Predicting Customer Churnin Telecom Industry using PowerBI or Tableau and SQL

Data Cleaning:

The given customer churn.csv file is open in the Microsoft Excel then the unwanted rows which are not necessary to do the analytical part are deleted by right click and selecting delete option

Then the cleaned data is saved as churn.csv file

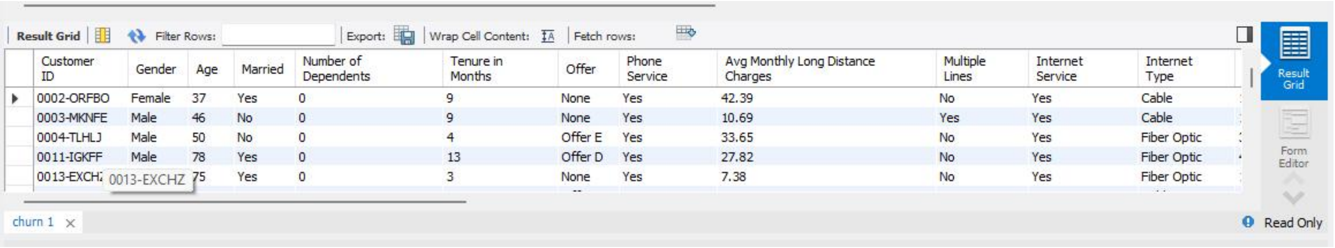
My SQL:

SQL to query the telecom data base and extract relevant data

My SQL was opened and local host is opened , new schema is created by the name of churn

By double click the churn schema, The table option right click mouse then Table data import wizard ,the table saved by name of churn is imported
After importing the table the SQL query is used to view the table

SELECT * FROM churn.churn;



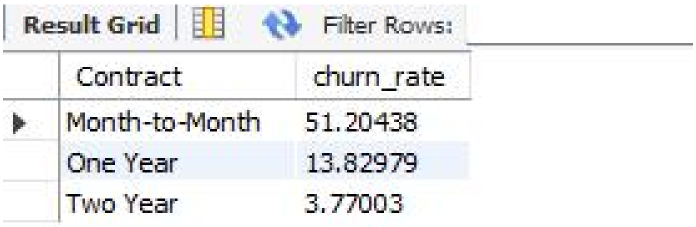
Customer ID	Gender	Age	Married	Number of Dependents	Tenure in Months	Offer	Phone Service	Avg Monthly Long Distance Charges	Multiple Lines	Internet Service	Internet Type
0002-ORFBO	Female	37	Yes	0	9	None	Yes	42.39	No	Yes	Cable
0003-MKNFE	Male	46	No	0	9	None	Yes	10.69	Yes	Yes	Cable
0004-TLHLJ	Male	50	No	0	4	Offer E	Yes	33.65	No	Yes	Fiber Optic
0011-IGKFF	Male	78	Yes	0	13	Offer D	Yes	27.82	No	Yes	Fiber Optic
0013-EXCHZ		75	Yes	0	3	None	Yes	7.38	No	Yes	Fiber Optic

The data types are checked whether all the dates are in correct formats

Questions worked using MySQL querys and result

❖ Identify the total number of customers and the churn rate

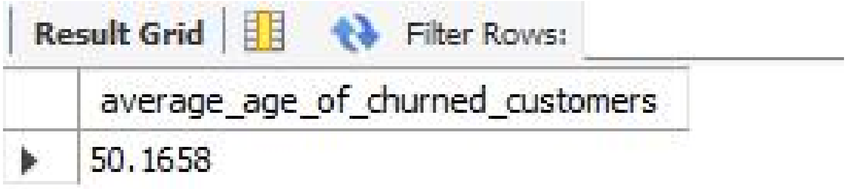
```
SELECT (SELECT COUNT(*) FROM churn.churn WHERE `Customer
Status` = 'Churned') * 100.0 / (SELECT COUNT(*) FROM churn) AS
churn_rate;
```



