DAB 303: Individual Project Report
Airline Loyalty Program

Introduction:

The airline industry continually seeks innovative strategies to enhance customer loyalty and optimize marketing efforts. This project will delve into a dataset associated with a Canadian airline's Customer Loyalty Program. The dataset consists of data collected during a promotional campaign conducted between February and April 2018.

The primary objectives of this project are:

- Analyzing the impact of the promotional campaign on the enrollment and engagement levels within the loyalty program.
- Analyzing whether certain demographic segments of loyalty members exhibited more interest and engagement with the campaign.
- Assessing the campaign's influence on flight bookings for summer 2018.

Dataset Description:

Dataset is sourced from Maven Analytics which is an educational platform for data enthusiasts.

Table	Field	Description
Customer Flight Activity	Loyalty Number	Customer's unique loyalty number
	Year	Year of the period
	Month	Month of the period
	Flights Booked	Number of flights booked for member only in the period
	Flights with Companions	Number of flights booked with additional passengers in the period
	Total Flights	Sum of Flights Booked and Flights with Companions
	Distance	Flight distance traveled in the period (km)
	Points Accumulated	Loyalty points accumulated in the period
	Points Redeemed	Loyalty points redeemed in the period
	Dollar Cost Points Redeemed	Dollar equivalent for points redeemed in the period in CDN
Customer Loyalty History	Loyalty Number	Customer's unique loyalty number
	Country	Country of residence

|	Province	Province of residence
	City	City of residence
	Postal Code	Postal code of residence
	Gender	Gender
	Education	Highest education level (High school or lower > College > Bachelor > Master > Doctor)
	Salary	Annual income
	Marital Status	Marital status (Single, Married, Divorced)
	Loyalty Card	Loyalty card status (Star > Nova > Aurora)
	CLV	Customer lifetime value - total invoice value for all flights ever booked by member
	Enrollment Type	Enrollment type (Standard / 2018 Promotion)
	Enrollment Year	Year Member enrolled in membership program
	Enrollment Month	Month Member enrolled in membership program
	Cancellation Year	Year Member cancelled their membership
	Cancellation Month	Month Member cancelled their membership

Exploratory Data Analysis:

We started by loading the given dataset into a pandas data frame for EDA, after which we obtained a comprehensive report outlining the data types of every column in the dataset. This made it clearer to us how many of the columns were numerical and how many were categorical. To comprehend the dataset's fundamental statistical summary, we next computed. Additionally, we determined whether any dataset missing values exist and whether the data contain any duplicate records.

i. Preliminary EDA-

➢ **Dataset Overview:** First dataset (Customer Loyalty History) comprises **9 Categorical and 7 Numerical** columns, and **16737 records**. Second dataset (Customer Flight Activity) comprises of **9 Numerical** columns, and **405624 records**.

➢ **Data Anomalies Identified:** In the preliminary analysis, it was observed that the dataset contains duplicate records and missing data, requiring further attention to ensure data integrity.

➢ **Duplicate Record Handling:** A total of 1864 records in the dataset were found to be exact duplicates. To address this issue, those duplicate records were deleted, resulting in a unique dataset.

➢ **Creation of new columns:** Two new columns, 'EnrollmentDate' and 'CancellationDate', were generated by utilizing the existing 'year' and 'month' columns of enrollment and cancellation.

ii. Data Visualization

Analyzing the impact of the promotional campaign on the loyalty program memberships and Revenue

