

Given that functional description of the processes at Automata's purchasing department, do the following:

- a. Identify all of the main entities.
  - b. Identify all of the relations and connectivities among entities.
  - c. Identify the type of existence dependence in all the relationships.
  - d. Give at least two examples of the types of reports that can be obtained from the database.
7. United Helpers is a nonprofit organization that provides aid to people after natural disasters. Based on the following brief description of operations, create the appropriate fully labeled Crow's Foot ERD.
- Volunteers carry out the tasks of the organization. The name, address, and telephone number are tracked for each volunteer. Each volunteer may be assigned to several tasks, and some tasks require many volunteers. A volunteer might be in the system without having been assigned a task yet. It is possible to have tasks that no one has been assigned. When a volunteer is assigned to a task, the system should track the start time and end time of that assignment.
  - Each task has a task code, task description, task type, and task status. For example, there may be a task with task code "101," a description of "answer the telephone," a type of "recurring," and a status of "ongoing." Another task might have a code of "102," a description of "prepare 5,000 packages of basic medical supplies," a type of "packing," and a status of "open."
  - For all tasks of type "packing," there is a packing list that specifies the contents of the packages. There are many packing lists to produce different packages, such as basic medical packages, child-care packages, and food packages. Each packing list has an ID number, a packing list name, and a packing list description, which describes the items that should make up the package. Every packing task is associated with only one packing list. A packing list may not be associated with any tasks, or it may be associated with many tasks. Tasks that are not packing tasks are not associated with any packing list.
  - Packing tasks result in the creation of packages. Each individual package of supplies produced by the organization is tracked, and each package is assigned an ID number. The date the package was created and its total weight are recorded. A given package is associated with only one task. Some tasks (such as "answer the phones") will not produce any packages, while other tasks (such as "prepare 5,000 packages of basic medical supplies") will be associated with many packages.
  - The packing list describes the *ideal* contents of each package, but it is not always possible to include the ideal number of each item. Therefore, the actual items included in each package should be tracked. A package can contain many different items, and a given item can be used in many different packages.
  - Each item that the organization provides has an item ID number, item description, item value, and item quantity on hand stored in the system. Along with tracking the actual items that are placed in each package, the quantity of each item placed in the package must be tracked as well. For example, a packing list may state that basic medical packages should include 100 bandages, 4 bottles of iodine, and 4 bottles of hydrogen peroxide. However, because of the limited supply of items, a given package may include only 10 bandages, 1 bottle of iodine, and no hydrogen peroxide. The fact that the package includes bandages and iodine needs to be recorded along with the quantity of each item included. It is possible

for the organization to have items that have not been included in any package yet, but every package will contain at least one item.

8. Using the Crow's Foot notation, create an ERD that can be implemented for a medical clinic using the following business rules:
  - A patient can make many appointments with one or more doctors in the clinic, and a doctor can accept appointments with many patients. However, each appointment is made with only one doctor and one patient.
  - Emergency cases do not require an appointment. However, for appointment management purposes, an emergency is entered in the appointment book as “unscheduled.”
  - If kept, an appointment yields a visit with the doctor specified in the appointment. The visit yields a diagnosis and, when appropriate, treatment.
  - With each visit, the patient's records are updated to provide a medical history.
  - Each patient visit creates a bill. Each patient visit is billed by one doctor, and each doctor can bill many patients.
  - Each bill must be paid. However, a bill may be paid in many installments, and a payment may cover more than one bill.
  - A patient may pay the bill directly, or the bill may be the basis for a claim submitted to an insurance company.
  - If the bill is paid by an insurance company, the deductible is submitted to the patient for payment.
9. Create a Crow's Foot notation ERD to support the following business operations:
  - A friend of yours has opened Professional Electronics and Repairs (PEAR) to repair smartphones, laptops, tablets, and MP3 players. She wants you to create a database to help her run her business.
  - When a customer brings a device to PEAR for repair, data must be recorded about the customer, the device, and the repair. The customer's name, address, and a contact phone number must be recorded (if the customer has used the shop before, the information already in the system for the customer is verified as being current). For the device to be repaired, the type of device, model, and serial number are recorded (or verified if the device is already in the system). Only customers who have brought devices into PEAR for repair will be included in this system.
  - Since a customer might sell an older device to someone else who then brings the device to PEAR for repair, it is possible for a device to be brought in for repair by more than one customer. However, each repair is associated with only one customer. When a customer brings in a device to be fixed, it is referred to as a repair request, or just “repair,” for short. Each repair request is given a reference number, which is recorded in the system along with the date of the request, and a description of the problem(s) that the customer wants fixed. It is possible for a device to be brought to the shop for repair many different times, and only devices that are brought in for repair are recorded in the system. Each repair request is for the repair of one and only one device. If a customer needs multiple devices fixed, then each device will require its own repair request.
  - There are a limited number of repair services that PEAR can perform. For each repair service, there is a service ID number, description, and charge. “Charge” is how much the customer is charged for the shop to perform the service, including