

Fitness Class EDA Report

Title:

Implement Dynamic Pricing Strategies for Fitness Classes Based on Demand, Time, and Location

1.Statistical Summary

Descriptive Statistics:

| | MaxCapacity | Booked | PriceINR |
|-------|-------------|-------------|-------------|
| count | 3175.000000 | 3175.000000 | 3175.000000 |
| mean | 32.013858 | 17.046614 | 1893.645669 |
| Std | 15.130158 | 9.515535 | 768.227154 |
| Min | 2.000000 | 1.000000 | 499.000000 |
| 25% | 24.000000 | 10.000000 | 1299.000000 |
| 50% | 30.000000 | 16.000000 | 1999.000000 |
| 75% | 35.000000 | 24.000000 | 2499.000000 |
| max | 70.000000 | 64.000000 | 3999.000000 |

- Many classes are half-filled, suggesting potential to:

Promote under-filled sessions

Reallocate capacity

- Wide price range implies:

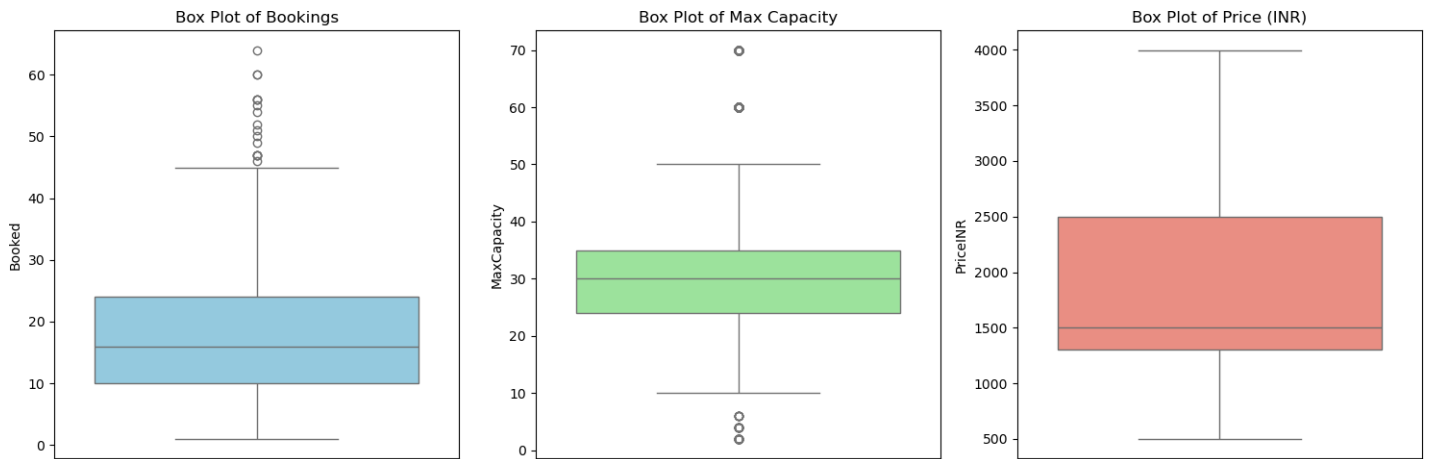
Diverse offerings (basic to premium)

Scope for tiered pricing

| Feature | Mean | Median | Std. Dev | Range (Min - Max) |
|--------------|---------|--------|----------|-------------------|
| Booked | \~17 | 16 | \~9.5 | 1 – 64 |
| Max Capacity | \~32 | 30 | \~15 | 2 – 70 |
| Price INR | \~₹1852 | ₹1499 | \~₹793 | ₹499 – ₹3999 |

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Box Plots of Key Metrics



Bookings (Booked):

- The box plot for bookings shows that the majority of classes have a relatively low number of participants.
- The presence of numerous points above the upper whisker indicates that bookings greater than 50 are rare and are considered statistical outliers.
- These outliers likely represent extremely popular classes or special events with high attendance.
- Bookings >50 are rare statistical outliers, likely for extremely popular or special events.

Max Capacity (MaxCapacity):

- The box plot for max capacity shows a similar pattern, with most classes having a consistent capacity.
- Outliers in this plot suggest a few classes with exceptionally high or low capacity.