Contract	churn_rate
Month-to-Month	51.20438
One Year	13.82979
Two Year	3.77003

❖ Find the average age of churned customers

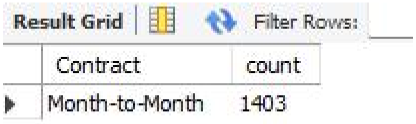
```
SELECT AVG(Age) AS average_age_of_churned_customers
FROM churn.churn
WHERE `Customer Status` = 'Churned';
```



average_age_of_churned_customers
50.1658

❖ Discover the most common contract types among churned customers

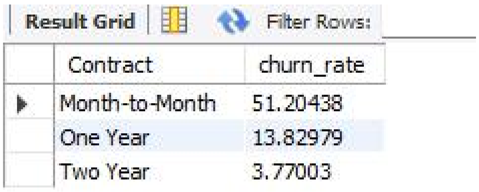
```
SELECT `Contract`, COUNT(*) AS count
FROM churn.churn
WHERE `Customer Status` = 'Churned'
GROUP BY `Contract`
ORDER BY count DESC
LIMIT 1;
```



Contract	count
Month-to-Month	1403

- ❖ Create a query to identify the contract types that are most prone to churn

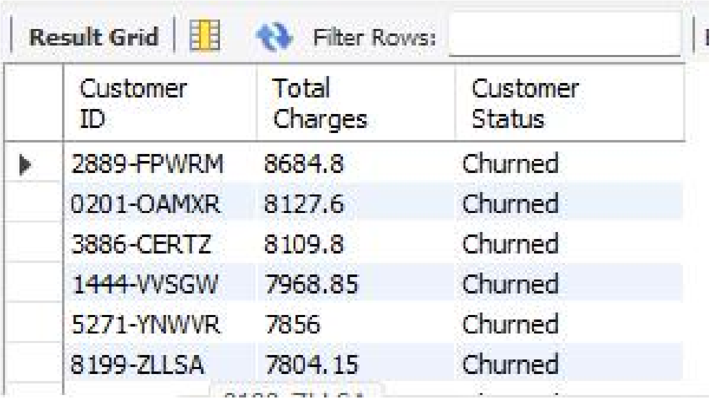
```
SELECT
   `Contract`,
   COUNT(CASE WHEN `Customer Status` = 'Churned' THEN 1 END) * 100.0 / COUNT(*) AS churn_rate
FROM churn.churn
GROUP BY `Contract`
ORDER BY churn_rate DESC;
```



Contract	churn_rate
Month-to-Month	51.20438
One Year	13.82979
Two Year	3.77003

- ❖ Identify customers with high total charges who have churned

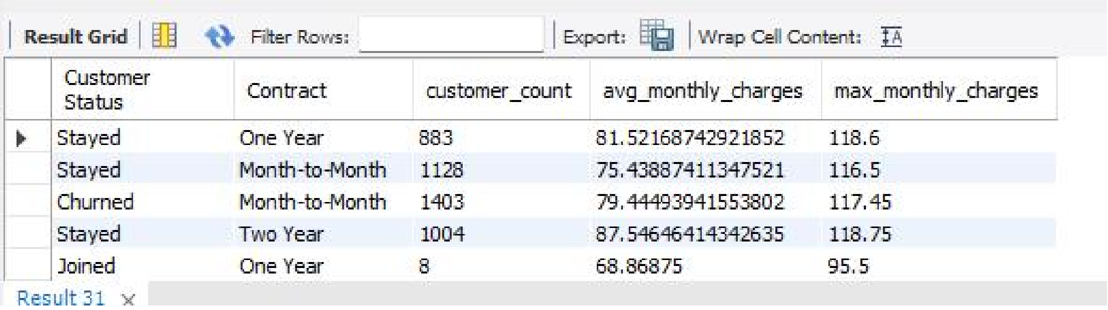
```
SELECT `Customer ID`, `Total Charges`, `Customer Status`
FROM churn.churn
WHERE `Customer Status` = 'Churned' AND `Total Charges` > 7000
ORDER BY `Total Charges` DESC;
```



