



TOPICS:
Instructions:

Allowed Time: 120 minutes
Total Marks: 70

ERD

Task 1

Marks[20]

Use the following business rules to create a ERD. Write all appropriate connectivities and cardinalities in the ERD.

- A department employs many employees, but each employee is employed by only one department.
 - Some employees, known as “rovers,” are not assigned to any department.
 - A division operates many departments, but each department is operated by only one division.
 - An employee may be assigned many projects, and a project may have many employees assigned to it.
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- A project must have at least one employee assigned to it.
 - One of the employees manages each department, and each department is managed by only one employee.
 - One of the employees runs each division, and each division is run by only one employee.

Task 2

Marks[50]

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 labelled 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.