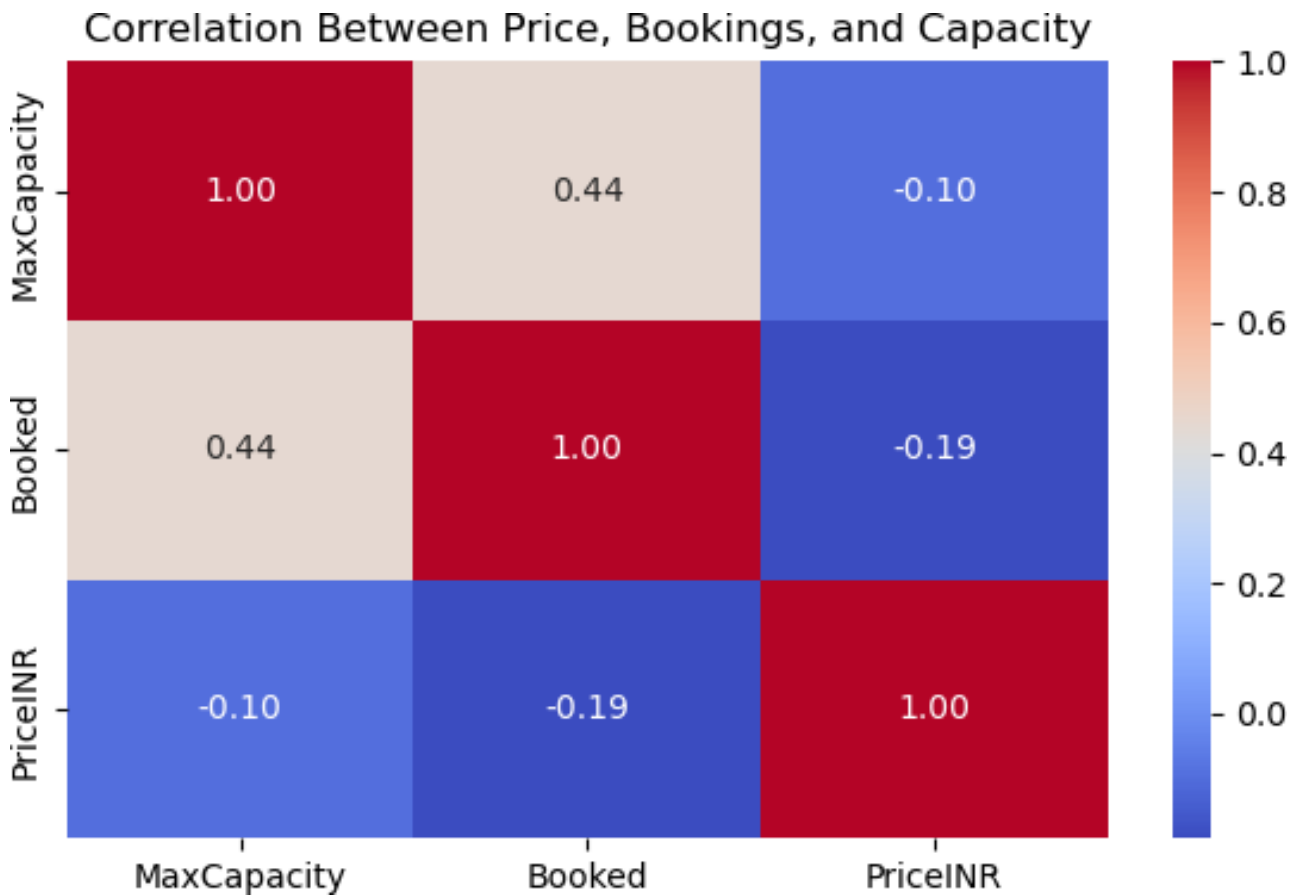
Price (PriceINR):