Customer ID	Total Charges	Customer Status
2889-FPWRM	8684.8	Churned
0201-OAMXR	8127.6	Churned
3886-CERTZ	8109.8	Churned
1444-VVSGW	7968.85	Churned
5271-YNWVR	7856	Churned
8199-ZLLSA	7804.15	Churned

- ❖ Calculate the total charges distribution for churned and non-churned customers

```
SELECT
   `Customer Status`,
   `Contract`,
   COUNT(*) AS customer_count,
   AVG(`Monthly Charge`) AS avg_monthly_charges,
   MAX(`Monthly Charge`) AS max_monthly_charges
FROM churn.churn
GROUP BY `Customer Status`, `Contract`;
```

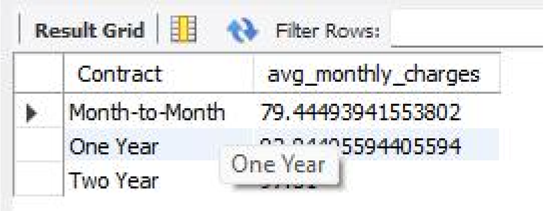


Customer Status	Contract	customer_count	avg_monthly_charges	max_monthly_charges
Stayed	One Year	883	81.52168742921852	118.6
Stayed	Month-to-Month	1128	75.43887411347521	116.5
Churned	Month-to-Month	1403	79.44493941553802	117.45
Stayed	Two Year	1004	87.54646414342635	118.75
Joined	One Year	8	68.86875	95.5

- ❖ Calculate the average monthly charges for different contract types among churned customers

```
SELECT
   `Contract`,
   AVG(`Monthly Charge`) AS avg_monthly_charges
FROM churn.churn
WHERE `Customer Status` = 'Churned'
```

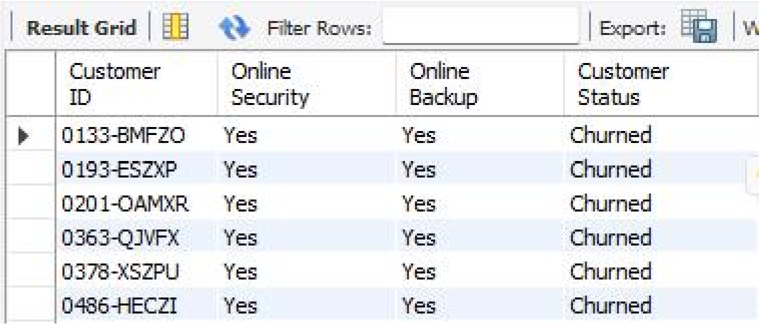
```
GROUP BY `Contract`;
```



	Contract	avg_monthly_charges
▶	Month-to-Month	79.44493941553802
	One Year	[illegible]5594405594
	Two Year	[illegible]

- ❖ Identify customers who have both online security and online backup services and have not churned

```
SELECT
 `Customer ID`, `Online Security`, `Online Backup`, `Customer Status`
FROM churn.churn
WHERE `Customer Status` = 'Churned'
  AND `Online Security` = 'Yes'
  AND `Online Backup` = 'Yes';
```

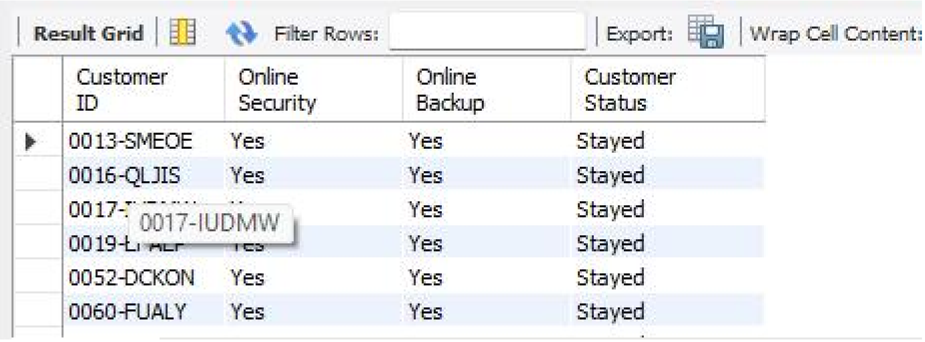


	Customer ID	Online Security	Online Backup	Customer Status
▶	0133-BMFZO	Yes	Yes	Churned
	0193-ESZXP	Yes	Yes	Churned
	0201-OAMXR	Yes	Yes	Churned
	0363-QJVFX	Yes	Yes	Churned
	0378-XSZPU	Yes	Yes	Churned
	0486-HECZI	Yes	Yes	Churned

