Information School
UNIVERSITY of WASHINGTON

INFO 330: DATABASE SYSTEMS AND DATA MODELING

Alternative Assignment 1 Due Saturday, Oct 14 (by end of Day)

Marks: 50

Background

I had stated before that it is sad to see the homeless in encampments on the outskirts of the university. It is a complex problem which seems to be getting worse over time. To address this, there are several stakeholders trying to offer help, such as homeless shelters, soup kitchens, individuals providing donations and volunteering their time (e.g., to work at soup kitchens), and others such as Department of Human Services, and nonprofit organizations, such as Seattle Homeless Outreach.

Given the complexity of the problem, we can design a database that focuses on a specific component of this problem, for example (i) homeless shelters database (helps to assess capacity), (ii) donor database – track donations and individuals providing donations of various types, (iii) nonprofit organizations focused on the issue, and (iv) volunteers' database to track people volunteering their time/skills.

For the assignment, we are going to focus on volunteer-related database design.

Assignment Description and Business Rules

A nonprofit organization in King County provides services to the homeless. The organization relies on volunteers to help it carry out some of its operations. A brief description of what the volunteers may assist with is provided below:

- Individuals volunteer their time to carry out the tasks of the organization. For each volunteer, their name, address, and telephone number are tracked. Each volunteer may be assigned several tasks during the time that they are doing volunteer work, and some tasks require many volunteers. It is possible for a volunteer to 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.
- For each task, there is a task code, task description, task type, and task status. For example, there may be a task with task code "101," description of "answer the telephone," a type of "recurring," and a status of "ongoing." There could be another task with a code of "102," description of "prepare 5000 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 different packing lists to produce different packages, such as basic medical packages, childcare packages, food packages, etc. Each packing list has a

packing list ID number, packing list name, and a packing list description, which describes the items that ideally go into making that type of package. Every packing task is associated with only one packing list. A packing list may not be associated with any tasks or 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 that is produced by the organization is tracked. Each package is assigned an ID number. The date the package was created, and the total weight of the package is recorded. A given package is associated with only one task. Some tasks (e.g., "answer the phones") will not have produced any packages, while other tasks (e.g., "prepare 5000 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.
- For each item that the organization provides, there is 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 too. 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 this package includes bandages and iodine needs to be recorded along with the quantity of each that is included. It is possible for the organization to have items donated that have not been included in any package yet, but every package will contain at least one item.

What you should do

Based on the above description:

- Draw a logical E-R diagram for the data model (note: a logical E-R diagram has all the many-to-many relationships resolved, has all the necessary attributes, and has all the primary keys and foreign keys identified). **Write your name at the top of the ERD.**
- Write down the relational schema for each relation (please write the relational schema below the ER diagram in the same file).

What to submit/upload to Canvas

- A pdf file (make sure that you have included your name as instructed).
- **Note**: To save your diagram as a PDF document, click on **File** menu in Draw.io (app-diagrams.net) E-R diagrams tools, then select "Export AS PDF".