Number of Customers Enrolled vs Total Revenue in 2018
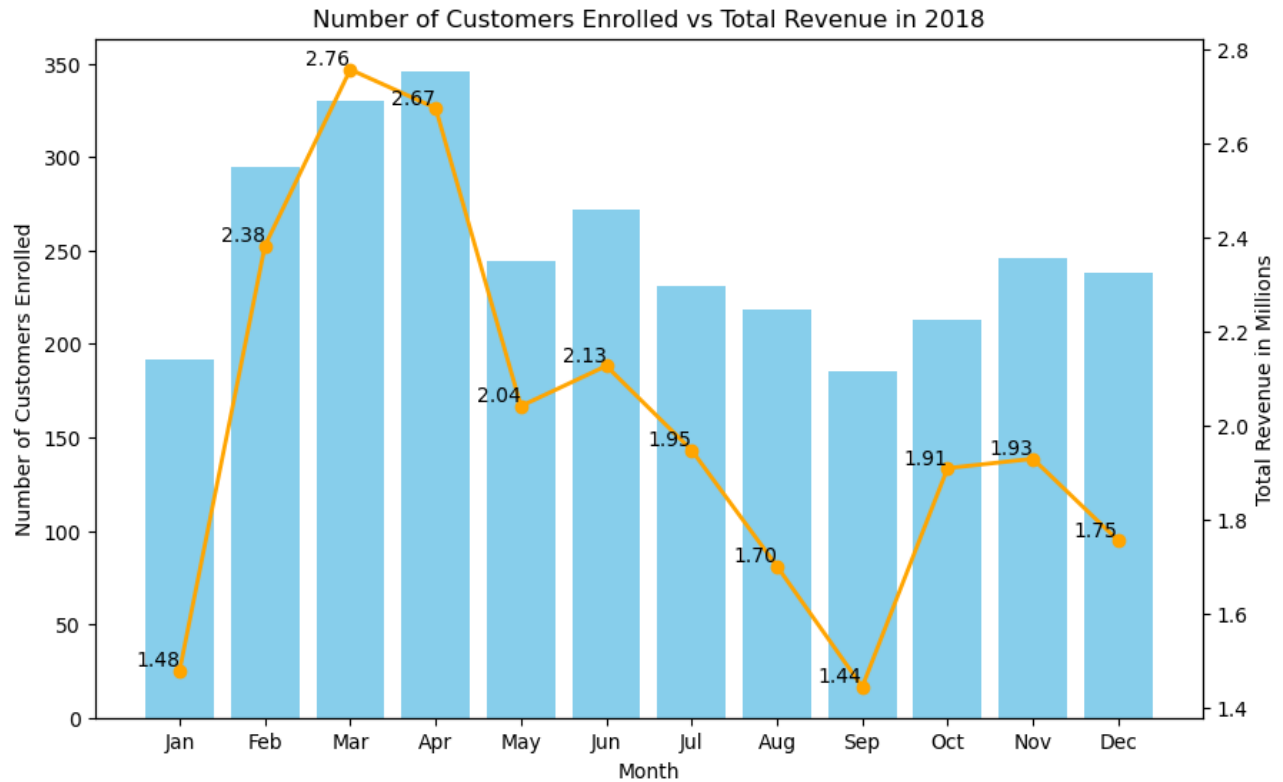
- Significant spikes in customer enrollments and total revenue are observed in the first quarter. However, these figures hit their lowest points during the third quarter, indicating possible seasonal trends or varying market behaviors.

- The period from February to April demonstrated the highest numbers for customer enrollments in loyalty programs and total revenue ranging from 2.38M to 2.76M. This indicates the success of marketing campaign during these months.