- ❖ Determine the most common combinations of services among churned customers

```
  SELECT
   `Online Security`,
   `Online Backup`,
   `Streaming TV`,
   `Streaming Movies`,
   COUNT(*) AS combination_count
FROM churn.churn
```

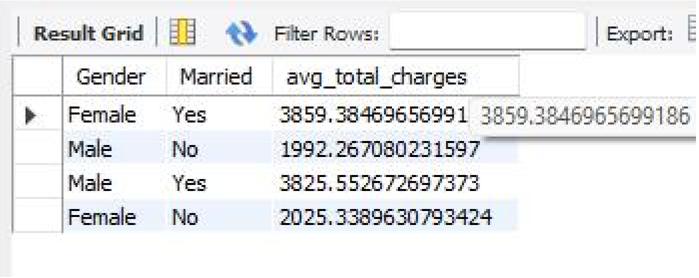
```
WHERE `Customer Status` ='Churned'
GROUP BY `Online Security`, `Online Backup`, `Device Protection`,
`Streaming TV`, `Streaming Movies`
ORDER BY combination_count DESC
LIMIT 1;
```



	Customer ID	Online Security	Online Backup	Customer Status
▶	0013-SMEOE	Yes	Yes	Stayed
	0016-QLJIS	Yes	Yes	Stayed
	0017-IUDMW	[illegible]	Yes	Stayed
	0019-[illegible]	Yes	Yes	Stayed
	0052-DCKON	Yes	Yes	Stayed
	0060-FUALY	Yes	Yes	Stayed

- ❖ Identify the average total charges for customers grouped by gender and marital status

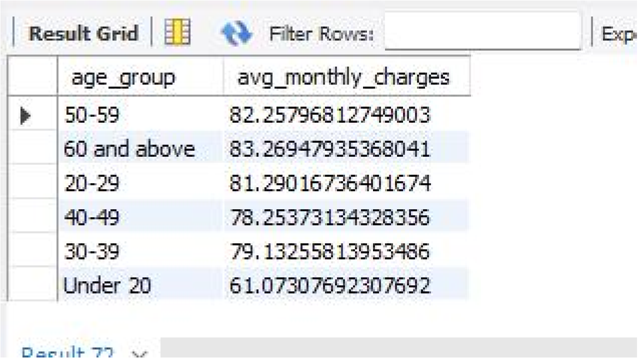
```
SELECT
   `Gender`,
   `Married`,
   AVG(`Total Charges`) AS avg_total_charges
FROM churn.churn
GROUP BY `Gender`, `Married`;
```



	Gender	Married	avg_total_charges
▶	Female	Yes	3859.38469656991 3859.3846965699186
	Male	No	1992.267080231597
	Male	Yes	3825.552672697373
	Female	No	2025.3389630793424

- ❖ Calculate the average monthly charges for different age groups among churned customers

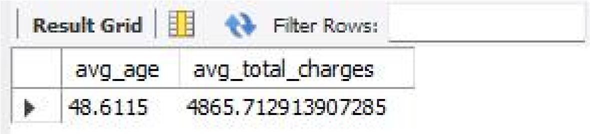
```
SELECT
   CASE
      WHEN Age < 20 THEN 'Under 20'
      WHEN Age BETWEEN 20 AND 29 THEN '20-29'
      WHEN Age BETWEEN 30 AND 39 THEN '30-39'
      WHEN Age BETWEEN 40 AND 49 THEN '40-49'
      WHEN Age BETWEEN 50 AND 59 THEN '50-59'
      WHEN Age >= 60 THEN '60 and above'
   END AS age_group,
   AVG(`Monthly Charge`) AS avg_monthly_charges
FROM churn.churn
WHERE `Customer Status` = 'Churned'
GROUP BY age_group;
```



age_group	avg_monthly_charges
50-59	82.25796812749003
60 and above	83.26947935368041
20-29	81.29016736401674
40-49	78.25373134328356
30-39	79.13255813953486
Under 20	61.07307692307692