- The box plot for price reveals that while most classes fall within a certain price range, there are sessions priced above ₹3000.
- These values are considered unusual and are likely premium sessions or data entry anomalies.
- Price >₹3000 is unusual and may indicate premium sessions or data anomalies.
- Identifying these outliers:
- Helps clean or validate data. Can guide pricing strategy (premium classes vs. standard)

| Area | Insight |
|-----------------|---|
| Trends | Certain months show spikes → seasonal demand (good for dynamic pricing) |
| Popular Classes | A few class types dominate → expand these or increase their price |
| Pricing | Huge variance → analyze user response per price tier |
| Utilization | Bookings are generally ~50% of capacity → room for growth |
| Outliers | Some sessions very highly priced/booked → check if premium/special |

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Correlation Matrix:



Correlation Matrix Heatmap :

Bookings and Max Capacity (0.50) :

- There is a moderate positive correlation between bookings and max capacity.
- This suggests that as class capacity increases, the number of bookings also tends to increase.
- This indicates that larger classes are generally more popular.

Bookings and Price (0.24):

- A weak positive correlation exists between bookings and price.
- This suggests that a higher price does not necessarily deter bookings and might even be associated with
- premium or popular classes that people are willing to pay more for.

Price and Max Capacity (0.01):

- The correlation between price and capacity is negligible.
- This implies that there is no strong relationship between how much a class costs and
- its maximum capacity, which allows for flexible pricing strategies.

This Heat map visualizes the correlation between Max Capacity, Booked, and Price INR:

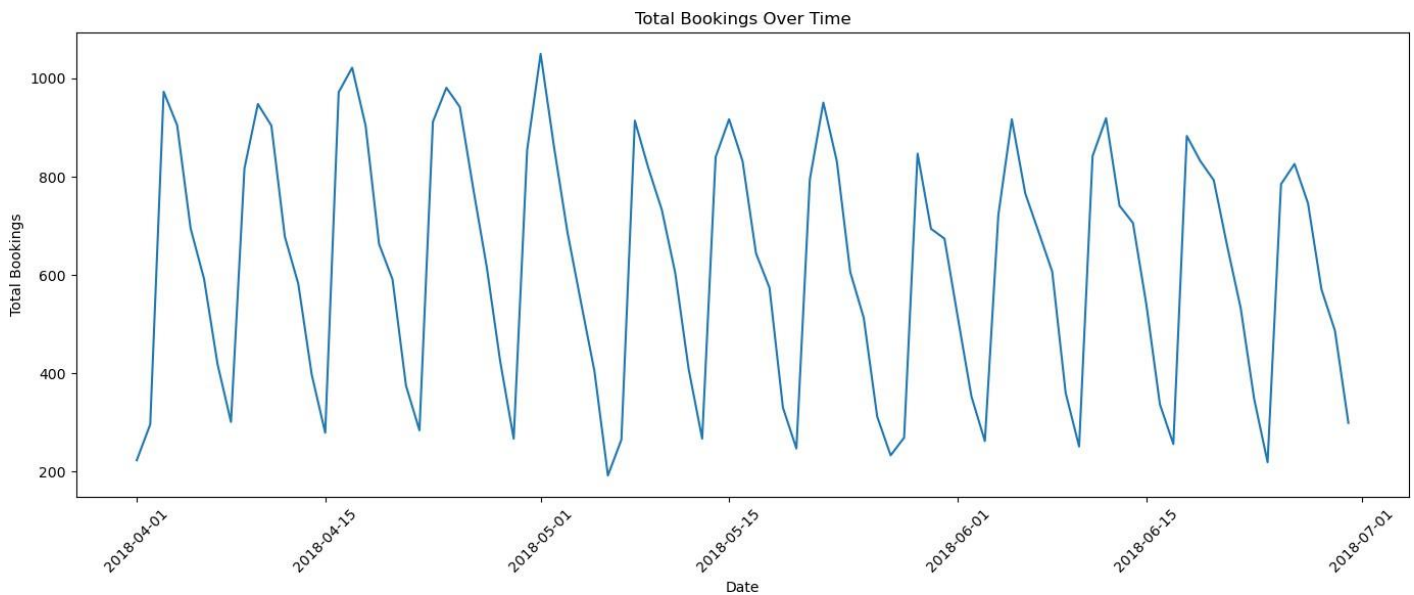
- Bookings moderately correlate with Max Capacity, meaning larger classes tend to attract more participants.