Number of Customers Enrolled by Loyalty Card
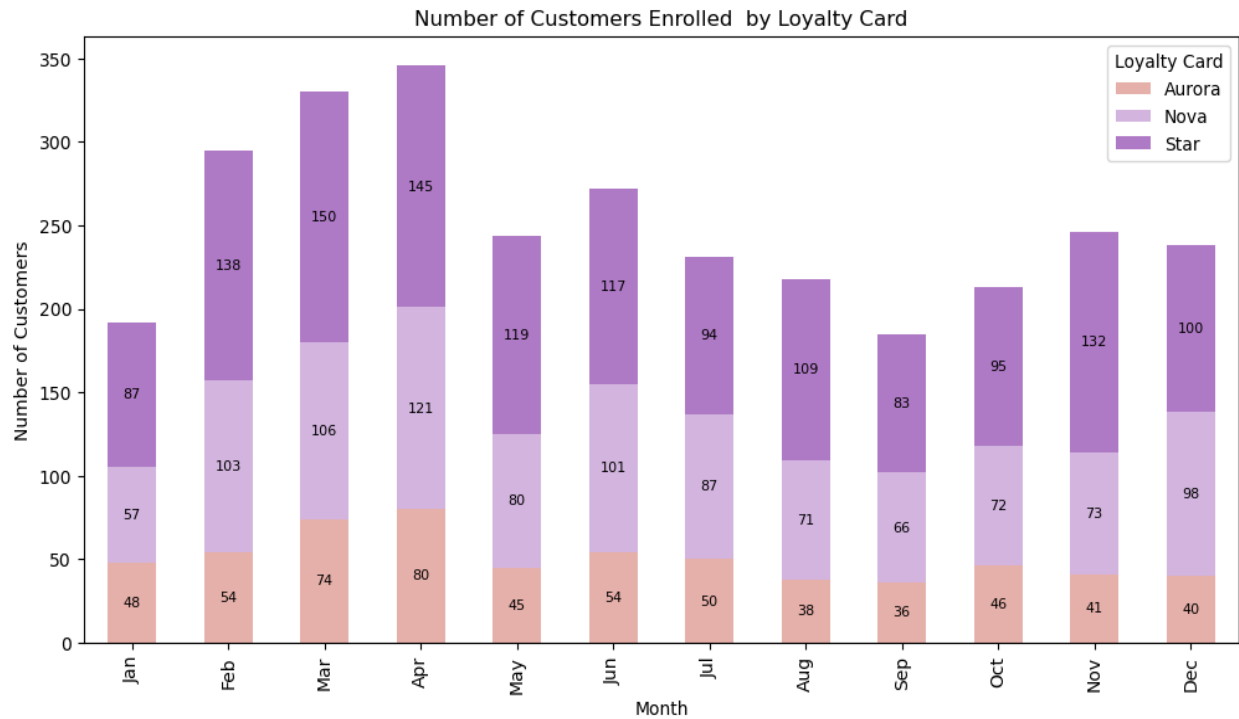
- A noticeable surge in loyalty card enrollments occurred during the months of February to April, accumulating approximately 346 new customers. This upsurge strongly indicates the success of a campaign executed during this period.

- The increased number of enrollments in the Star membership program suggests its popularity, possibly due to its attractive perks and benefits, enticing more individuals to opt for this particular tier.

**Analyzing whether campaign adoption was more successful for certain demographics of loyalty members?**

Distribution of Customers Enrolled for Different Loyalty Cards (2018 Promotion)
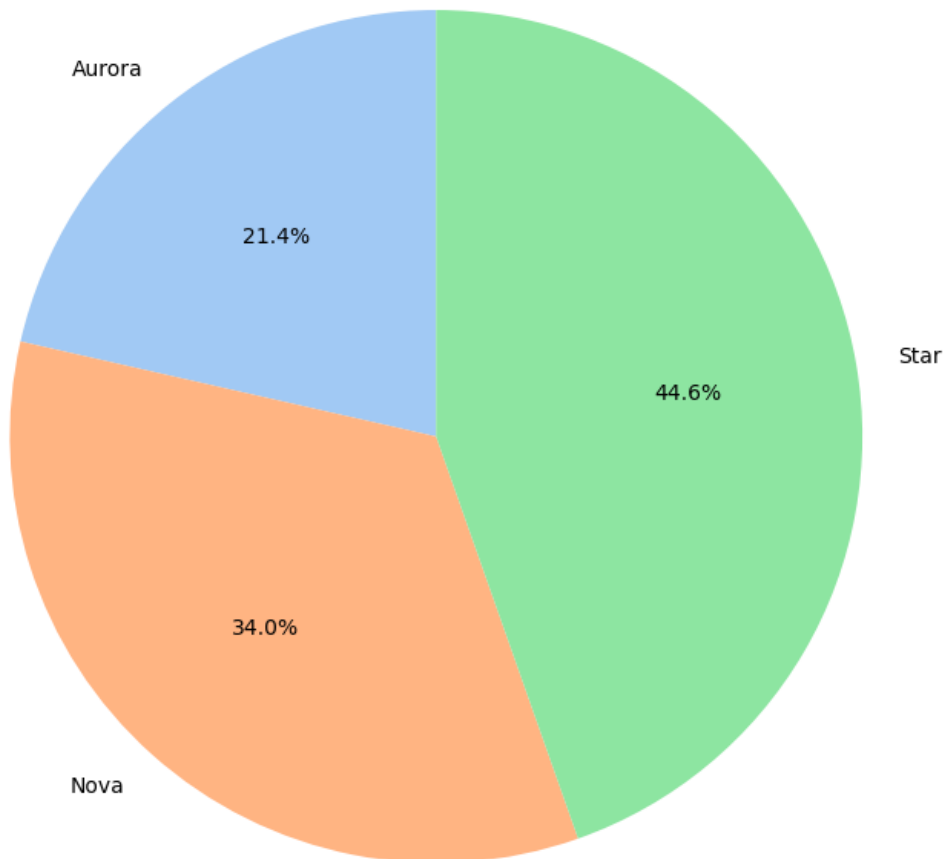
- The Star membership comprises the majority, capturing around 44.6% of total enrollments. Following closely is Nova with 34.0%, trailed by Nova at 21.4%.

