

DYNAMIC PRICING AT K-FASHION

MSBA7003



K-Fashion is a boutique store for women's fashion apparel located in a big shopping mall at the Causeway Bay. The store is targeting young female white-collar who care less about brand but more about fashion and price.

For the next three-month season, K-Fashion has ordered 200 different stock keeping units¹ (SKUs) from a foreign supplier. Due to the long production and order lead time, K-Fashion can place the order only once. Given the large store traffic at Causeway Bay, the store ordered 10 pieces for each SKU. To simplify the analysis, we can assume that the demand for each SKU is independent and statistically identical.

The challenge for K-Fashion is how to maximize the total revenue, given the fixed amount of inventory over the next three months or 12 weeks. Any unsold inventory after the twelfth week will be discarded with zero salvage value. Your job is to focus on the pricing of three SKUs—A,

¹ An SKU is defined by the style, color, and size of a product. For example, a blue, size-M shirt of a unique style.

B, and C, the sales of which are independent of other SKUs. You must set the same price for all the three SKUs as they differ only in color or size. The price can be adjusted every Monday. You must pick a price from the set: {999, 899, 799, 699, 599, 499, 399, 299, 199, 99}.

For simplicity, we can assume that each of the three SKUs has its own buyers and cannot substitute each other. Buyers for each SKU arrive randomly. According to past experience, you know that at most one buyer (i.e., 0 or 1) will show up during a day. If a buyer shows up, her valuation for the SKU will be random and in general the value decreases over time. For example, during the first week, the maximum price acceptable for a buyer may be \$1,000; but in the last week the maximum acceptable price may be only \$500. If a buyer shows up but finds that the price is higher than her valuation, then there is a chance that she will come back during the last (twelfth) week of the season with a new, random valuation.

Please collaborate with your teammates to find out a scientific way of setting the price of each week in order to maximize the total revenue. You can use Monte Carlo Tree Search or other methods. You are expected to use the simulated data set of buyer valuations for arrivals and returns. In the data set, a buyer with zero valuation means that the buyer does not show up on that day.

Your strategy will be tested in class on October 8. On that day, you will make decisions on the fly, and your performance (total revenue) will be compared against other teams. The team that achieves the highest total revenue will receive an award. The score of each team will be determined according to a comparison against the highest possible total revenue. The team that does not show up or participate in the competition will receive a score of zero.

Table: The Scoring Scheme

Your total revenue / The highest possible revenue	Your Score
0.8 or above	10/10
0.6 or above	9/10
0.4 or above	7/10
Below 0.4	4/10