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SMM641 REVENUE MANAGEMENT AND PRICING

Individual Problem Set 1

Q1:

a) 3592

b) 14 --- 4066.444 --- 13.21%

c) When the price for regular reservations increases to £220, both the FCFS revenue and the optimal expected revenue rise, showing a 13.21% improvement in the latter. This is expected, as higher prices typically enhance revenue potential without having to make changes in reservation strategies.

With the mean demand for early reservations rising to 35, FCFS revenue dropped. However, the optimal protection level increased, resulting in an expected revenue of £4,132.65 and a 15.14% improvement. This is expected, as higher demand requires the hotel to adjust its reservation strategy to maximize revenue from regular reservations.

This indicates that increasing prices can boost revenue, while rising demand requires changes in allocation decisions to maximize earnings.

Q2:

a) The first two numbers on the value function (50,50,100), represent the number of remaining seats for each flight. The first flight, Dublin-London, has 50 seats left. The second flight has another 50. 100, represents the current time period.

   Therefore, this value function represents the expected revenue that it can be achieved by optimally selling the remaining seats on both flights from period 100 until the end.

b) In the acceptance decision for product 2 capacity plays a key role, particularly at t=100. In the case where leg 1(Dublin-London) has high capacity and leg 2(London-Edinburgh) low, the airline may consider rejecting product 2, and reserving seats for those passengers that are flying from Dublin to Edinburgh. However, if both legs have a high capacity, it would be more likely that product 2 is accepted.

   When leg 2 starts reaching a high capacity, for the sake of not overbooking the plane and aiming to maximize revenue, the airline would be inclined to accept product 2. Further, this decision should also consider the arrival probabilities. Products 2 and 4 present the highest probabilities. Thus, if leg 1 still isn't very full, accepting product 4 over 2 could maximize overall revenue.

   Ultimately, the decision to accept product 2 should consider both demand and capacity. The strategy should be adjusted as capacity and demand vary over the selling horizon.

c) Firstly, the new product's arrival probability should be added to the "arrivalprob" vector. Then, in the price vector, the £200 premium fare should also be included. The next step would be initializing a new acceptance decision vector (accept5). A fifth loop should then be incorporated in the dynamic programming iteration. The fifth step would be modifying the value function to incorporate the product. Lastly, updating the acceptance logic so that the new product is included in the decision making process.

Q3:

A company specializes in study abroad programs for high school Spanish students, focusing on English language experiences in Ireland. They offer Summer Experiences and Year Abroad Programs.

The primary goal is to maximize revenue through diverse offerings while ensuring high student satisfaction.

Capacity of the program is 50.

Poisson distribution could be used to model expected inquiries and registrations, considering seasonal peaks. For instance, a few months before summer break people would be interested in the summer program.

Pricing Strategy:

- Early Bookings Discounts
- Offer different prices depending on the level of service (basic vs. premium)

Allocation Decisions:

- Reserve spots for early registrants to ensure availability.
- Optimize staff and activity resources based on demand forecasts.

We could also analyse what would happen if a Semester Abroad Program was also offered.