding Mandatory

Tasks

Task 1

Connect Power BI to SQL

I can't connect mysql server to power bi for some unknown reason I save the table as csv file then import to power bi.

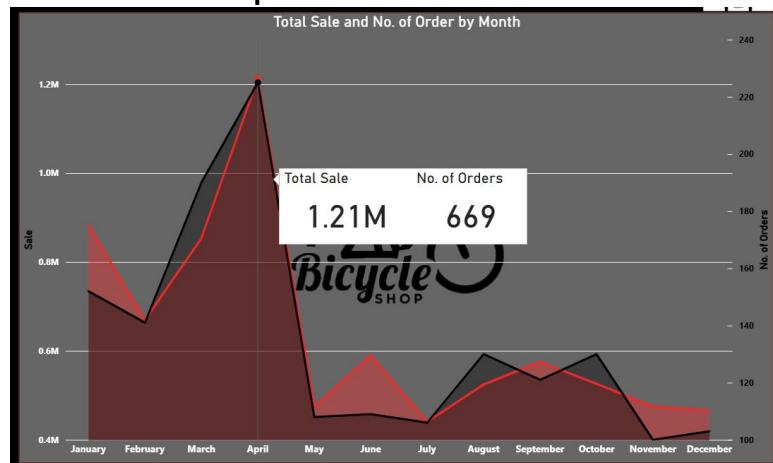
Task 2

Create Relationships Between Tables



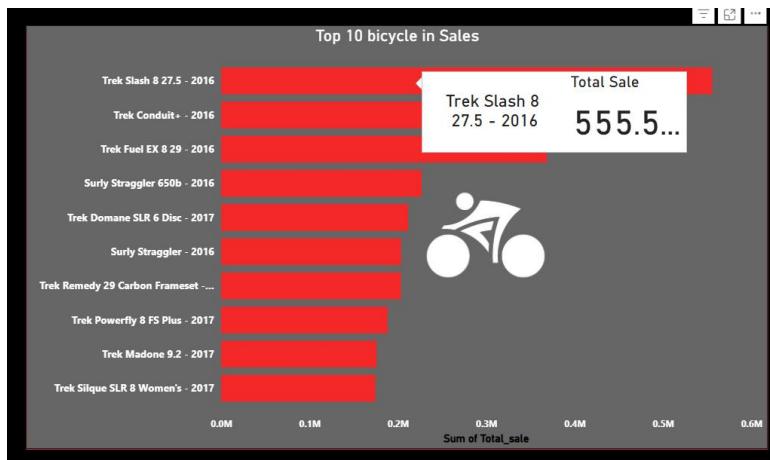
Task 3

Sales Overview Report



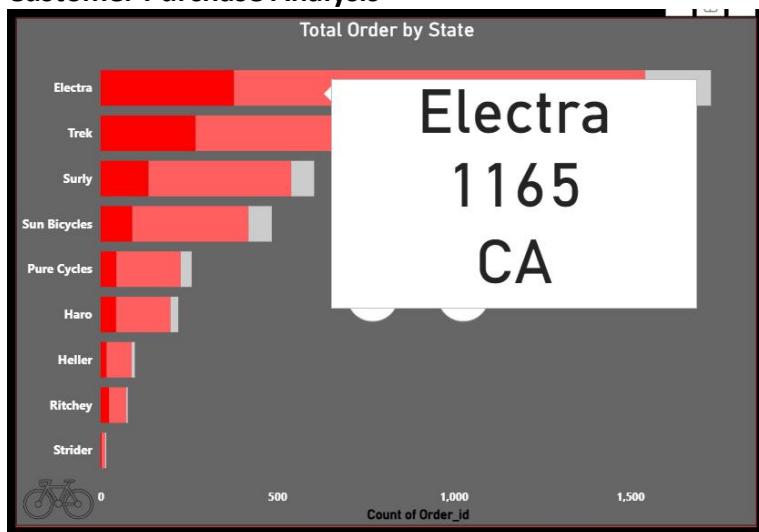
Task 4

Top Products by Sales



Task 5

Customer Purchase Analysis



Task 6

Sales by Store Map



Task 7

Low Stock Alert Dashboard



Task 8

Interactive Filters and Slicers

Task 9

Staff Performance Report

First_name	Sum of Total_sale	Count of Order_id
Genna	8,53,294.29	184
Kali	4,63,921.74	88
Layla	4,03,627.01	86
Marcelene	26,24,140.52	553
Mireya	7,52,541.36	164
Venita	25,91,649.90	540
Total	76,89,174.82	1615

