

# **UGBA 141**

# **Discussion 12**

**Agenda: - Review Revenue Management Module**  
**- Final Exam Review I**

**April 22, 2022**  
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# Reminder

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- Littlefield simulation team strategy slides (4 page) due tonight (4/22)
- HW5 is due next Tuesday (4/26)
  - Optional if you have done HW4
- Last week of instruction
  - Monday (4/25): Case IDEO + Final exam information will be out + practice final and solutions will be provided
  - Wednesday (4/27) Lecture: Final Flash Review + HW5 solution provided
  - Friday (4/29) Discussion: Final Exam Review II

# A Glimpse of Dynamic Pricing

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- Dynamic pricing lies at the core of modern RM
- **Purposes**
  - Manipulate demand to match fixed supply
  - Limit demand variation to support planning (manufacturing or inventory)
  - Competition with other retailers
  - Learn about customers' preferences (willingness to pay)
- **Methodologies**
  - Mark down pricing
  - Cyclic pricing
  - Application of machine learning in E-commerce

# Review on Revenue Management (RM)

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- **Two RM practices:** Protection level and Overbooking
- **Protection level**
  - $Q$  is the number of seats reserved for high-fare
    - $G$  = high fare - low fare
    - $L$  = low fare
- **Overbooking**
  - $Q$  is number of service that are overbooked (in response to no-shows)
    - $G$  = profit of service
    - $L$  = cost of denying service

# Practice Problem: Overbooking in RM

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Hyatt Regency San Francisco provides 802 King/Queen rooms with rate of \$242 /night. The cost of denying a room to the customer with a confirmed reservation (“walking” a customer) is estimated to be \$500 in ill-will and penalties. For simplicity, assume the cost of cleaning a used room is insignificant. The forecasted number of no-shows, based on historical data, is normally distributed with mean 40 and standard deviation 20.

**Q1.** How many rooms should be overbooked?

**Q2.** If the hotel overbooks the quantity in Q1, what is the probability that you will have to refuse a customer?

# Other Examples in RM

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- (Protection level) A hotel provides two kinds of room fares: high-fare room offers additional service such as free breakfast; low-fare room does have such additional benefits.
  - $G$  = high fare - low fare - cost of additional service
  - $L$  = low fare
- (Overbooking) A airline estimates that there is a random number of passengers who won't show up. The airline oversold tickets to improve occupancy rate
  - $G$  = price of flight ticket
  - $L$  = cost of denying a passenger

# Final Exam Review: Advanced Newsvendor

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- Newsvendor analysis showed up in A LOT of topics
  - Quick response
  - Contracts
  - Staffing
- Main elements of Newsvendor analysis
  - Identify gain  $G$
  - Identify loss  $L$
  - Critical ratio  $G/(G + L)$
  - Find z-score based on critical ratio
  - Relate z-score to optimal quantity based on given distribution

# Practice Problem: Quick Response

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Bay Surf Shop orders swimsuits from a supplier at the wholesale price of \$110 and sell at the price of \$190. The salvage value of each unit of swimsuit is \$90. The demand of swimsuits is Normal with mean = 3192 and standard deviation = 1181. Bay Surf Shop manages to achieve a contract with the supplier to do a make-up order of swimsuits with little lead time, but Bay Surf Shop needs to pay 20% premium per swimsuit to cover additional expenses of the supplier.

**Q3.** What is the optimal initial order quantity?



# Practice Problem: Quick Response

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Bay Surf Shop orders swimsuits from a supplier at the wholesale price of \$110 and sell at the price of \$190. The salvage value of each unit of swimsuit is \$90. The demand of swimsuits is Normal with mean = 3192 and standard deviation = 1181. Bay Surf Shop manages to achieve a contract with the supplier to do a make-up order of swimsuits with little lead time, but Bay Surf Shop needs to pay 20% premium per swimsuit to cover additional expenses of the supplier.

**Q4.** What is the expected profit if the initial order quantity is the same as in Q3?

# Practice: Identify **Gain** and **Loss**

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- Recap: Kristen's boba shop
  - Every employee shortage leads to \$50 profit decline (Gain)
  - Every on-call employee needs additional pay of \$10 (Loss)
- Recap: Stinking Rose's parking space
  - The profit from one parking space is about \$10 per day (Gain)
  - The building cost of one parking space is about \$8 per day (Loss)

# Practice: Identify **Gain** and **Loss**

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- Joe's gift shop places orders for Christmas items during a trade show in July. One item to be ordered is a dated sterling silver tree ornament. The ornament will sell for \$80. The ornaments cost \$55 when ordered in July. Ornaments unsold by Christmas are marked down to half price and always sell during January.
- (Buy-back) Consider a simple example with a supplier and a retailer. The unit production cost is \$35, and the supplier's wholesale price to the retailer is \$80. The retailer selling price is \$125, while salvage price is \$20. Suppose the supplier offers to buy unsold units from the retailer at the price of \$65. But the retailer also needs to pay for \$10 shipping cost per unit.