- The surge in enrollments for Star and Nova memberships signifies their popularity among customers. This trend could be attributed to the alluring benefits and perks associated with these tiers, making them more appealing options among customers seeking these advantages.

Campaign Adoption by Province
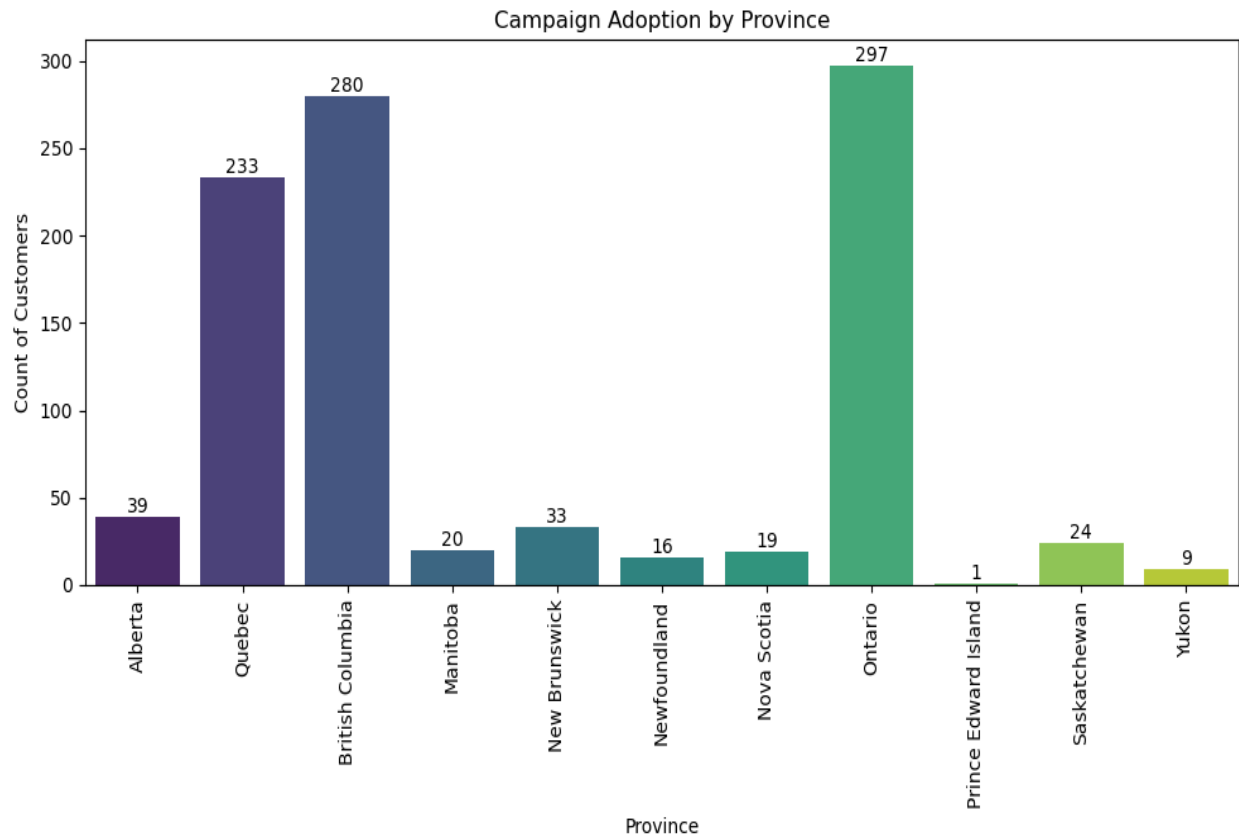
- **Strong Adoption in Ontario, Columbia, and Quebec**: These provinces exhibited notable success in the campaign, accumulating between 233 to 297 new customers. This strong adoption highlights the effectiveness of the promotional efforts in these regions.