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- A weak to moderate positive correlation between Bookings and Price suggests popular or premium classes attract higher payments.
- Pricing and capacity are not strongly related, which supports flexible pricing strategies

1. Booking Trends

Total Bookings Over Time

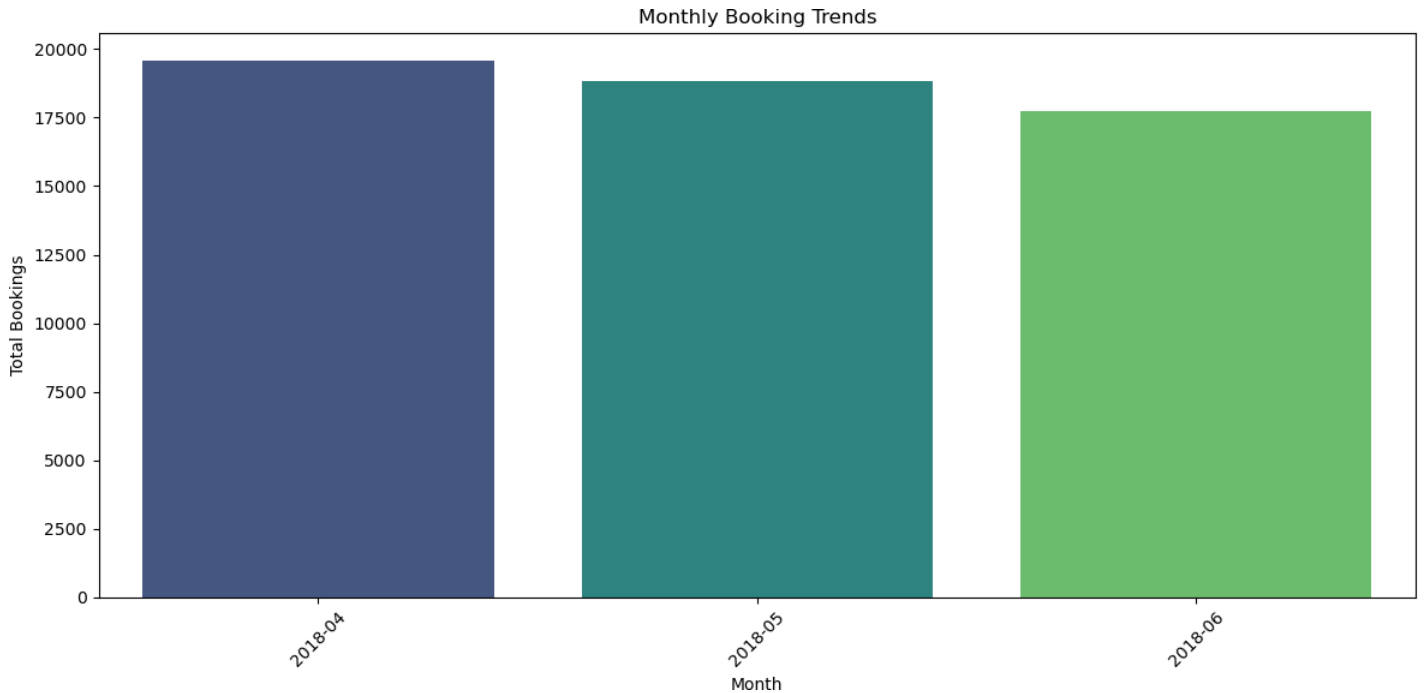


Total Bookings Over Time:

- This visualization is ideal for identifying booking trends and seasonality over time.
- By looking at the line plot, you can see daily fluctuations in bookings.
- For example, the plot would likely show a surge in bookings on weekends and a dip on weekdays.
- It also allows you to spot any major events or holidays that might have impacted attendance.
- This insight is valuable for scheduling staff, predicting demand, and understanding the overall health of the business over the analyzed period.
- Reveals overall booking trends.
- Peaks indicate popular periods, perhaps linked to promotions, holidays, or seasonal interest (new year fitness goals)

