### **Below is a compilation of extra scenario sets for running a restaurant and their corresponding findings:**

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### **Scenario 3: Menu Complexity with Basic and Gourmet Options Overview and Performance Metrics** In Scenario 3, the introduction of two menu types—**Basic Menu** and **Gourmet Menu**—created a system to evaluate the impact of menu complexity on operational efficiency and customer satisfaction. The Basic Menu had an average service time of 15 minutes *(μ1 = 4 jobs/hour),* while the Gourmet Menu required 30 minutes *(μ2= 2 jobs/hour).* Customer arrivals followed a Poisson process at a rate of *λ= 8 customers/hour,* evenly distributed between the menu types. By using a mixed exponential distribution to model service times, the restaurant aimed to maintain operational balance and meet customer demand effectively.

#### **Impact on Restaurant Operations** Despite the increased variability, the *average service time was 0.33 minutes,* highlighting the restaurant’s efficiency in managing the demands of menu diversity. Waiting times remained negligible as in scenario 2, with an *average wait time of 0.02 minutes*, ensuring minimal delays for most customers. However, overlapping Gourmet orders occasionally led to minor queuing, as observed in customers waiting up to *0.86 minutes*. Downtime was exceptionally low at *0.30 minutes*, demonstrating high staff engagement and resource utilization. In effect, the distribution of *39 Basic orders and 28 Gourmet orders* reflects balanced customer preferences, which supported seamless operations. This balance ensured that the system was not overwhelmed by Gourmet orders, though a shift in demand could risk delays.[ref](https://colab.research.google.com/drive/1qQO_ym9XKVTJR95aRUfhwPPrBHU1Tj3g#scrollTo=zRam74yakZZH&line=12&uniqifier=1)

#### **Recommendations and Strategic Adjustments** To mitigate risks associated with Gourmet orders, *dynamic staffing* is recommended during peak hours to manage extended service times effectively. Pricing adjustments for Gourmet items, reflecting their complexity, could balance demand and increase profitability. Additionally, implementing a *reservation system* for Gourmet dishes during peak periods would prevent bottlenecks and improve predictability. *Data-driven adjustments* to menu-specific demand trends will also help align resources and service strategies.

#### **Conclusion** Altogether,menu complexity can enhance customer satisfaction and profitability when managed effectively. With low waiting times and optimal utilization, this scenario underscores the restaurant’s ability to handle variability. Strategic adjustments in staffing and pricing will further optimize operations, maintaining efficiency even during peak demand.

### **Scenario 7: Dynamic Pricing Strategy Overview and Performance Metrics** Scenario 7 explored **dynamic pricing**, where meal prices increased by **20% during peak hours** (lunch and dinner) and decreased by **10% during off-peak hours**. Customers arrived following a Poisson process at rates of *λ= 15 customers/hour* during peak times and *λ= 8* during off-peak hours. Service times averaged *10 minutes (μ=6jobs/hour)*. The goal was to assess revenue optimization and customer retention under fluctuating pricing conditions.

#### **Impact on Restaurant Operations** Our financial analysis showed that dynamic pricing would be successful, generating *$5,760 in revenue*. Peak-hour customers demonstrated *inelastic demand*, with full retention (100%) despite the price increase. The system efficiently managed customer flow, maintaining *average waiting times below 0.01 minutes*. Off-peak pricing effectively attracted additional customers, ensuring steady revenue and optimized resource utilization during slower periods.

#### **Recommendations and Strategic Adjustments** To maximize the benefits of dynamic pricing, *tiered peak-hour pricing* can target specific time segments, such as early lunch or late dinner rushes, to capture additional value. Off-peak discounts could be adjusted based on elasticity to attract more customers while preserving profitability. Ensuring *adequate staffing and kitchen capacity* during peak periods will also sustain minimal waiting times and justify premium pricing. WIth effective marketing campaigns, we could also promote off-peak discounts and *loyalty rewards that will* build a consistent customer base.[ref](https://colab.research.google.com/drive/1qQO_ym9XKVTJR95aRUfhwPPrBHU1Tj3g#scrollTo=T5vugdkFmSOb&line=1&uniqifier=1)

#### **Conclusion** Dynamic pricing enhanced revenue while maintaining customer satisfaction. With strategic refinements in pricing tiers and operational adjustments, the restaurant can sustain growth and profitability, capitalizing on demand elasticity and optimizing customer flow.

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### **Scenario 8: Integration of Delivery and Takeout Services Overview and Performance Metrics** Scenario 8 integrated *delivery and takeout options* to enhance operational flexibility and revenue during off-peak hours. Thirty percent of customers chose takeout, which required *75% of the service time* of dine-in orders. Customer arrivals followed a Poisson process at *λ = 10 customers/hour*, with service times for dine-in and takeout modeled as *μ=6 jobs/hour* and *μ=8 jobs/hour*, respectively.

#### **Impact on Restaurant Operations** Under this system**,** the restaurant served *79 customers,* with takeout orders contributing to smoother operations by utilizing idle time. The *average service time* was *0.1582 minutes for dine-in* and *0.1063 minutes for takeou***t**, reflecting the reduced complexity of takeout preparation. Due to this,*waiting times remained low, averaging 0.0059 minutes,* whilst ensuring seamless service for both customer groups. The system effectively balanced dine-in and takeout demands, avoiding delays or disruptions.

#### **Recommendations and Strategic Adjustments** To further improve operational efficiency,expanding takeout services through targeted promotions and *exclusive menu items* can attract more off-peak customers. Also, implementing an *online ordering platform* will streamline operations and minimize errors. With minimized errors, a regular analysis of dine-in and takeout balance and checks will ensure consistent service quality and satisfaction. [ref](https://colab.research.google.com/drive/1qQO_ym9XKVTJR95aRUfhwPPrBHU1Tj3g#scrollTo=fejw2748ouA1&line=1&uniqifier=1)

#### **Conclusion** The successful integration of takeout services highlighted the potential for operational diversification. By expanding offerings and leveraging technology, the restaurant can capitalize on off-peak opportunities, driving profitability while maintaining high customer satisfaction.

### **Scenario 10: Operating Under Health and Safety Constraints Overview and Performance Metrics** Scenario 10 modeled the impact of *social distancing policies,* restricting occupancy to *three active tables,* with one chef per table. Customers displayed a *20% higher patience threshold* (12 minutes on average). Arrival rates followed a Poisson process (λ=10 customers/hour), and service times were modeled as μ=6 jobs/hour.

#### **Impact on Restaurant Operations** The restaurant served *120 customers* with a *100% satisfaction rate* and *zero waiting times,* reflecting efficient demand management within occupancy constraints. However, the limited capacity restricted potential revenue, emphasizing the need for alternative income streams.

#### **Recommendations and Strategic Adjustments** To fix the restraints of this system in revenue generation,expanding *takeout and delivery services* with *dynamic pricing* during peak periods would maximize earnings per customer. Marketing health compliance as a differentiator will attract safety-conscious customers. This will however, make an impact on the number of customers served. [ref](https://colab.research.google.com/drive/1qQO_ym9XKVTJR95aRUfhwPPrBHU1Tj3g#scrollTo=a89zluopwB9T&line=1&uniqifier=1)

#### **Conclusion** Health and safety constraints demand adaptable business models. By leveraging alternative revenue streams, promoting compliance, and implementing dynamic pricing, the restaurant can sustain profitability while ensuring customer trust and satisfaction.

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