- **Minimal impact in Prince Edward Island and Yukon:** The campaign's impact was relatively less in Prince Edward Island and Yukon, reflecting lower customer adoption compared to other provinces. Further analysis could uncover reasons for this comparatively weaker response in these provinces.

Top 10 Cities with the Highest Number of Enrollments (2018 Promotion)
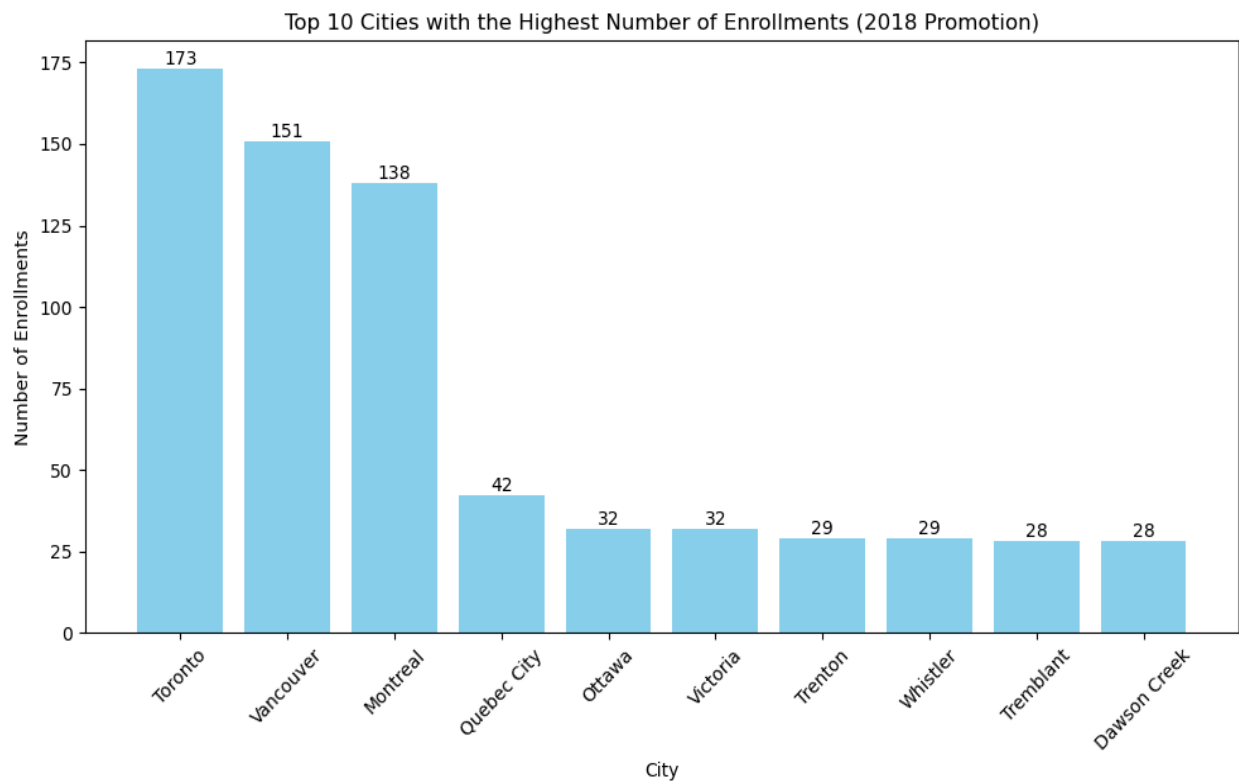
- ***Toronto, Vancouver, and Montreal Lead Enrollment:*** These cities have shown the highest number of new customer enrollments through the campaign.