Task 10

Stock value	Sale value	Total discount	Average sale per order
19.82M	7.69M	889.88K	1.63K
stock quantity	Sale quantity	Total orders	Active customers
14K	7078	1615	1445

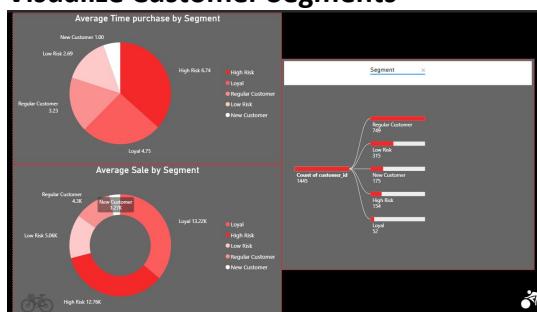
Task 11

Import customer_segments Table

I can't connect mysql server to power bi for some unknown reason I save the table as csv file then import to power bi.

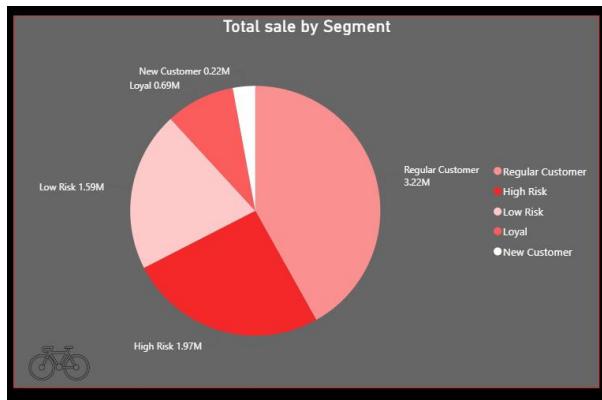
Task 12

Visualize Customer Segments



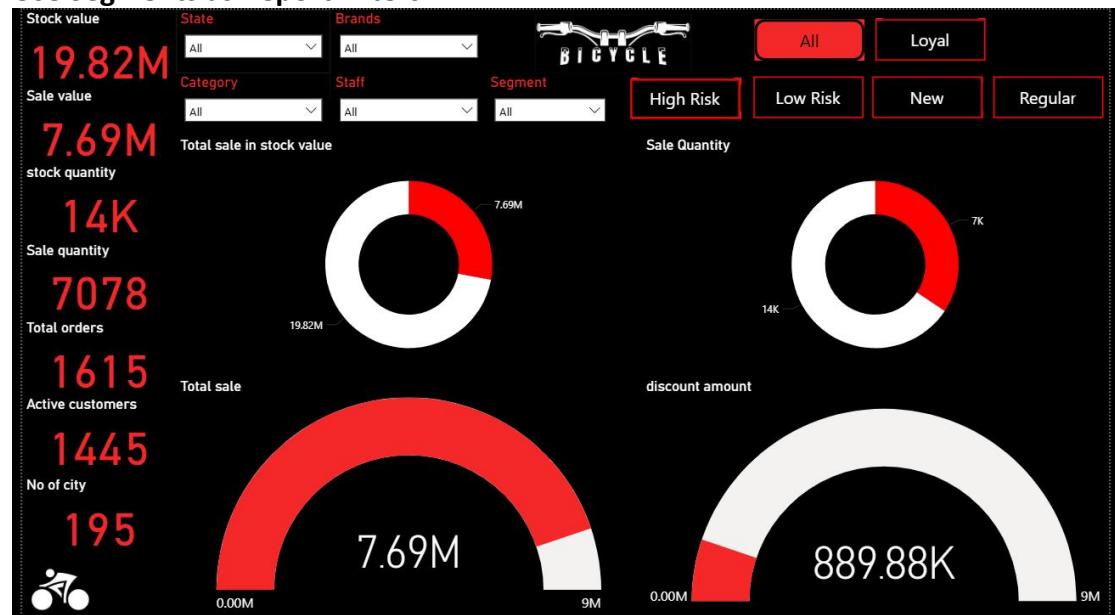
Task 13

Segment-Level Revenue Breakdown



Task 14

Use Segments as Report Filters



The end.