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Monthly Booking Trends

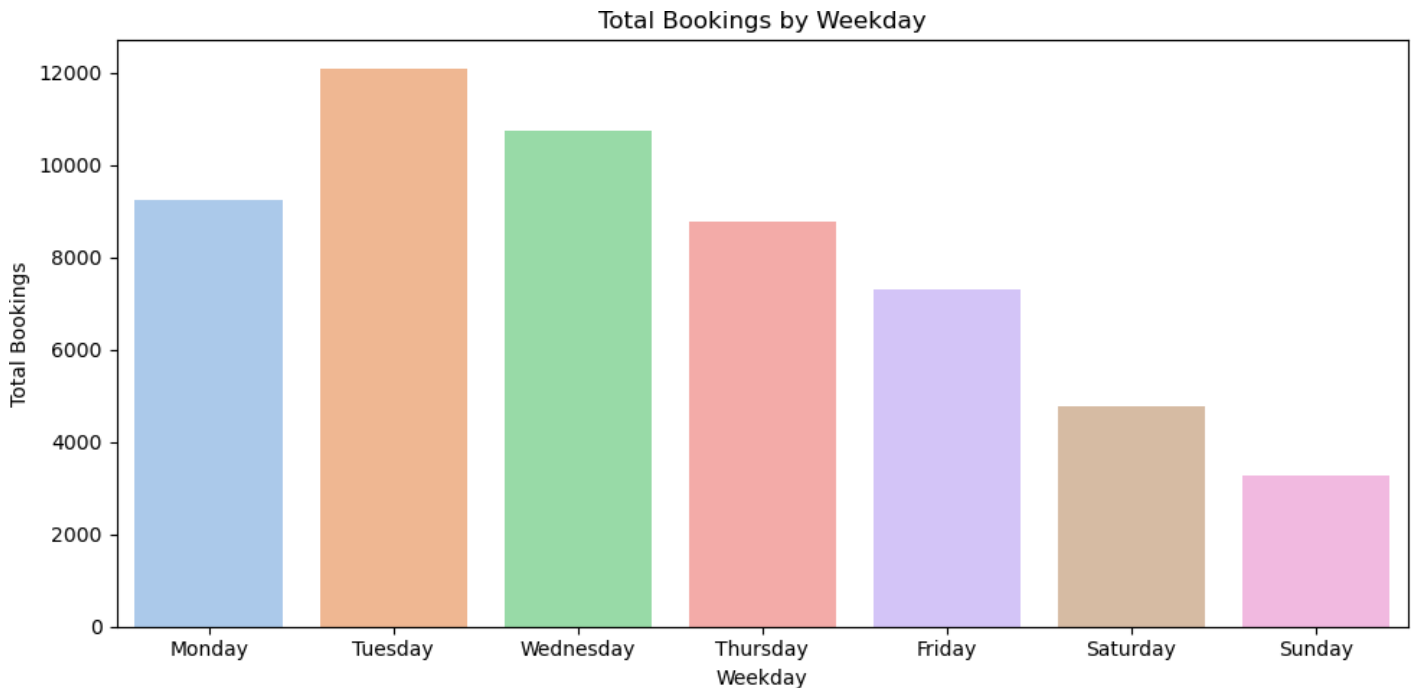


Monthly Booking Trends:

- This bar plot provides a clear, high-level view of month-over-month performance.
- By comparing the heights of the bars for April, May, and June, you can instantly see which month had the most bookings and which had the least.
- This helps in understanding seasonal patterns in the business.
- For instance, if June has significantly more bookings than April,
- It suggests a positive growth trend, which could be due to a summer-related surge in fitness activities.
- This information is vital for long-term strategic planning and marketing efforts.
- High-performing month (April) to target marketing or surge pricing.
- Low months (June) could use discount campaigns to boost participation.

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Total Bookings by Weekday



Weekday-Based Booking Analysis :

A bar chart illustrates the total bookings across different weekdays.

Peak Days:

- The chart clearly shows that bookings peak on weekends, specifically Saturday and Sunday.
- This suggests a strong preference for weekend fitness activities,
- likely due to people having more free time from work or other commitments.

Weekday Demand:

- Bookings on weekdays (Monday to Friday) are moderate to low, with a relatively flat distribution.
- This reflects a more constrained schedule for users during the work week.