- This trend indicates the effectiveness of the campaign strategy in attracting customers in these urban centers.

## Campaign Adoption Distribution by Gender

Female 50.9%   49.1% Male
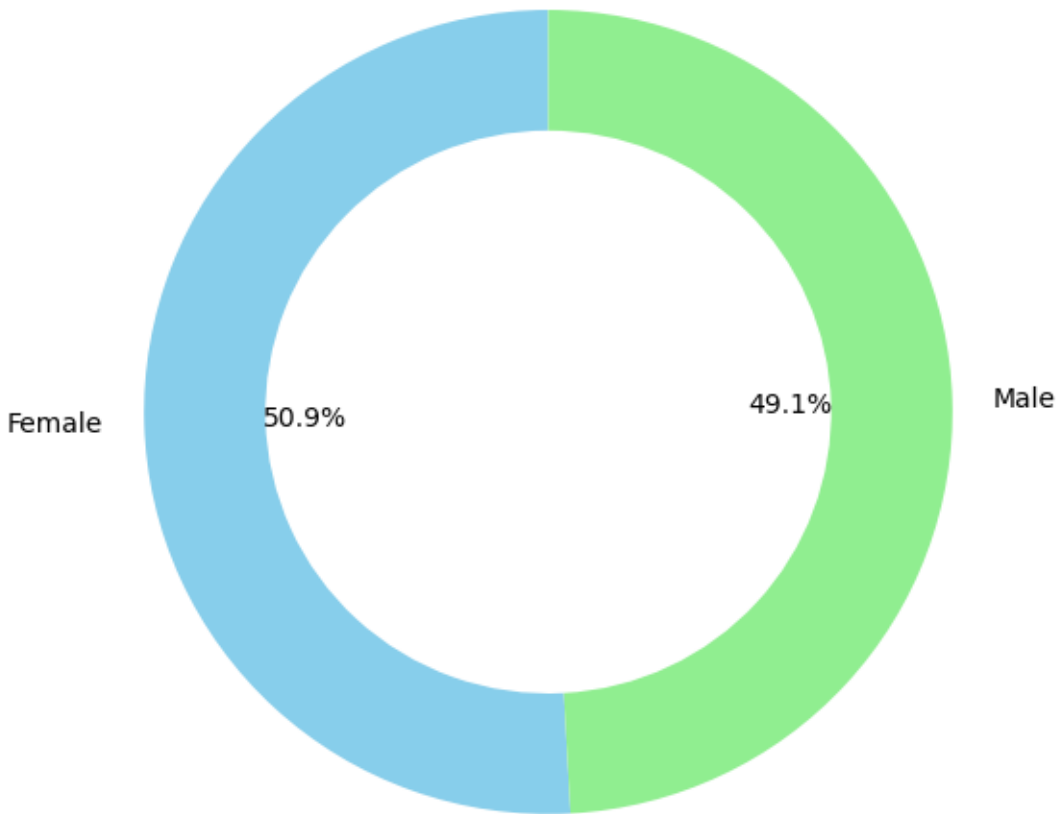
- The campaign's adoption across genders appears balanced, suggesting that the promotional efforts were equally appealing and effective among both genders.

- This gender-agnostic response might indicate the campaign's universal appeal or a well-targeted strategy that resonated equally across genders.

