Homework:

**Instructions:**

• Format: Times New Roman, 12pts, 1.5” space, 1” margin (all around), full justification.

• If you have to make an assumption [or various] to work a situation, explain them.

**Situations:**

1. José and María and run a small surf-board shop called "Z to A Surf-boards”, in Rincon. They must order surf-boards for the coming season. Orders for the surf-boards must be placed in quantities of twenty (20). The cost per surf-board is $70 if they order 20, $67 if they order 40, $65 if they order 60, and $64 if they order 80. The surf-boards will be sold for $100 each. Any surf-boards left over at the end of the season can be sold (for certain) at $45 each. If José and María run out of surf-boards during the season, then they will suffer a loss of "goodwill" among their customers. They estimate this goodwill loss to be $5 per customer who was unable to buy a surf-board. José and María estimate that the demand for surf-boards this season will be 10, 30, 50, or 70 surf-boards with probabilities of 0.2, 0.4, 0.3, and 0.1 respectively.

Explain how many surf-boards they should buy, based on the Expected Value Criterion, Minimax Criterion and the Maximax criterion. Which is more reliable and why?

2. A customer arrives at a service station each 2.31 minutes, according to an exponential distribution. There is one server who serves customers in an average time of 2 minutes according to an exponential distribution. The administration goal is to have a service level of 85%, which they translate that no more than five customers should be in the line. Are these goal expectations achievable?

3. Guava Inc. is manufacture touch screen computers, and is currently producing 380 per week. One component of each computer is a Gorilla Glass display (GGD), which the company purchases from Corning Inc. (CI) for $1.45 per display. Guava’s management wants to avoid any shortage of displays, since this would disrupt production, so CI guarantees a delivery time of 5 days on each order. The placement of each order is estimated to require 30 minutes of clerical time, with a direct cost of $18 per hour plus overhead costs of another $7 per hour. A rough estimate has been made that the annual cost of capital tied up in Guava’s inventory is 10 percent of the value (measured by

purchase cost) of the inventory. Other costs associated with storing and protecting the GCDs in inventory amount to 15 cents per GCD per year.

1. What should the order quantity and reorder point be for the displays? What is the corresponding total variable inventory cost per year (holding costs plus administrative costs for placing orders)?
2. Suppose the true annual cost of capital tied up in Guava’s inventory actually is 15 percent of the value of the inventory. Then, what should the order quantity be? What is the difference between this order quantity and the one obtained in part (a)? What would the total variable inventory cost per year (TVC) be? How much more would TVC be if the order quantity obtained in part (a) still were used here because of the incorrect estimate of the cost of capital tied up in inventory?

4. A restaurant has seven tables and only serves patrons with reservations. If more customers with reservations show up than the number of available tables, the restaurant incurs a cost of $145 associated with customer ill will and lost future business. Each empty table costs the restaurant $100 in lost profits. Historical records related to no shows indicate the following. What is the expected value of perfect information?

|  |  |
| --- | --- |
| Number of No Shows | **Probability** |
| 0 | .2 |
| 1 | .3 |
| 2 | .4 |
| 3 | .1 |

5. Logistics PR provides services to three types of markets: Low, Intermediate and High. Each category refers to a construct of several key variables that makes the market competitively desirable. During a given year, there is a 0.25 probability that a Low market will change to an Intermediate market and a 0.05 probability that Logistics PR will stop providing service to the market (is no longer competitive to develop the market.) Also, there is a 0.15 probability that an Intermediate market evolve to a High market and a 0.10 probability that Logistics PR will stop providing service to this market. There is a 0.05 probability that Logistics PR will stop providing service to a High market. For the time-frame of this study, once a market has reached a higher category, it won’t fall back to a lower category. What is the probability that Logistics PR will stop providing service to an Intermediate market before becoming a High market?

6. A hotel is considering changing its waiting line system. In the current system hotel guests divide themselves equally between the lines that form in front of 4 hotel clerks. The manager is considering having hotel guests wait in one line and then proceeding to the next available clerk. If average service time is 10 minutes and the average number of arrivals per hour is 12 guests, explain which system results in the lowest customer waiting time.

7. The JUPR sells Flat-TVs which it orders from a company in Japan. Because the time it takes to receive and order, JUPR places an order every time the present stock drops to 300 Flat-TVs. It costs $50 to place an order. It costs $40 to keep each TV stored in JUPR’s warehouse. If a customer cannot purchase a Flat-TV when it is requested, the customer will not wait until the next shipment, but will go to a competitor. The following probability distribution for demand for HDTVs has been determined.

|  |  |
| --- | --- |
| Demand per Months (x100) | Probability |
| 1 | .12 |
| 2.5 | .25 |
| 3 | .40 |
| 4.5 | .15 |
| 5 | .02 |
| 5.5 | .06 |
| The time required to receive an order once it is placed has the following probability distribution. |  |

|  |  |
| --- | --- |
| Time to Receive and Order (weeks) | Probability |
| 2 | .45 |
| 3 | .25 |
| 4 | .15 |
| 5 | .10 |
| 6 | .05 |

JUPR presently has 250 HDTVs in stock. Orders are always received at the beginning of the week. Simulate JUPR Warehouse’s ordering and sales policy for 25 months.

a. What is the estimates average monthly cost (show your data or calculations).

b. If the company that supplies the company stated that it has a service level of 85%, based on the Time to Deliver an order (which is 70% of the “Time to Receive and Order” of the customer, what can you conclude about the company’s statement?

8. The JOR Company has a distribution division that delivers products direct to regional customers. The company is analyzing to upgrade their truck fleet by next year. A survey conducted on Customer satisfaction based on Delivery speed concluded the following results. JOR is considering to buy one of two model of trucks: Model A or Model B. The latter (Model B) cost 1.5 times the cost of the first (Model A), but delivers products in 2.6 days. Model A delivers products in 3.9 days. The decision will be made using the ratio of Customer satisfaction/delivery speed. Explain what kind of truck JOR should purchase.

|  |  |
| --- | --- |
| Delivery Speed  (Days) | Customer Satisfaction  (Scale 0-6) |
| 4.1 | 0.6 |
| 1.8 | 3 |
| 3.4 | 5.2 |
| 2.7 | 1 |
| 6 | 0.9 |
| 1.9 | 3.3 |
| 4.6 | 2.4 |
| 1.3 | 4.2 |
| 5.5 | 1.6 |
| 4 | 3.5 |
| 2.4 | 1.6 |
| 3.9 | 2.2 |
| 2.8 | 1.4 |
| 3.7 | 1.5 |
| 4.7 | 1.3 |
| 3.4 | 2 |
| 3.2 | 4.1 |
| 4.9 | 1.8 |
| 5.3 | 1.4 |
| 4.7 | 1.3 |
| 3.3 | 0.9 |
| 3.4 | 0.4 |
| 3 | 4 |
| 2.4 | 1.5 |
| 5.1 | 1.4 |
| 4.6 | 2.1 |
| 2.4 | 1.5 |
| 5.2 | 1.3 |
| 3.5 | 2.8 |