- Determine the average age and total charges for customers with multiple lines and online backup

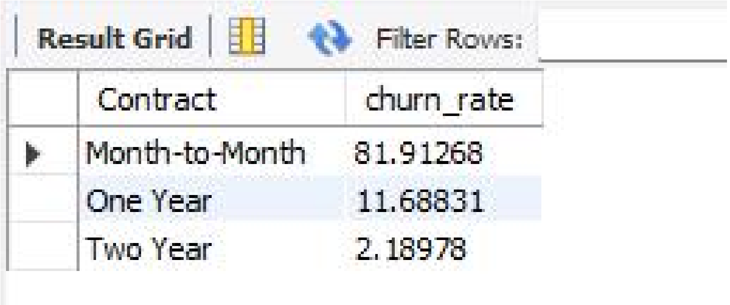
```
SELECT
   AVG(Age) AS avg_age,
   AVG(`Total Charges`) AS avg_total_charges
FROM churn.churn
WHERE `Multiple Lines` = 'Yes'
  AND `Online Backup` = 'Yes';
```



avg_age	avg_total_charges
48.6115	4865.712913907285

- Identify the contract types with the highest churn rate among senior citizens (age 65 and over)

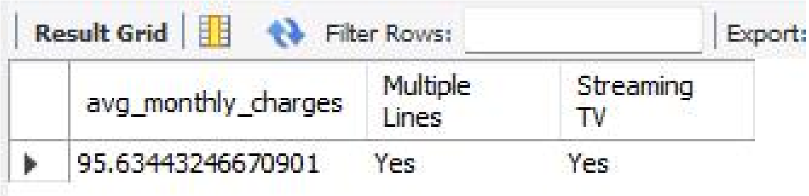
```
SELECT
   `Contract`,
   COUNT(CASE WHEN `Customer Status` = 'Churned' THEN 1 END) *
100.0 / COUNT(*) AS churn_rate
FROM churn.churn
WHERE Age >= 65
GROUP BY `Contract`
ORDER BY churn_rate DESC;
```



Contract	churn_rate
Month-to-Month	81.91268
One Year	11.68831
Two Year	2.18978

- Calculate the average monthly charges for customers who have multiple lines and streaming TV

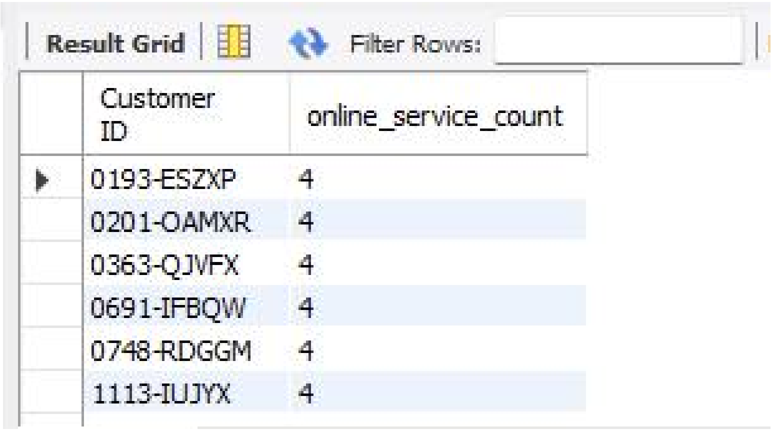
```
SELECT
   AVG(`Monthly Charge`) AS avg_monthly_charges,
   `Multiple Lines`,
   `Streaming TV`
  FROM churn.churn
WHERE `Multiple Lines` = 'Yes'
 AND `Streaming TV` = 'Yes';
```



avg_monthly_charges	Multiple Lines	Streaming TV
95.63443246670901	Yes	Yes

- ❖ Identify the customers who have churned and used the most online services

```
SELECT
   `Customer ID`,
   (`Online Security` = 'Yes') +
   (`Online Backup` = 'Yes') +
   (`Device Protection` = 'Yes') +
   (`Streaming TV` = 'Yes') +
   (`Streaming Movies` = 'Yes') AS online_service_count
FROM churn.churn
WHERE `Customer Status` = 'Churned'
ORDER BY online_service_count DESC;
```

