

Computer Laboratory Session 7

Aim

Management decisions to resolve Waiting Line issues

Objectives

1. To increase efficiency and productivity of a business
2. To develop and create procedures that offer a competitive advantage
3. To create solution models

Challenge – Waiting Line issues in business

The company Fastshop wants to find out how much it loses due to waiting times. Fastshop wants two alternatives tested to reduce the waiting time.

- 1) Addition of another employee to pack up purchases
- 2) Addition of another checkout counter

Your observations showed that 24 customers per hour arrive at the checkout counter on average. You have also seen that it takes 2 minutes on average to serve a customer. You have estimated that each “avoided” minute of waiting saves Fastshop £75 per week. The service rate increases to 40 customers per hour, when someone helps packing. The costs for this additional employee are £150 per week. A new till will cost £6,000 and the employee operating it will cost £200 per week.

Hint: M/M/1 queueing model: $W = \frac{1}{\mu - \lambda}$, $W_q = \frac{\lambda}{\mu(\mu - \lambda)}$, $W_s = W - W_q$, $L_q = \lambda W_q$, $L = \lambda W$, $L_s = L - L_q$

Tasks

1. Determine Operating characteristics of As-Is situation
 - a. Arrival rate, service rate, utilisation, idle percentage
 - b. Customer numbers: in queue, in service and in system
 - c. Times: waiting time, service time, system time
 - d. Costs for waiting
2. Determine savings through addition of another employee
 - a. Compute operating characteristics and costs of waiting
 - b. Determine savings because of reduced waiting (despite costs of additional employee)
3. Add another till (assume “independent” queues)
 - a. Compute operating characteristics and costs of waiting
 - b. Determine savings (ignoring fixed costs)
 - c. How many weeks will it take until the investment pays off
4. What is your advice to the Fastshop management