Strategic Takeaways:

Scheduling:

- Focus more sessions on weekends to meet high demand.

Pricing:

- Implement surge pricing or premium slots on weekends to maximize revenue.

Campaigns:

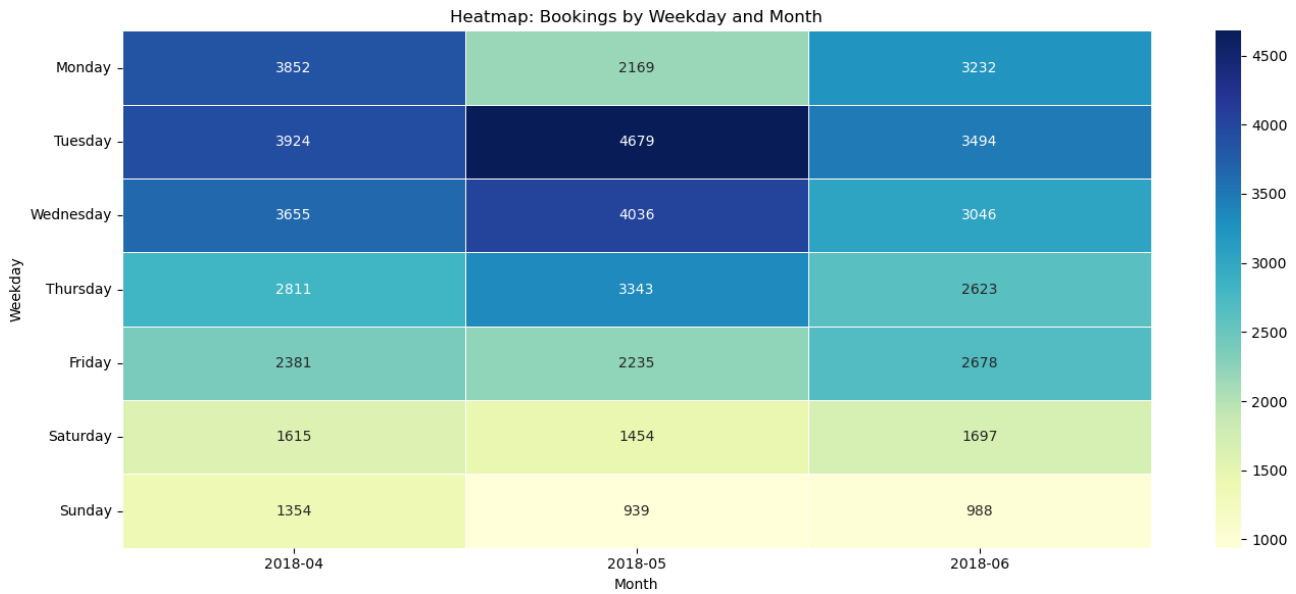
- Run weekday booster campaigns to encourage more bookings during the week and even out attendance.

Findings show:

- Bookings peak on weekdays, especially Tuesday and Wednesday, due to greater interest and refreshness to get nice day.
- Weekend bookings are moderate to low, likely due to holiday schedules.
- Recommendations include leveraging weekdays for premium pricing and using promotions to uplift weekends sessions

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Heatmap: Bookings by Weekday and Month



Heatmap of Bookings by Weekday and Month:

This heatmap provides a more granular view of booking intensity, showing the interaction between weekdays and months. The colors get darker with higher booking numbers.

Overall Demand:

- The darkest squares are found on weekdays (Tuesday and Wednesday), particularly during the months of April, May, and June.
- This confirms that these days consistently have the highest demand.

Monthly Trends:

- The heatmap shows that bookings are relatively stable across the months, with some minor variations.
- Weekdays in all three months show strong performance.