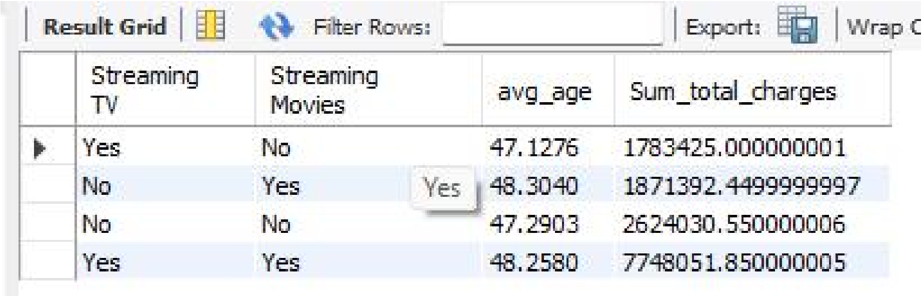


Customer ID	online_service_count
0193-ESZXP	4
0201-OAMXR	4
0363-QJVFX	4
0691-IFBQW	4
0748-RDGGM	4
1113-IUJYX	4

- ❖ Calculate the average age and total charges for customers with different combinations of streaming services

```
SELECT
   `Streaming TV`,
   `Streaming Movies`,
   AVG(Age) AS avg_age,
   sum(`Total Charges`) AS Sum_total_charges
```

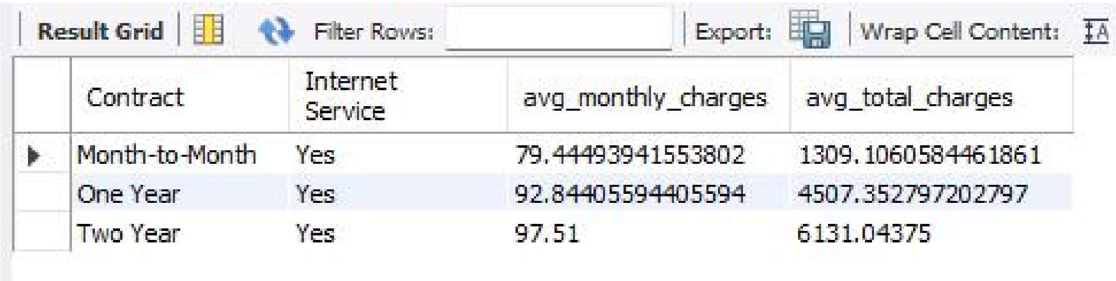
```
FROM churn.churn
GROUP BY `Streaming TV`, `Streaming Movies`;
```



Streaming TV	Streaming Movies	avg_age	Sum_total_charges
Yes	No	47.1276	1783425.000000001
No	Yes	48.3040	1871392.4499999997
No	No	47.2903	2624030.550000006
Yes	Yes	48.2580	7748051.850000005

❖ Calculate the average monthly charges and total charges for customers who have churned, grouped by contract type and internet service type

```
SELECT
   `Contract`,
   `Internet Service`,
   AVG(`Monthly Charge`) AS avg_monthly_charges,
   AVG(`Total Charges`) AS avg_total_charges
FROM churn.churn
WHERE `Customer Status` = 'Churned'
GROUP BY `Contract`, `Internet Service`;
```