Assessing the campaign's influence on flight bookings for summer 2018

Monthly Trend of Total Bookings in 2018
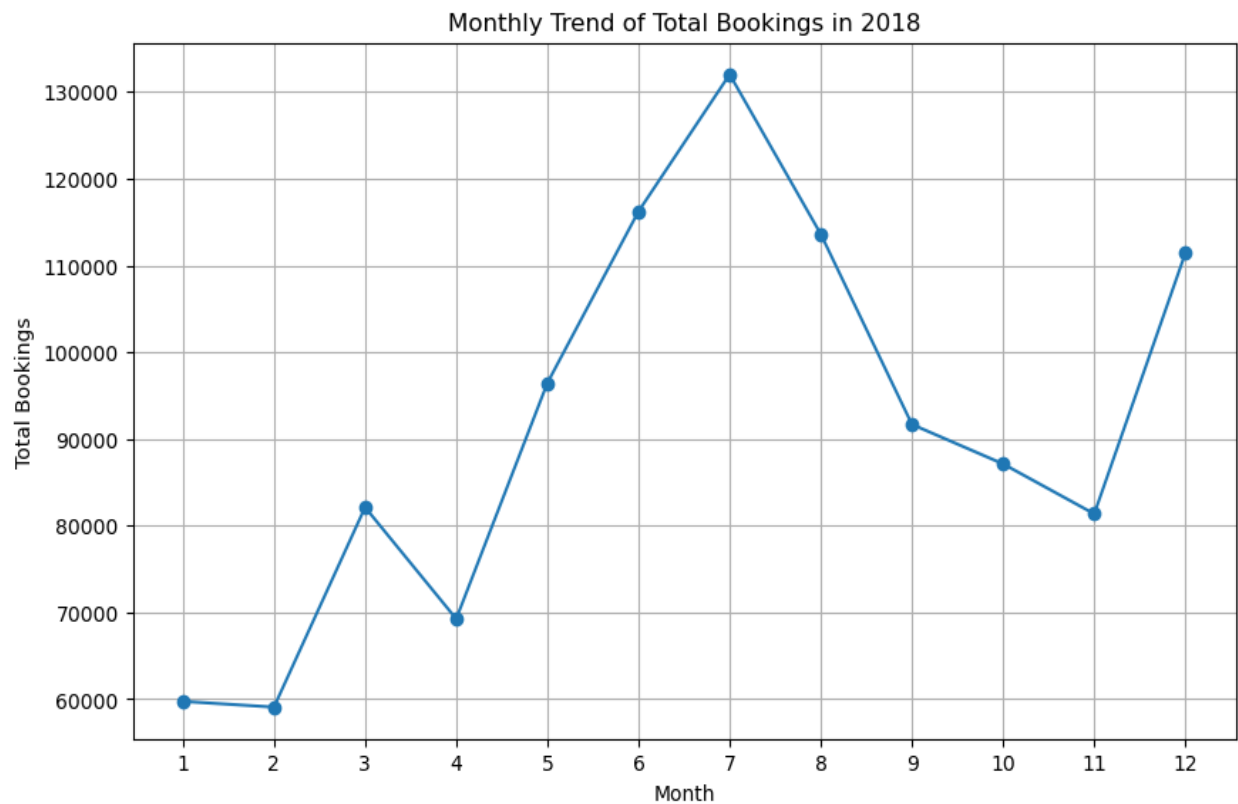
- We can observe a remarkable rise in bookings from April to July, reaching its peak with over 130,000 bookings in the month of July, which highlights the campaign's significant impact on 2018 summer flight bookings.

- The subsequent decline from August to November could potentially be due to seasonal patterns or a reduced promotional impact.

- Offering enticing deals during these periods could potentially invigorate customer interest, boosting both number of flights booking and overall revenue.