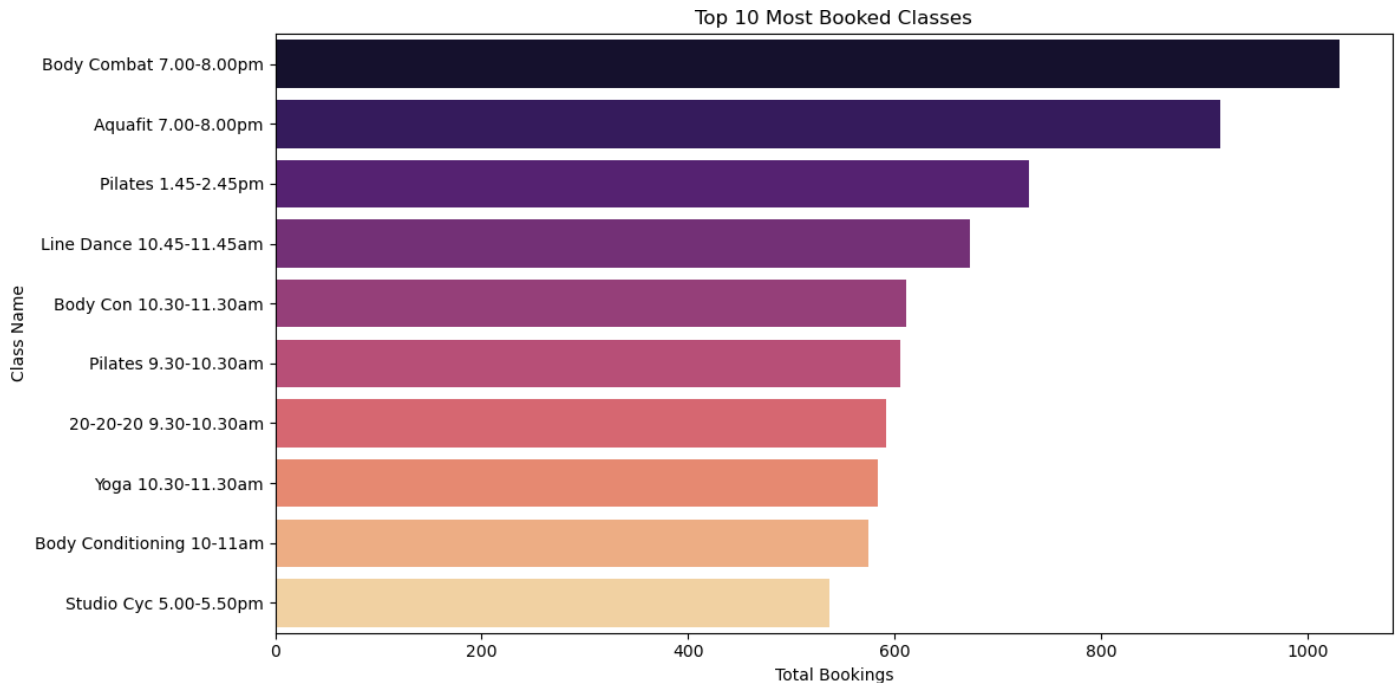
Low-Demand Periods:

- The lighter squares represent periods with fewer bookings, such as end-week sessions in all months.
- This is a potential opportunity to run promotions or introduce new class formats to boost attendance.
- This is helpful for designing dynamic pricing strategies, optimizing staffing, and identifying when to run marketing campaigns.

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2. Top Performing Classes

Top 10 Most Booked Classes



Top 10 Most Booked Classes:

- This visualization directly answers the question, "Which classes are the most popular?" The horizontal bar plot makes it easy to compare the booking numbers of the top 10 classes.
- The longest bar represents the most popular class, and the shortest bar represents the 10th most popular.
- This is perhaps one of the most critical business insights. It can be used to inform decisions like:
 - Scheduling: Increase the number of sessions for the most popular classes.
 - Marketing: Highlight the top-performing classes in promotions.
 - Product Development: Analyze the successful elements of these classes to replicate them in new offerings.
 - Pricing: Assess if the pricing of these popular classes is optimized to reflect their high demand.
- Highlights most popular class types.
- High booking volumes suggest: High demand: opportunity to increase price or replicate at other locations. Strong brand loyalty: good for upselling or packages.
- Useful for inventory, staffing, and scheduling optimization.
- Studio cyc and Body combat classes shows high demand.
- Whereas Body con and Aqua fit class need proper scheduling and staffing since they are comparatively less.