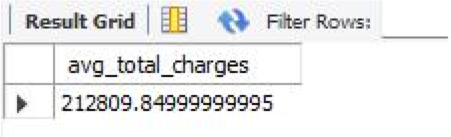


Contract	Internet Service	avg_monthly_charges	avg_total_charges
Month-to-Month	Yes	79.44493941553802	1309.1060584461861
One Year	Yes	92.84405594405594	4507.352797202797
Two Year	Yes	97.51	6131.04375

❖ Find the customers who have churned and are not using online services, and their average total charges

```
SELECT
   AVG(`Total Charges`) AS avg_total_charges
```

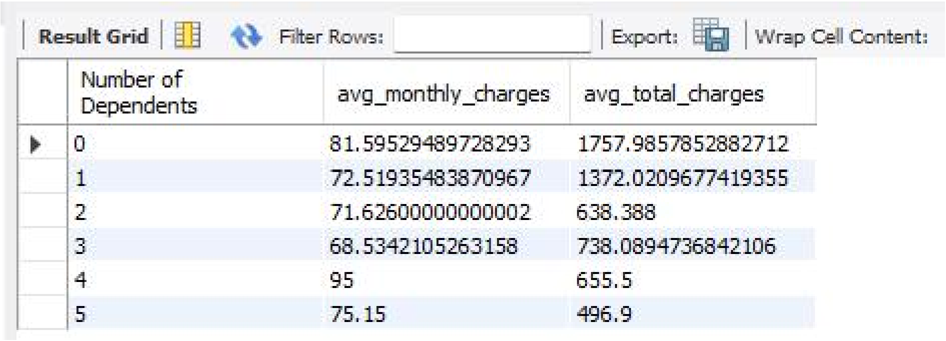
```
FROM churn.churn
WHERE `Customer Status` = 'Churned'
  AND `Online Security` = 'No'
  AND `Online Backup` = 'No'
  AND `Device Protection` = 'No'
  AND `Streaming TV` = 'No'
  AND `Streaming Movies` = 'No';
```



avg_total_charges
212809.84999999995

❖ Calculate the average monthly charges and total charges for customers who have churned, grouped by the number of dependents

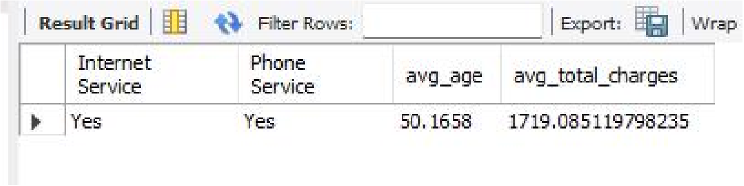
```
SELECT
   `Number of Dependents`,
   AVG(`Monthly Charge`) AS avg_monthly_charges,
   AVG(`Total Charges`) AS avg_total_charges
FROM churn.churn
WHERE `Customer Status` = 'Churned'
GROUP BY `Number of Dependents`;
```



Number of Dependents	avg_monthly_charges	avg_total_charges
0	81.59529489728293	1757.9857852882712
1	72.51935483870967	1372.0209677419355
2	71.62600000000002	638.388
3	68.5342105263158	738.0894736842106
4	95	655.5
5	75.15	496.9

❖ Determine the average age and total charges for customers who have churned, grouped by internet service and phone service

```
SELECT
   `Internet Service`,
   `Phone Service`,
   AVG(Age) AS avg_age,
   AVG(`Total Charges`) AS avg_total_charges
FROM churn.churn
WHERE `Customer Status` = 'Churned'
GROUP BY `Internet Service`, `Phone Service`;
```

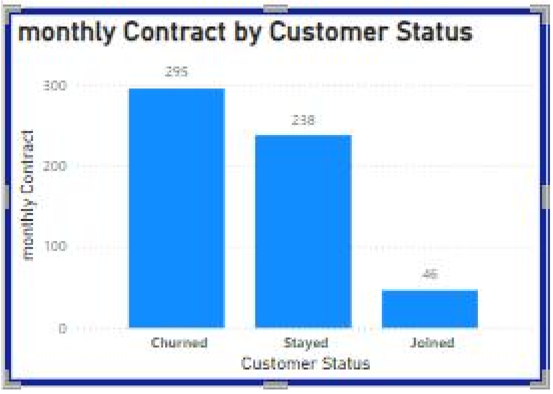


Internet Service	Phone Service	avg_age	avg_total_charges
Yes	Yes	50.1658	1719.085119798235