Analysing Customer Churn
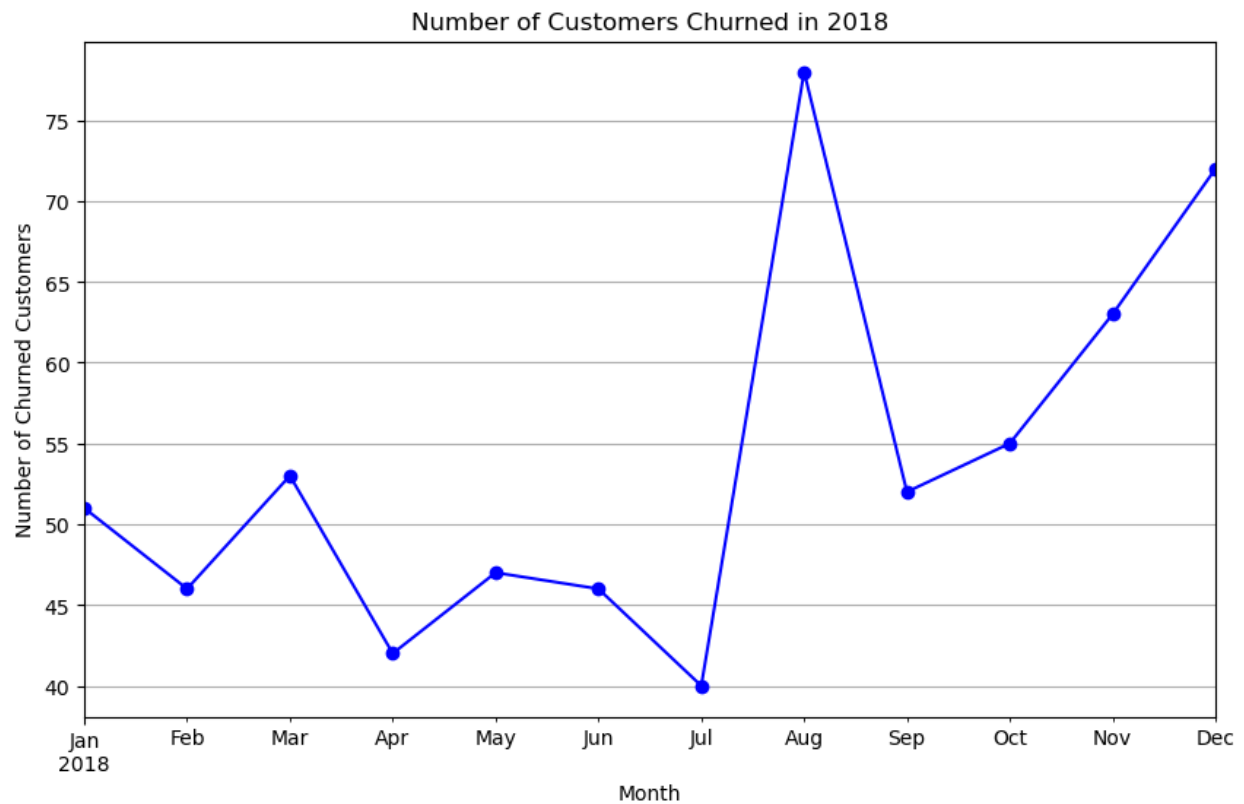
- The data reveals a noteworthy pattern in customer churn, with peaks recorded notably in August and December.
- This observation could signify a seasonal trend or specific external factors influencing customer attrition during these months.
- Further investigation into these periods might uncover underlying causes or factors contributing to higher customer churn.
- Customer feedback can be helpful in understanding the reasons behind this attrition.
- It can shed light on various aspects such as service quality, product offerings, pricing, or overall customer experience, aiding in identifying the reasons and implementing necessary improvements to reduce churn.

Conclusion:

- **Campaign Success:** The campaign between February and April resulted in a significant rise in loyalty program enrollments and flight bookings, indicating its success.
- **Membership Preferences:** The Star membership witnessed the highest enrollment, showcasing its popularity among customers.
- **Geographical Impact:** Certain regions, notably Ontario, British Columbia, and Quebec, showed higher campaign adoption, while others like Prince Edward Island and Yukon lagged.
- **Booking Trends:** There was a peak in bookings from April to July, possibly due to the campaign's influence during the summer months. However, a decline was observed later, possibly due to seasonal effects.
- **Churn Observations:** Customer churn rates were notably higher in August and December.

Recommendations:

- **Feedback Collection:** Solicit customer feedback to understand the reasons for churn, allowing for targeted improvements. Implementing these feedback can mitigate issues and improve services, potentially reducing churn.
- **Seasonal Offers:** Introduce seasonal promotions or offers during periods of lower bookings to stimulate customer interest and increase revenue. These promotions can attract more customers during slower months, leveraging seasonal demand to boost revenue.
- **Region-Specific Strategies:** Tailor marketing strategies or campaigns to regions with lower adoption to improve reach and impact.
- **Continuous Monitoring:** Regularly track customer trends, feedback, and campaign impact to adapt strategies for better results.