Data visualization using Power BI

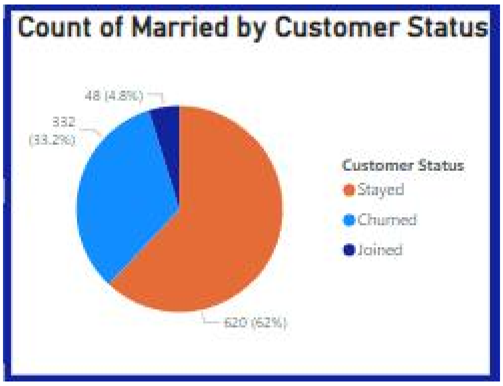
From the cleaned data the following are visualizations done to get understanding the churn characteristics of the customers.

➢ Bar Chart



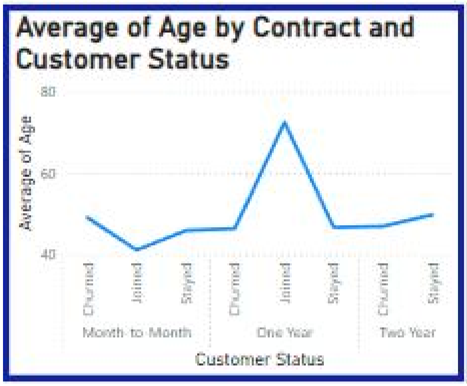
From this Bar Chart we come to decision the most of customers churned due to high monthly charges

➢ Pie Chart

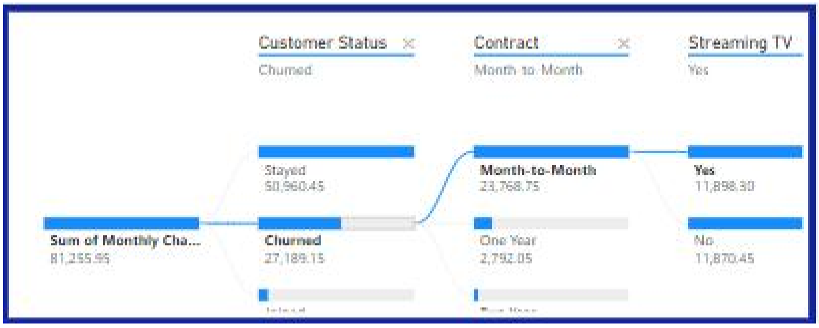


From the pie chart we come to conclusion that mostly 62% of customers do not churned from the services who got married

➢ Line Chart

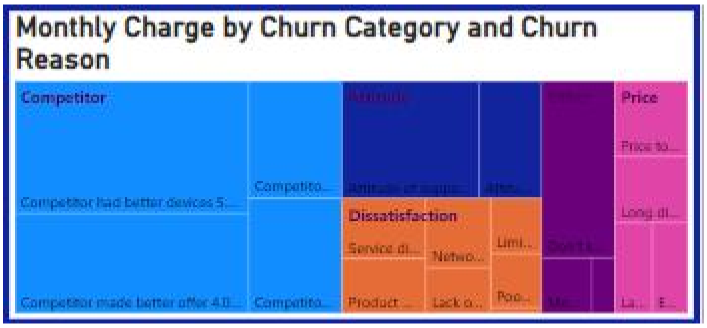


➢ Decomposition Tree



From this decomposition tree we understand that customers who are using month to month contract they churned mostly

➢ <u>Tree Map</u>



From the tree map we identify most of the customers churned due to competitor who giving better services, better offers, better support. They are also given more profit to company

❖ Results

The result get from the above calculation and visualization are as follows.

- **The age of the churned customers are between the age of 46 to 50**
- **The churned customers are mostly in the month to month contract so the cost of recharge or offers must be given in this category**
- **Customers churned due competitor who are giving better offers and better services support we must have eye on this.**